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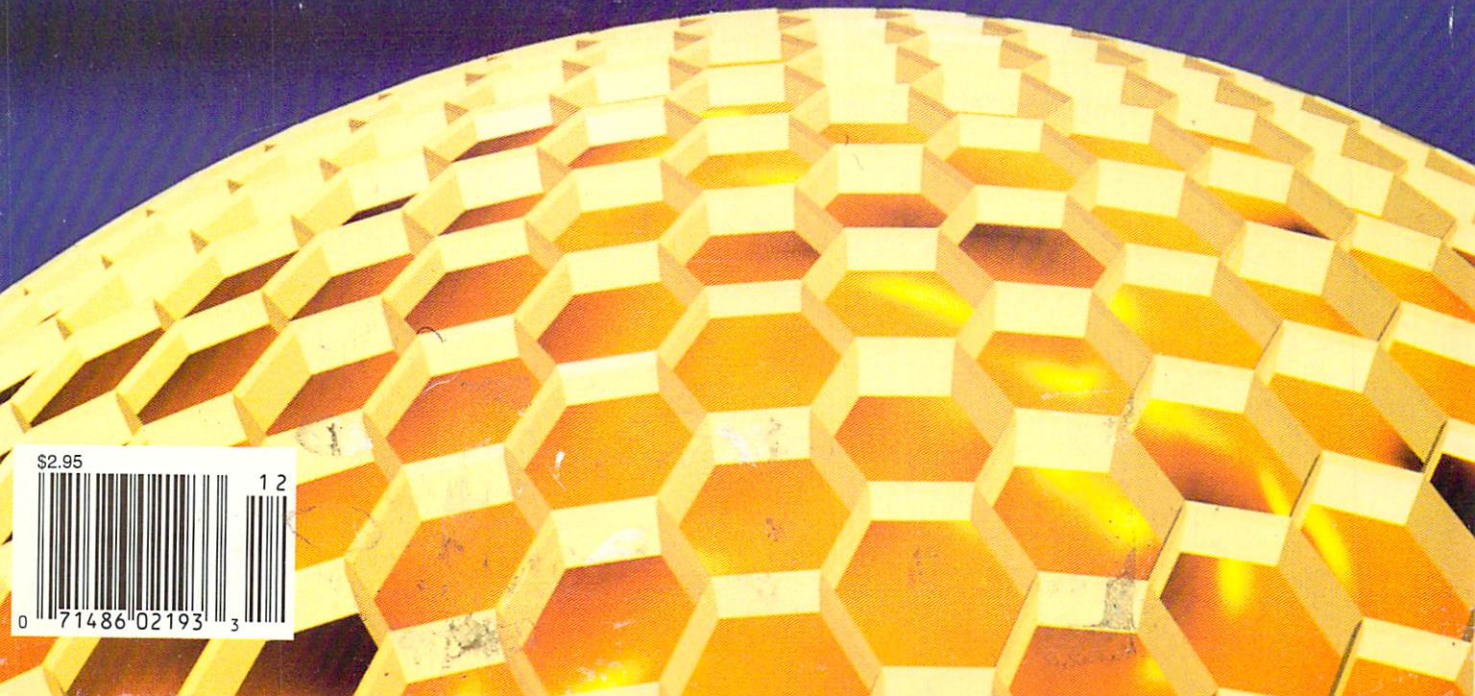

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For a while there, it was beginning to look like there would never be a dot matrix printer versatile enough to be a real jack-of-all-trades. But no more. Now, for the first time ever, there's a new series of printers designed to bring you big-business performance at a small-business price.

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DESKTOP NEWS

VOLUME 2 — *What's coming... What's going* — No. 2

Network Television

MAGAZINES

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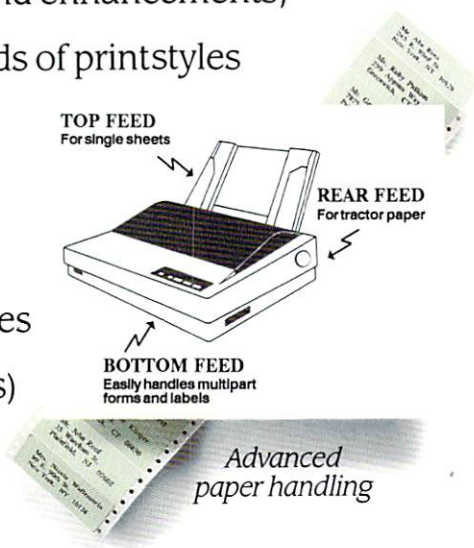
Advanced paper handling features (which are optional on most printers)



Advanced paper handling

are standard with Star. The switchable push/pull tractor makes changing paper paths a snap—a feature that's especially handy when you're printing a lot of hard-to-manage forms. Plus, convenient paper parking lets you feed single sheets through at the touch of a button—without removing or wasting continuous-feed paper.

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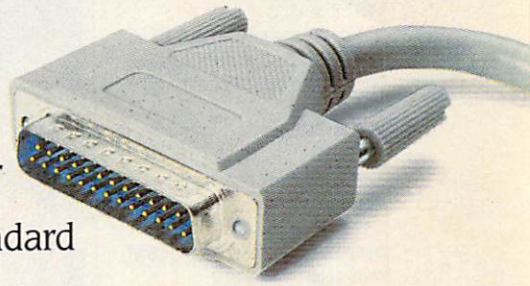
NX printer control panels are designed for the ultimate in user-friendliness. You can easily select up to 14 of the most commonly used functions. And an Electronic Dip Switch Mode lets you customize the control panel with up to 15 of your own power-on settings.



Compatibility

Star's NX printers are Epson and IBM* compatible for use with most off-the-shelf software packages. Their standard parallel centronics interface with optional serial-to-parallel converter makes them simple to use with most personal computers. All are capable of high-speed, bi-directional printing at extremely low noise levels. And the two *RAINBOW* models—the NX-1020 and NX-2420—even offer printing in seven vibrant colors.

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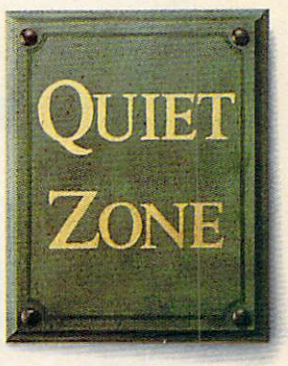

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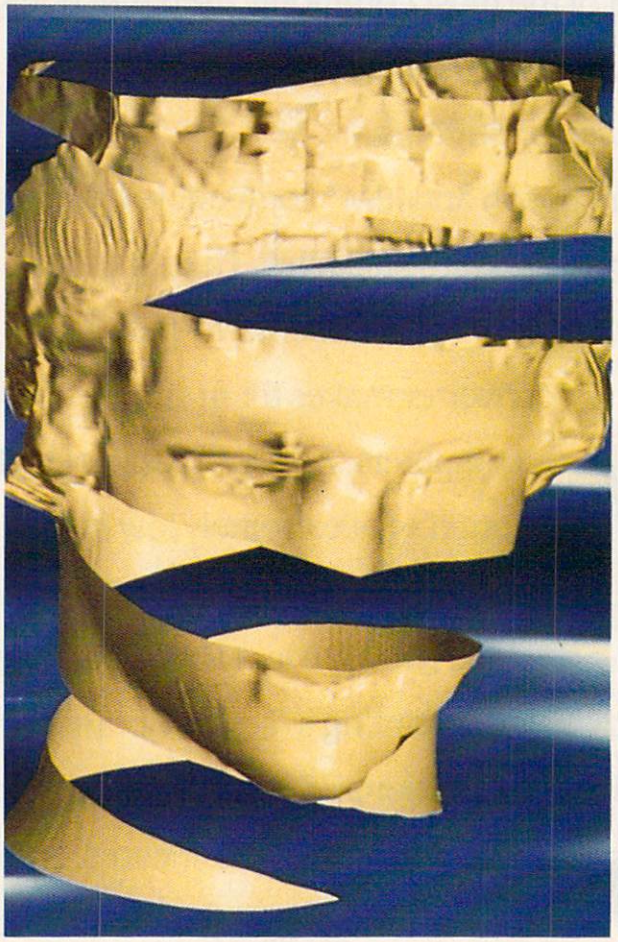

ON THE COVER

David Leich created *Toshiba Greek Unraveling* featured on our cover. He used proprietary software called *Visions* to generate polygonal computer graphics with image mapping on a Harris 800 computer.

COMPUTE **Your Complete Home Computer Resource** (ISSN 0194-357X) is published monthly in the United States and Canada by COMPUTE Publications International Ltd., 1965 Broadway, New York, NY 10023-5965. Volume 12, Number 9, Issue 124.

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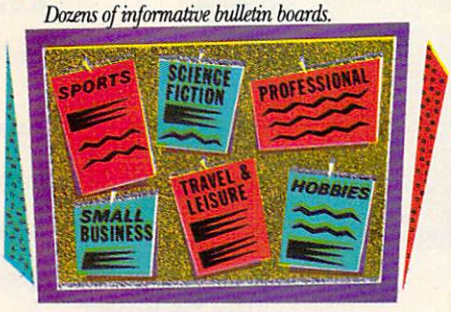

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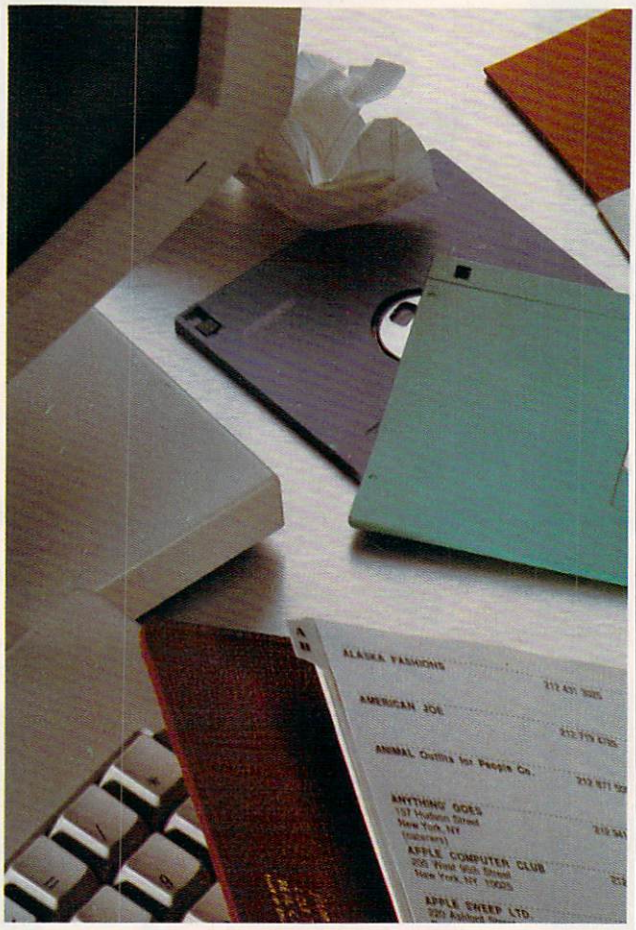

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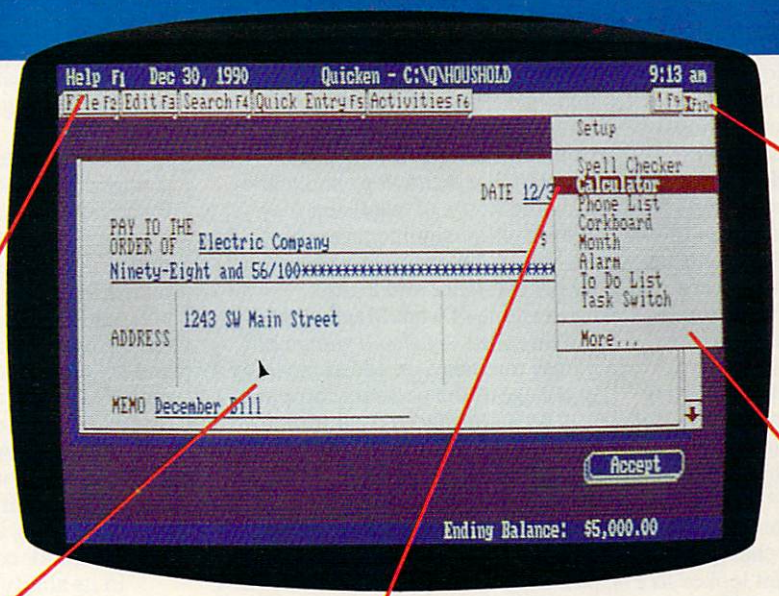

You'll love the user-friendly look and feel of DeskMate as it guides you comfortably through your tasks. DeskMate provides a similar "environment" for different applications, so it's easy to move from one program to another.

If you need help, DeskMate has easy on-screen instructions—and on most programs, help pertains specifically to where you are within the program!

To move around in DeskMate, all you have to do is "roll" the mouse to point to one of the choices on your screen, "click"—and you're there!

A variety of convenient accessories come with DeskMate productivity software—and most are available for use while using any DeskMate application. There's a handy phone list, a calendar, a calculator, a corkboard for daily reminders, a clipboard to hold imported text or graphics, and more.

DeskMate uses handy pull-down menus—similar from program to program—to present your options clearly. Select a menu from an ever-present "menu bar" at the top of the screen. Use your mouse or the keyboard to highlight your choice.

Handy pop-up dialog boxes present your options in simple, plain English. So you don't have to figure out confusing computer syntax just to get started.

Unlike other graphical user interfaces, DeskMate requires only a minimum of RAM—and can even be used on 8086-based PC compatibles!

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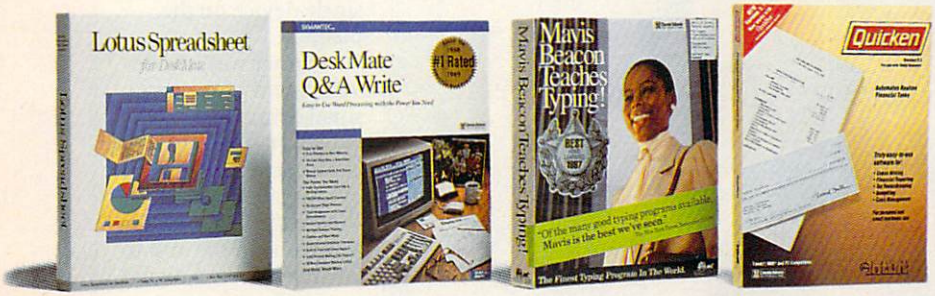

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PETER SCISCO

Except for the invention of movable type and the printing presses that it spawned, no medium has had as dramatic an effect on popular culture as the television. From its humble start half a century ago to the sophisticated array of images it presents today, television's impact has been felt by almost every civilization worldwide. More and more, our collective memory is shaped by television images.

What I remember about growing up with television: The orange glow of vacuum tubes. The mysterious white dot that lingered when the set was switched off. My family's first color set, into the house far after most of the neighbors had made the change. A set of rabbit-ear antennas that looked like a prop from a B-grade sci-fi flick and did nothing for reception. Only two channels, the local NBC and CBS affiliates.

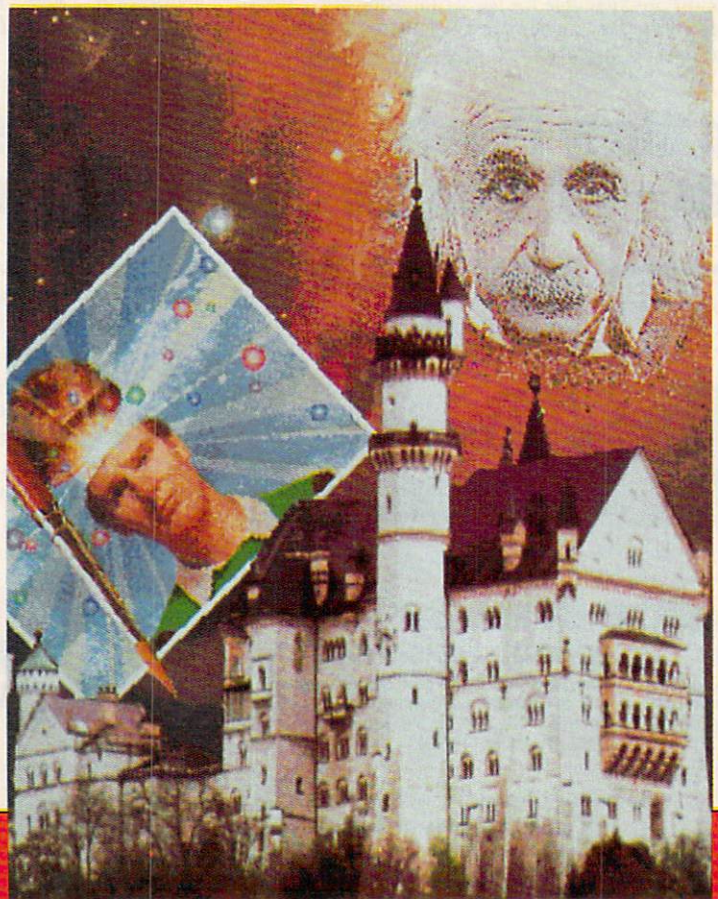
Though it should've been a wonder, and I suppose it was to my parents and grandparents, the TV quickly became just another thing that had always been there, no stranger than the radio or the phonograph. Television in the sixties, fueled by millions of baby-boomer eyes, framed the cusp of a new American culture, one set apart from previous generations by its reliance on the moving image as an essential, if not primary, communications medium.

Almost since its inception, TV has been reviled as an enemy to literacy and critical thinking, a vulgar device of endless chatter and images, bubble gum for the eyes. Looking at television's emphasis on entertainment (even in its presentation of the "news"), it's difficult to argue against that view. But with the advent of personal computers and the inventive fusion that's already taking place between that technology and television, the future of television may yet dismiss those arguments as shortsighted. Television provides a commonality of experience and is the cornerstone of what Marshall McLuhan called the *global village*, a phrase that takes on added meaning in the age of the personal computer.

As a multifaceted communications device, TV has surpassed all but the most outlandish predictions. And even those predictions considered too far out (or bad financial risks, like videotex) may eventually come to pass as technologies such as HDTV and fiber optics become commonplace. Even so, TV remains the Rodney Dangerfield of communications, a technological marvel taken for granted and given no respect. No one calls the TV the *visually enhanced audio information unit;* everyone calls it the *tube.*

Computer technology may change all of that. Televisions have for some time now embraced silicon-based circuitry at the expense of tubes, solder, and wire. The line that separates a television from a computer is blurring. Entertainment centers across the country bristle with TVs that look and act more like computer monitors than traditional television sets. Hardwired and cable-ready, the latest generation of sets represents the first step in digital-information delivery for all consumers. That delivery, from a variety of sources, is the next logical step for TV and for consumer computing.

In its ability to process information, the home computer exceeds the capability of the most advanced television. Television, by comparison, excels in its ability to disseminate information. It can be argued which capability is the more powerful—the one that promotes an individual's access to and mastery of information or the one that carries a message to more people faster and with more impact than any other single device on the planet.



Either way, the development of the personal computer and the evolution of the TV are proceeding along paths of ultimate intersection. Where they will meet, sometime in the mid to late nineties, is a digital world of customized information delivery and manipulation. Smart TVs, customized news services, personalized entertainment venues—all coming through your door by wire. Information for the video age. ⊡

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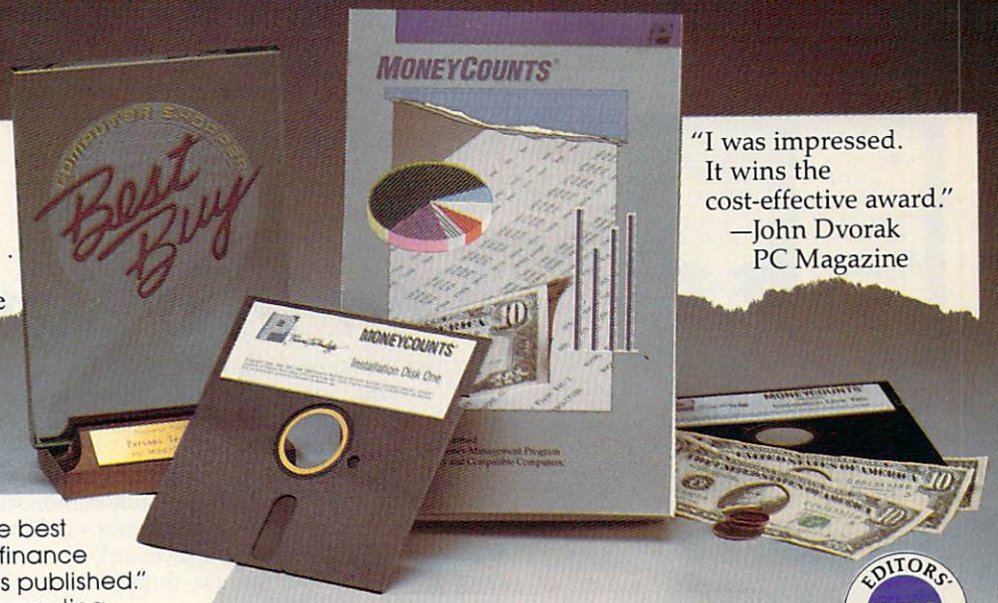

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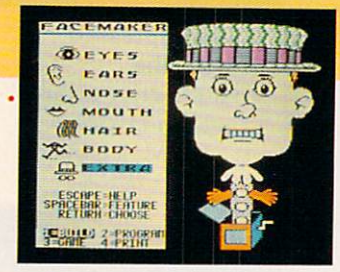
NEWS & NOTES



Spinnaker Spins Off Titles

Spinnaker, the company responsible for such hit educational titles over the years as *FaceMaker*, *SnooperTroops*, and *KidWriter*, has decided to concentrate its efforts on productivity software. The company sold its Spinnaker and Springboard educational software lines to Queue, a Fairfield, Connecticut, software company.

Queue will continue to sell all of the Spinnaker and Springboard educational products, said Jonathan Kantrowitz, CEO of Queue. In addition, it will bring back some products that Spinnaker was no longer marketing and revise some of the older titles. Spinnaker, which began as an educational software company in 1982, sold off the titles so that it could concentrate on its BetterWorking productivity series and *Plus* hypermedia program.

—DENNY ATKIN

What Next—A Papal BBS?

Has the world got you down? Don't give up hope; call the Pope on the Popeline, a new 900 number run by Sprint USA. It features Pope John Paul II's daily message and costs $2.00 for the first minute and $0.95 for each additional minute. The Pope records his own messages. Call (900) 230-POPE.

—DAVID ENGLISH

New Mac Attack

Seeing an "at-home computer" market rather than a "home computer" market, Apple Computer unveiled in October a new line of lower-priced Macintosh computers, but it didn't announce the long-rumored $1,600 color Mac.

Three new Macintosh models were introduced. The Mac Classic has the familiar upright look and built-in monochrome monitor of the SE and Plus models. The Classic comes with 2 megabytes of RAM, a 40-megabyte hard disk, and a keyboard; it carries a suggested retail price of about $1,500. A single–floppy disk configuration is available for around $1,000.

The Macintosh LC (for Low-cost Color) is modular, with a separate monitor and CPU. The CPU unit itself is the sleekest of all Macs, with a small footprint and thin case. Aimed at the business, education, and at-home markets, the LC with 2 megabytes of RAM, a 40-megabyte hard disk, a 12-inch RGB color monitor, and a keyboard should have a suggested retail price of about $3,000.

The upper tier of the market was addressed by the Macintosh IIsi, another modular Mac. Configured with 2 megabytes of RAM, a 40-megabyte hard disk, a 13-inch high-resolution color monitor, and a keyboard, the Mac IIsi (for Simply Irresistible) was expected to carry a suggested retail price of around $4,600.

Both the Mac Classic and Mac IIsi were to be available on the October 15 announcement date. The LC was, at press time, to be announced in October, but it may not be available until early 1991.

The decision to equip all configurations of the new Macs with at least two megabytes of RAM means that the computers are ready for System 7.0, the latest and much-delayed update of the Macintosh operating system software. System 7.0 is expected to be released early in 1991.

Both the LC and IIsi come with a microphone, allowing for sound input as well as output. For the education market, an Apple IIe emulation board for the LC was announced, but it wasn't expected to be ready before the spring of 1991; the board should retail for under $200.

While the new Macintoshes don't directly address the home consumer, at least not with color, as had been widely expected, the machines do represent a substantial shift in Apple's pricing strategy. The LC fills a gap in the modular Macintosh line, providing for the first time a relatively low-cost color-Macintosh capability. Street prices for the new machines should be substantially lower than suggested retail pricing.

Apple representatives declined to comment on the recent reinvigoration of the home computer by IBM, Tandy, and others. Computers in the home, according to company spokespersons, are extensions of those in the office or the classroom rather than being true home information appliances. In other words, if you're not using a computer for work or school, you may not have much need for one at home.

Apple representatives also noted that the company's Apple II and IIGS lines would continue to be supported.

—KEITH FERRELL

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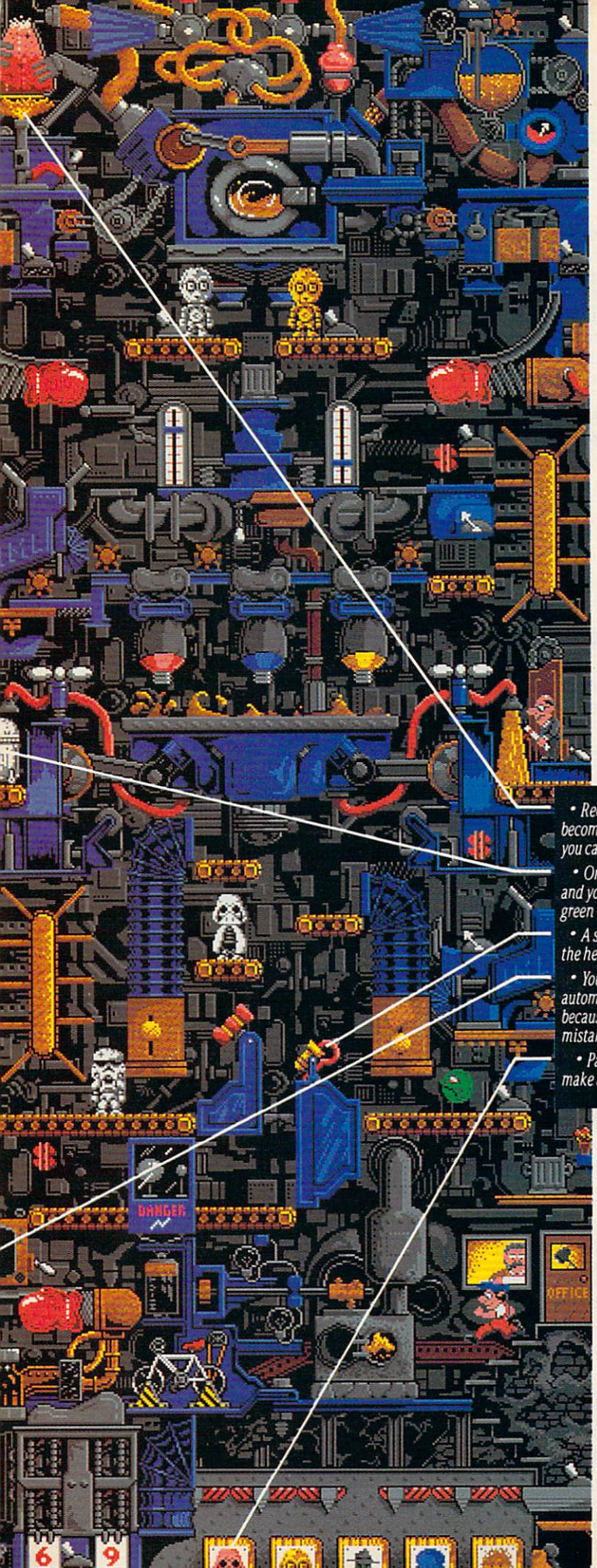

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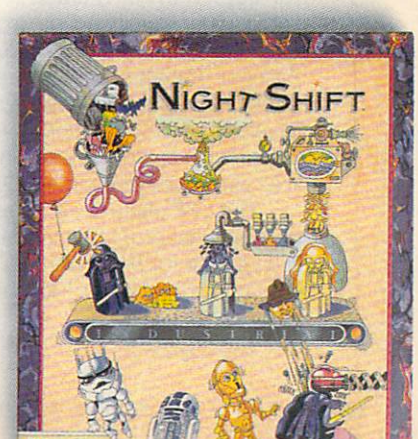

Night Shift is available for IBM and 100% compatibles, Amiga, Commodore 64/128, and Atari ST personal computers. Visit your retailer or order directly with Visa/MC by calling 1-800-STARWARS (in Canada 1-800-828-7927). ™ and © 1990 LucasArts Entertainment Company. Darth Vader and Indiana Jones are trademarks of Lucasfilm Ltd. All rights reserved. IBM is a trademark of International Business Machines, Inc. Amiga is a trademark of Commodore-Amiga, Inc. Commodore 64 and 128 are trademarks of Commodore Electronics, Inc. Atari and ST are trademarks of Atari Corp.

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Supercomputer Medicine

Eli Lilly, the fourth largest U.S. pharmaceutical firm, has added a Cray-2 supercomputer to the arsenal of tools it's applying to the development of new drugs.

Because pharmaceutical research rests upon complex molecular modeling—remember those colored Ping-Pong balls and straws from high school chemistry?—the arrival of the supercomputer is expected to speed up the research process. The Cray-2 enables researchers to "build" proteins and enzymes, depict them on monitors, and simulate their interaction with experimental pharmaceutical compounds. Using the computer, scientists can rotate, assemble, disassemble, and view chemical structures in a fraction of the time previously required.

Lilly scientists and researchers have undertaken training in supercomputer operation and are applying the Cray-2 to the search for cures or treatments for AIDS, Alzheimer's disease, and other currently intractable medical challenges.

—KEITH FERRELL

Software Justice League of America

The computer software industry is increasingly litigious, and programmers are banding together to protect their ability to create new software without fear of being sued.

The League for Programming Freedom (LPF) was founded to oppose look-and-feel lawsuits, software patents, and other monopolistic computer industry practices. Richard Stallman, president of the organization, is best known as the founder of the Free Software Foundation, a group that has, among other things, worked to create a freely distributable UNIX clone called *GNU*.

The LPF points to the Lotus Development suit against Paperback Software, where Paperback was found guilty of infringing on Lotus's copyrights because its spreadsheet obeyed the keystroke commands used in *Lotus 1-2-3* and had a similar user interface. The LPF's position paper opposing the look-and-feel copyrights compares this suit to a company filing a user-interface copyright on the steering wheel.

"During the span of the copyright, we would have gotten cars steered with joysticks, cars steered with levers, and cars steered with pedals. Each car user would have to choose a brand of car to learn to drive, and it would not be easy to switch," the paper states.

LPF members are also concerned about software patents. The U.S. Patent Office has issued patents on techniques the organization calls obvious, such as using an exclusive OR (XOR) to display a cursor (a technique used by most computers) or the technique of storing an obscured part of an onscreen window in memory so it can be redrawn quickly when the obscuring window disappears.

More than 2000 software patents have already been granted, the LPF says, with 700 granted in 1990 alone. The organization worries that if obvious or easily derived programming techniques are patented, the sheer number of patents will keep small companies out of the software business. Patent search fees and licensing costs make software development prohibitively expensive. New York–based REFAC Technology Development, for example, owner of the patent rights for the natural-order recalc technique used in spreadsheets, is demanding 5 percent of all earnings from spreadsheet sales.

The LPF plans to serve as an information resource and to actively lobby against programming restrictions. For more information, contact The League for Programming Freedom, 1 Kendall Square #143, P.O. Box 9171, Cambridge, Massachusetts 02139, or call (617) 243-4091.

—DENNY ATKIN

THE EYES HAVE IT

Computer users can dramatically reduce eyestrain by using indirect lighting, according to a new study from Cornell University.

The study compared conventional computer-area overhead fluorescent lighting with indirect, bounced fluorescent lighting. Workers who used conventional overhead lighting had 25 percent more complaints of eyestrain.

The study found 71 percent of those using the indirect lighting and 74 percent of those using conventional lighting preferred the indirect lighting. The most popular form of lighting consisted of lensed indirect fluorescent lights that focused light toward the ceiling.

—DAVID ENGLISH

Rejected Suitor

The signs read "Drop the Suit, We Have You Surrounded" and "Can Las Vegas Sue Atlantic City?" as about 320 marchers protested Lotus Development's recent bout of lawsuits protecting the look and feel of *1-2-3*. The August 2 rally at Lotus's Cambridge, Massachusetts, office was organized by the League for Programming Freedom (LPF). The LPF believes user interfaces shouldn't be copyrighted.

Highlights of the demonstration included the protesters' hex chant: "1-2-3-4, kick that lawsuit out the door; 5-6-7-8, innovate—don't litigate; 9-A-B-C, interfaces should be free; D-E-F-0, look-and-feel has got to go."

—DAVID ENGLISH ⊡

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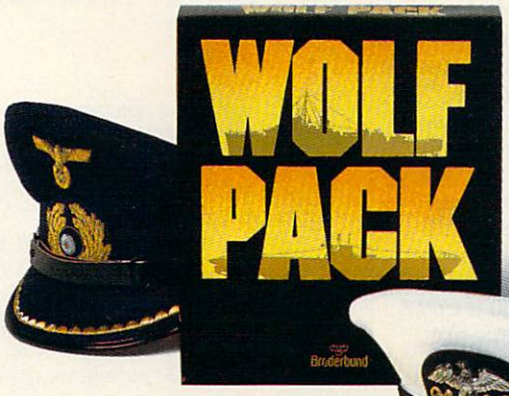

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LETTERS

Addams Admired

I am in the process of upgrading from a Commodore 64 to an IBM clone. Since I became interested in the PC world, I began to read your magazine and have recently bought a subscription. Let me tell you, I think your magazine is great. It has the right balance between business and entertainment software, and I love it.

I have one suggestion, though. I used to subscribe to *Commodore Magazine* before it was sold to *Run.* Since I have switched to *COMPUTE,* I only miss one thing from *Commodore Magazine.* It is a monthly column that Shay Addams wrote, which was dedicated totally to adventure (RPG) games. Mr. Addams would have reviews and hints and would keep us posted on the newest games. I really think it would be great if *COMPUTE* could adopt something like this, and I think other adventurers would, too.

JOSHUA EUDY
STATESVILLE, NC

Good news, Joshua. COMPUTE *readers whose edition includes the Amiga Resource section will be able to enjoy Shay Addams's ideas on a regular basis. His column is called "Just for Fun." For the rest of our subscribers, Nebula and Hugo award winner Orson Scott Card continues his meditations on computer games every month in "GamePlay."*

October Issues

I just got your October magazine, and it is GREAT! I love the new setup and the way you split up the information into different sections.

I subscribed in June and got my first magazine on September 14, and the subscription is due to expire next June, which is obviously not the full 12 months. Will I get all 12 issues?

Also, do you have a special *COMPUTE* edition for just IBM owners? That's the part I read and focus on.

One suggestion I have is to make the *SharePak* and the On Disk available for Amiga, Commodore, and Macintosh users.

I would like to mention that I thought "How to Get Started with Programming" was an excellent idea for anybody who might like to learn a little bit more about different programming, and it may even get some people interested in it. I also think that the "Feedback" column is very helpful.

STEVE RISH
INDIANAPOLIS, IN

Thanks for your encouraging response to the October issue. We're glad your like the new format, and we appreciate readers' comments and suggestions.

Rest assured that you will get all of your subscription, which begins with the October issue and will run for 12 months. During the transition from our previous owner to our new corporate parent, we took a brief hiatus.

We do print a special edition just for MS-DOS computer owners. If you would like to change the edition to which you subscribe, just let us know when your subscription comes due for renewal. In the meantime, enjoy the added home computer knowledge you'll be getting in the Amiga Resource and Gazette sections.

Your suggestion about disk products for each of the sections is a good one; however, the only disk product we lack now is one for the Macintosh. Let's hear from all you Macintosh owners—would you like a SharePak *disk for your Apple?*

Do you have questions or comments? Send your letter—with your name, address, and daytime telephone number—to COMPUTE Feedback, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We regret that, due to the volume of mail received, we cannot respond individually to questions. We reserve the right to edit letters for clarity and length. ⊡

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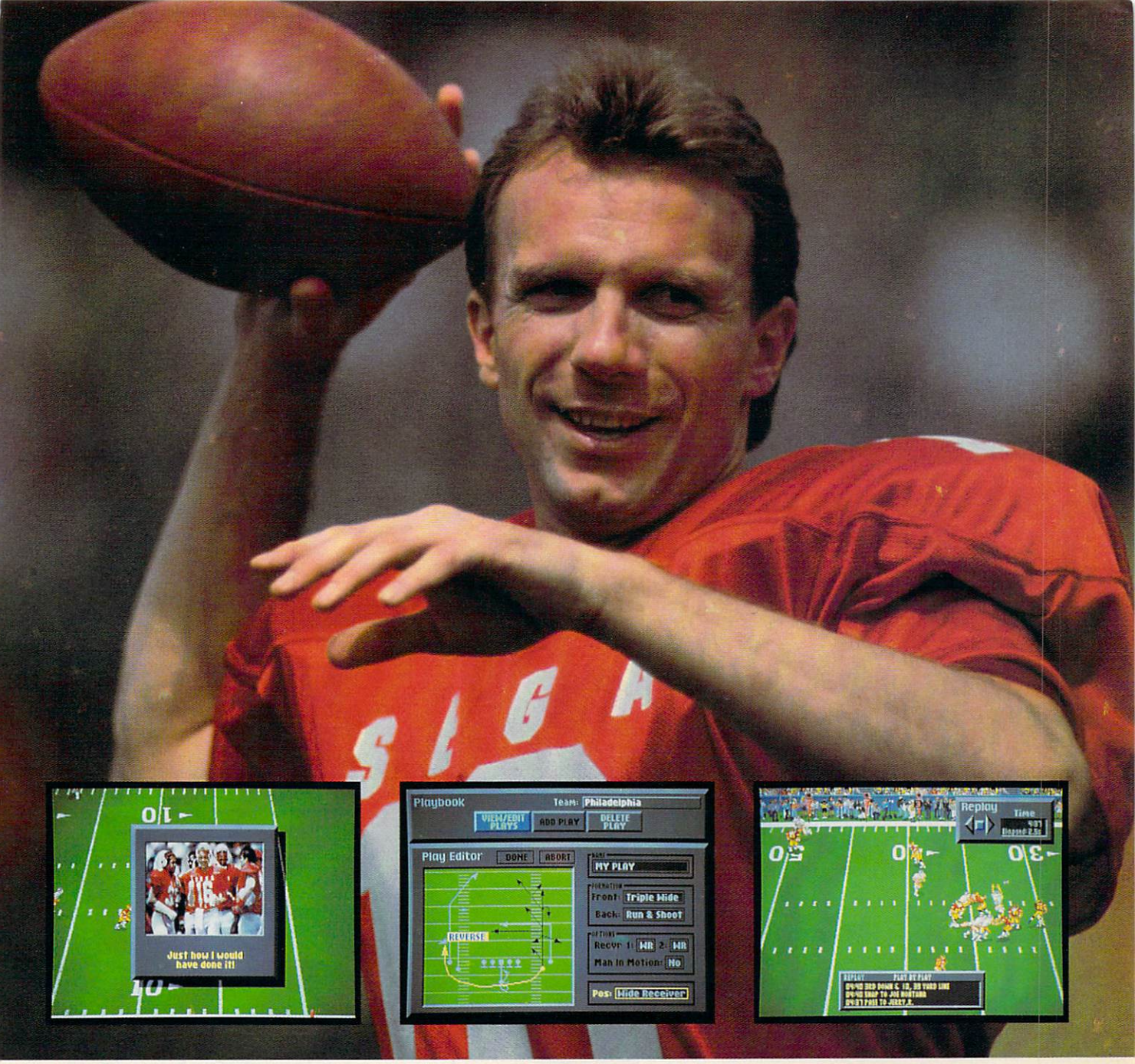

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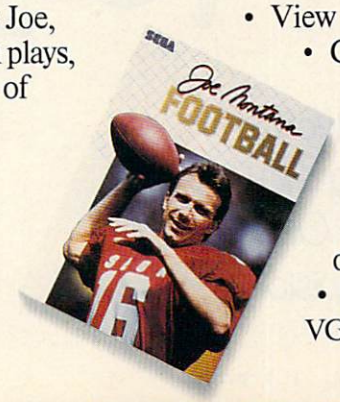

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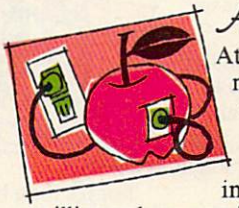
Television waves, like radio waves, use a portion of the electromagnetic spectrum, and there's only so much spectrum to go around. A variety of distribution alternatives are now available, all made for the digital world. Fiber optics can carry tens of thousands of digital signals at once—and carry them not only from source to receiver, but also from your receiver back out into the world. Compact discs and laser discs are already being used as video publishing media. Computers increasingly possess TV-like capabilities, just as TVs contain larger and larger amounts of computing power.

The ramifications of that power can only be glimpsed today. Who, 50 years ago, would have predicted the myriad ways television has changed society? Our purpose, here, is to offer a few informed glimpses, imagine a few consequences, and make some qualified guesses.

There's an underlying conceit to our speculation, and that's the idea of *interactive television.*

Once a television program—or anything—has been digitized, it can easily be manipulated. We're all familiar with the convenience of word processing, the pleasure of interactive computer games, the potential of electronic learning. Add full-motion video and high-quality digitized sound to the equation, and you're on the brink of TV that we control, rather than the other way around.

What exactly does this mean for all of us couch potatoes stretched out in front of the tube? Don't touch that dial—you're about to find out.



Apple of Your TV Eye

At Apple Computer, multimedia is where television, film, music, and interactive computer programs come together. A top-of-the-line Macintosh can display any of 16.7 million colors, providing tremendous potential for displaying lifelike pictures on your computer monitor. Link this system with the superb sound of audio CDs, the 54,000 still or moving video images available from a single laser videodisc, and the vast software storage capacity of CD-ROM discs, and you'll soon see why many in the industry think we're on the verge of truly interactive television.

Apple's CEO John Sculley himself set the tone for Apple's vision in *Odyssey,* his 1987 autobiography. In that book, he described what he called a *Knowledge Navigator,* "a tool as galvanizing as the printing press."

To make Sculley's dream come true, Apple's multimedia lab is working closely with Lucasfilm Games to develop the new visual vocabulary that will join computer graphics with video images. Much as D. W. Griffith had to invent cinematic techniques in his early films because there was no one to teach him, today's multimedia pioneers face the challenge of building an entirely new art form.

Some of the new video tools are truly startling. In one of Lucasfilm's techniques, a *HyperCard* flip-book animation moves to the edge of the computer screen, disappears, and then continues, as live video, on an adjacent television screen. A Macintosh coordinates the transfer of image from computer screen to TV screen. Apple and Lucasfilm have also collaborated with the Smithsonian Institution and the National Audubon Society to combine new technology with archival film and video.

As early as 1983, Apple acknowledged that we think visually as well as linguistically. With faster processors, better display technologies, and more sophisticated compression techniques, computers are rapidly moving toward full-motion video. By merging the best of video and computer technologies, we may soon see the day when television at last lives up to its potential—as a true window on the world and an instrument for learning about ourselves. ▷

The Blue Tube

Businesses and corporations are turning to television as a training aid to help improve efficiency, increase productivity, and aid employees in acquiring new skills. IBM is already marketing a variety of interactive TV tools and applications aimed at business and institutional needs.

Big Blue's approach to interactive video training began in 1983 with a product called *Info-Window,* which combines an analog video signal, typically from a videodisc, with a personal computer equipped with a touch-screen monitor. More recently, the technology has evolved into the M-Motion Video Adapter, a system that can take an analog signal from any NTSC (American television), PAL (European television), or other video source, digitize it, and display it either full screen or in a window format on any VGA computer monitor. In effect, M-Motion lets employees watch TV at a workstation while running other computer programs.

"Employers might be a little disappointed to see you watching soaps in the afternoon," says IBM Marketing Manager Peter Blakeney, "but some of our clients require it. We sold a good number of these [systems] to the National Security Agency. They have a requirement that certain staff monitor the news services, CNN, C-Span, and a few other networks to keep as current on late-breaking happenings around the world as the CIA, FBI, or any other agency."

Operators monitor the television signal in a window while the major portion of the screen is occupied by word processing or other more traditional computer activities. If a certain story on the video feed merits more attention, the operator can at any time bring the signal to full screen and increase the volume.

In most applications, however, the video signal will come from a tape or disc rather than from a live TV signal. "There are enormous markets that we see for multimedia," Blakeney says. "There's training: industrial, on the job, and skill transfers. There's education: kindergarten on up. There's merchandising, where we place multimedia kiosks out where the shoppers are and try to compel them to buy, augmenting retail employees."

Another application includes commercial and business presentations. Interactive TV presentations can be as simple as a product presentation at a sales meeting or as complex as a conceptual presentation by an advertising agency to a client.

Commodore's Comeback Console

What better way to sneak computers into unsuspecting homes than by marrying two of the most popular home entertainment devices: the television and the CD player?

That's what Commodore is trying to do with CDTV, an Amiga-based multimedia CD-ROM player designed for home use. While appearances aren't everything, CDTV's sleek black VCR-like cabinet certainly looks more at home next to the stereo than on the computer desk.

"We've taken a Trojan Horse approach by putting computer capabilities into a familiar box; it just becomes a natural expansion of the home entertainment center," says David Rosen, Commodore's director of international marketing.

Rosen believes CDTV will be accepted by consumers who have previously avoided computers. CDTV, he feels, will be seen as an enhanced CD player. Along with computerlike educational and entertainment software, CDTV will also play standard audio CDs and CD+G (CD plus Graphics: audio discs with visuals, computer graphics, or lyric texts encoded on unused tracks). CDTV isn't being marketed as a CD player with a computer inside, but as a CD player that plays a bigger variety of discs.

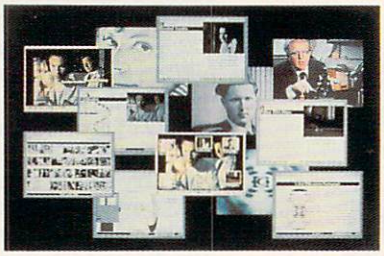
"Consumers have no problem moving from a single medium to multiple media," Rosen explains. "TVs aren't just passive terminals anymore. In the past few years, consumers have been attaching VCRs, videogames, computers, and laser discs to them; and all these have made TV acceptable as an interactive medium."

CDTV's success will depend upon its software. "Consumers don't care about boxes; they care about [entertainment] programming," says Rosen. Recalling the spreadsheet that essentially created the microcomputer industry, Commodore hopes for a CDTV version of *Visicalc,* a product so impressive, so unique, that people will buy a CDTV player just to use it.

"It's like MTV and music videos," Rosen says. "Cable TV created a new entertainment genre. No one anticipated it. We don't know what we will be doing with the [CDTV] technology two years from now."

Class Act

The future of computer education is here now, and it's called *interactive video.* This technology combines an interactive computer program with as much as two hours of video from a single videodisc. Sometimes a CD-ROM player is added to the mix for an additional 650 megabytes of computer-based material.



Life Story **combines full-motion video, interactive text, and hypermedia indexing to make television come alive.**

The Voyager Company, of Santa Monica, California, specializes in laser-disc and interactive multimedia programs. To get a sense of the breadth of Voyager's interests, look at just a few of the company's recent releases: *Eadweard Muybridge: Motion Studies, Vienna: The Spirit of a City, Bird Anatomy II,* and *The National Gallery of Art.*

Life Story, developed by Lucasfilm, the Smithsonian Institution, and Apple Computer, includes the 1986 BBC drama "Race for the Double Helix" and adds sound bites, video clips, text profiles, computer-generated diagrams, and videotaped interviews with the scientists involved in the search for the structure of DNA. The information in *Life Story* is indexed through a DNA-like double helix—one strand indicates scenes from the BBC drama while the other leads to supplemental information. ▷

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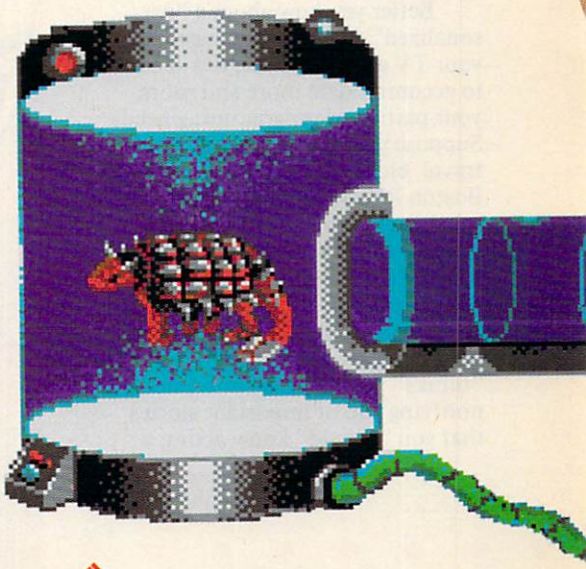

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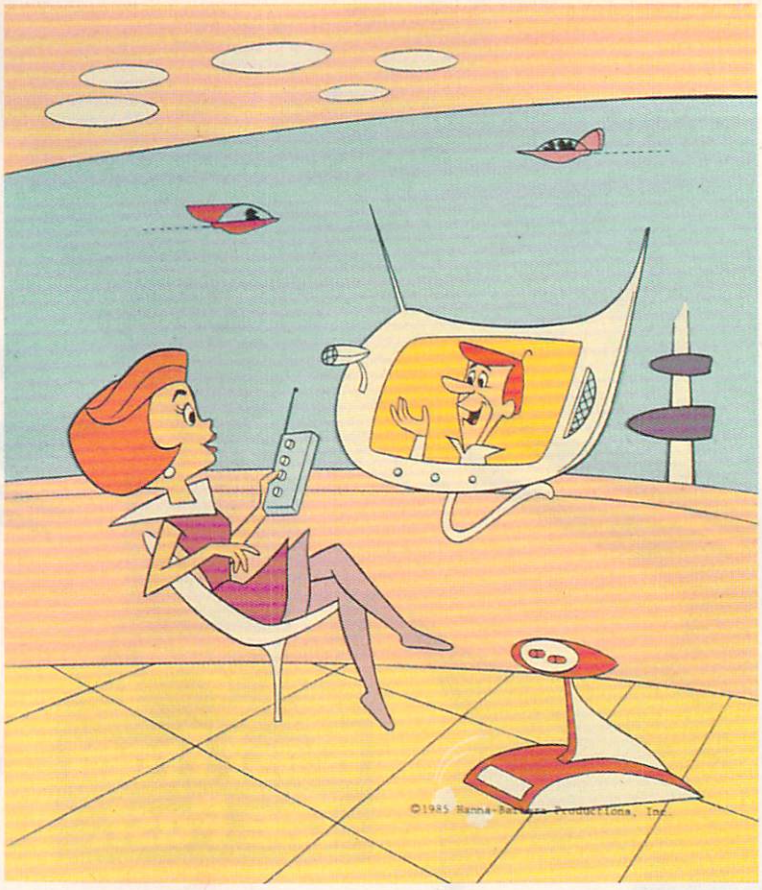
The Teacher's Living World is an interactive multimedia program developed on a Macintosh IIci for the St. Louis Zoo's The Living World exhibit. Teachers can select audio, video, graphic, and text material and save it to VHS videocassette, laser printer, or computer disk, creating their own classroom presentations. Available resources include an entire biology textbook, as much as 140 hours of full-motion color video from a special videodisc jukebox, and prepackaged "multimedia sets" that cover the most popular topics. Teachers can preview, add, delete, or rearrange their selections before recording them to videotape. They can also add their own titles and narration.

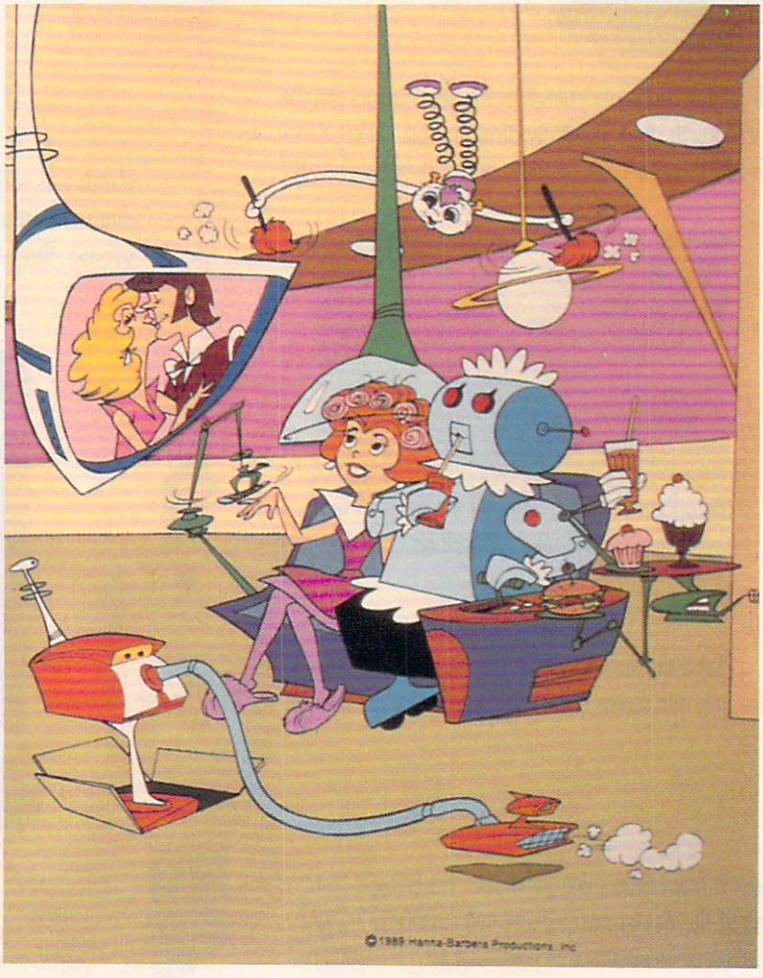
Unlike other electronic media, interactive video lets students and teachers set their own pace and actively participate in the selection of material. Attracted by the vast storage capacity of laser discs and CD-ROMs—where a single disc can contain paintings from the world's major museums or all the text from a complete encyclopedia—schools are forging computers and televisions into unique learning tools.

And Now the News

Imagine putting Tom Brokaw on hold in the middle of a story on computer technology and sending your TV out to find more details than a two-minute news story can provide. Accessing databases throughout the world, your TV assembles a package of information that you can peruse at your leisure.

Better yet, how about a "personalized"' evening newscast? As your TV grows smarter, it will be able to accommodate more and more your particular programming needs. Suppose you're interested in space travel, biotechnology stocks, and the Boston Red Sox, but not at all interested in clothing fashion, movie stars, or food. Your television may soon be able to scan hundreds of news sources around the clock, collecting stories that impinge upon your interests, flagging others that it "thinks" you might be interested in, notifying you of important stories that you "should" know about. ▷





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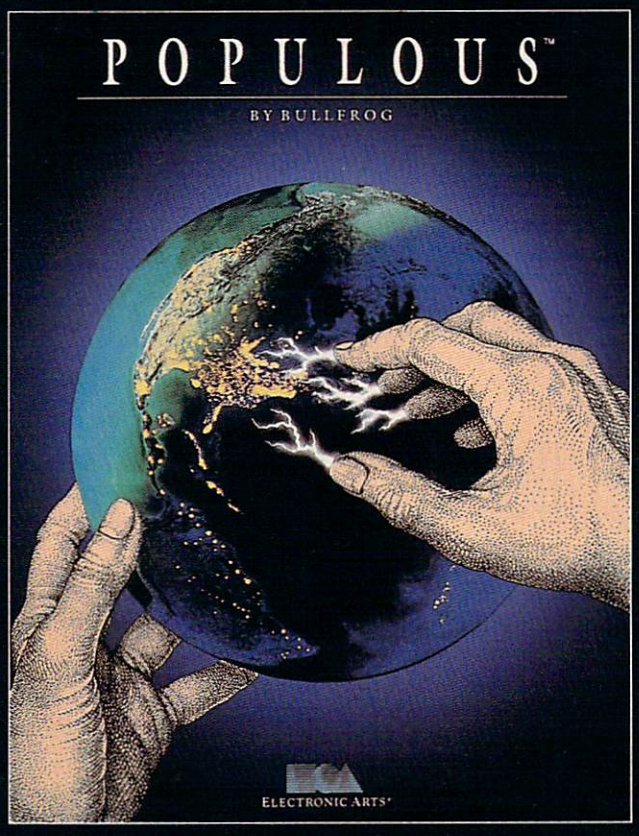

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#2 Simulation Game of All Time for the Amiga
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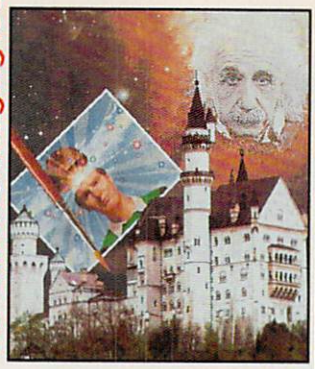

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Circle Reader Service Number 103

You won't have to constantly reprogram the smart set, as you must with contemporary VCRs; it will learn your preferences and remember them. Very quickly, the TV set comes to "know" your interests and act accordingly on your behalf.

Some of the required technology is already in place. Closed-captioning, for example, may serve a dual purpose. In addition to enabling the hearing-impaired to receive information, those captions may serve as an index to television content. "Search," you might tell your TV, "for every mention of the planet Mars in the past 24 hours." A moment later, the set reports its findings.

Rudimentary experiments with interactive news are in development. Call-in programs have long offered one level of interactivity. Earlier this year CNN experimented with viewer selection of news stories. ABC News has developed interactive videodisc presentations for classroom use. Several large news agencies have experimented with videotex services, delivering wire reports directly to homes.

Tomorrow's evening news will likely be an amalgam of all these services and approaches, delivering deeper and more useful information than Edward R. Murrow could ever have imagined.

The View from the FCC

This much power will doubtless be regulated by the federal government, won't it? Not necessarily.

Since so many of the new computer/television technologies and delivery systems don't use traditional radio frequencies (RF), traditional means of regulating TV broadcasts don't apply.

"You can transmit anything you want to over fiber optic, and we don't care. Fiber is not RF, and it's outside our purview," says John Reed, electronic engineer, Technical Standards Branch, Federal Communications Commission.

It's different with traditional cable transmissions. "Cables radiate RF," Reed says, "so the FCC regulates it. But fiber doesn't radiate—only where it actually interfaces with transmission and reception equipment to convert light to RF energy does the FCC get involved."

In Reed's view, fiber is coming online just in time. "The spectrum's already too crowded," he says. "You're not going to be able to load tens of thousands of new signals onto it. There's only about two megahertz of unallocated spectrum left—and everybody wants it."

Although the FCC isn't the only government agency overseeing the media, Reed sees regulation as a minor issue. Far larger is the question of whether or not the fiber network needed to create interactive TV will ever be put into place.

"Putting in a cable system was expensive," Reed says, "but a fiber system will be even more expensive. It's going to take a *lot* of capital."

If broadcast television serves as an example, computer TV will also *generate* a lot of capital. And that should ensure solid investment.

An Interactive Word from Our Sponsors

It may not be long before the commercials on your TV appear because you are female, make $50,000, live in New Jersey, and have bought an airline ticket within the last three months. The marriage of computers and television enables advertisers to target a specific audience and to deliver very specific information.

Many of the tools and techniques of interactive television are being developed on existing telecommunications services, and some online services already carry advertising. Ads on Prodigy, for example, are tied to the gender and age of the user, as well as to the editorial content of the service.

If, for example, you spend time in Prodigy's food and wine area, you will be shown gourmet food ads. If that "leader ad" piques your interest, you can elect to see more information. According to Steve Hein, program manager of communications with Prodigy Services, the ad package immediately fills one viewer need: instant gratification. Another advantage of the self-selective ad package is that it is nonintrusive—only interested viewers receive the extended ads.

Sign-off

Our time's up already? But we haven't even scratched the surface! Hardly a glance at interactive TV entertainment, barely a mention of the role the phone companies may play in all of this, not even a nod at the global implications.

And there are questions yet unraised. Where do the networks fit into this brave new picture tube? What creative video tools will we have in our homes? How far can all of this go?

The answers to these questions? Stay tuned. ⊡

Senior Editor Keith Ferrell coordinated our PC–TV connection coverage. Staff members Denny Atkin, David English, Tom Netsel, and Liz Casey worked the remote control.

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*Exchange offer expires January 15, 1991. MIDI interface requires the MIDI Connector Box. Referenced products and companies are registered trademarks of their respective holders.

Circle Reader Service Number 131

DESKTOP VIDEO

HERE AND NOW

Just as camcorders replaced 8mm movie cameras, within five years still-video imaging will banish 35mm cameras to the dusty shelves of the Museum of Vintage Technology. Long overshadowed by its more popular relative, the camcorder, still-image video remains an underused technology. This is partly due to a misconception about its high initial cost. While the elaborate systems used by computer graphic artists and professional photographers (especially in the film industry) cost megabucks, savvy shoppers can assemble a consumer-grade system for about $1,000.

The system we assembled included Canon's Xap Shot camera, a ComputerEyes Professional image-capture board, Spinnaker's graphic-editing software *Splash!,* and the graphics-printing program *Pizazz Plus.* We also tested US Video's combination VGA and genlock video card. The results we achieved with our $1,000 video system ranged from fair to good. And with the addition of two more sophisticated editing packages—*Tempra* and *Picture Publisher Plus*—our results were nearly spectacular.

YOU CAN ADD A COMPLETE VIDEO SYSTEM TO YOUR IBM PC FOR ABOUT $1,000. HERE'S HOW.

Zap—You're on TV

Manipulating complex graphic images creates heavy demands on a computer system. To avoid expiring from old age at the keyboard, you need a 286, 386, or PS/2 computer with 640K; DOS 3.0 or higher; a VGA card (preferably SuperVGA) with at least 256K (better yet, 512K or more); a multifrequency monitor; and a high-resolution mouse or trackball.

The $595 list ($500 street) price Xap Shot behaves much like other point-and-shoot cameras. The on-board electronic circuits determine the exposure, speed, and range to subject. A built-in LCD panel displays track numbers along with the mode (single shot or three per second), low-battery warning, and disk-related problems. A flash automatically fires in low ambient light. With its 2.8 lens, indoor pictures often require a flash.

The Xap Shot electronically records images on magnetic media. With its two-inch internal disk, the Xap Shot can be fairly described as a camera married to a portable disk drive. The resemblance is more than superficial, since the Xap Shot acts as a disk drive when displaying stored images on a computer or television. The images are filed by track number and retrieved for processing using the camera's advance and reverse buttons.

The jacketed disk accepts 50 images in the camera's 786 × 250 pixel format. Extra disks cost $10, or you can delete the images and reuse the disk.

After you've taken your pictures, the Xap Shot links to the ComputerEyes expansion card with a single coax cable (supplied by Canon).

Importing the image into the computer proved to be as simple as Mother Goose. Digital Vision's bundled software, *Eyes,* while not quite as lovable as it could have been, streamlined the task.

Using *Eyes,* you first preview any or all on-disk images before committing to a capture. The Xap Shot's drive takes about 20 seconds to travel through all 50 tracks. When you find the image you want to digitize, you simply hit a key. Depending on the display resolution selected, the software requires 10–25 seconds to digitize the Xap Shot's composite video signal and redraw it on the monitor.

With the image now digitized and displayed, you can perform some fundamental editing with *Eyes*—including globally raising or lowering the image's red, green, or blue components, as well as its contrast and intensity.

In addition to still video, the ComputerEyes board also captures frozen-frame video generated by a video camera. Capturing and editing full-motion video in realtime, however, requires both a digitizer and a signal synchronization device called a *genlock.* US Video's modular TVGA board lets you expand your system when and if the need arises. The company's separate genlock daughterboard and digitizer module (functionally similar to the ComputerEyes ▷

HOWARD MILLMAN

COURTESY OF MATHEMATICA

Professional) piggyback onto the main VGA card. With 512K, US Video's board provides a resolution of 1024 × 800 × 256 colors.

In addition to the Xap Shot's signal, ComputerEyes can also capture images generated by VCRs, videodisc players, and still-image cameras marketed by Panasonic and Sony. While the ComputerEyes board performs well for image capture, implementing advanced editing techniques requires more potent software.

Testing the Waters

Spinnaker's *Splash!,* a hybrid paint program and entry-level editing package, includes functions specifically designed for image capture and retouching. The program's icon-driven menu, coupled with its straightforward features, makes it extremely easy to use.

Splash! includes the requisite basic editing techniques, including color fills, pattern copy/repeat, individual pixel editing, multiple patterns, brush sizes, and color swaps. Additionally, you can rotate, resize, and merge captured images.

You can experiment with the many samples included with the program, or you can import your own graphics. Although *Splash!* saves to disk in standard image formats such as PCX, TIF, and GIF, it imports only its own graphics format (SS). An odd omission, but not lethal. We used Digital Visions' software to import a TGA graphic, saved it in SS, and subsequently loaded it into *Splash!.*

Another limitation is *Splash!*'s maximum image resolution of 320 × 200 (VGA or MCGA). As a result, the image details and menu icons appear fuzzy. (Images displayed in a 640 × 480 resolution appear much sharper, but these higher resolutions are nonstandard and usually require special video drivers). Also, some of the program's more advanced features, such as color blending and the alternate canvas, need clearer instructions or perhaps a simple tutorial.

Despite these limitations, *Splash!* lives up to Spinnaker's reputation for software that's easy to learn, capable, and—with a street price of $60 ($99.95 list)—inexpensive.

Taking the Plunge

At four times the price of *Splash!* ($395 list or $300 street price), the next level in editing software delivers five times the muscle. In fact, Mathematica's *Tempra* integrates all the essential paint features with commercial-quality image-manipulation, special-effects, and text-overlay features.

With its multiple icon-based menus, backed by a logically organized manual and sample images, *Tempra* accomplishes the handholding necessary to flatten its learning curve. The program's seemingly endless array of editing features includes antialiasing (to smooth jagged lines), regional or global masking (to protect specified colors or locations), selective color swaps, color-contingent animation, image-warping with perspective, and multiple Bitstream fonts with the international extended character set. The program also automatically uses available expanded memory to execute memory-intensive functions and provides a volatile Undo buffer.

Tempra's intended market is serious hobbyists and economy-minded pros. Unfortunately, this means limited printer support. Presently, the program supports just Hewlett-Packard LaserJets and compatibles and two thermal color printers.

Dive Right In

Tempra may provide all the editing muscle you'll ever need. If, however, you decide to "go pro," you'll need the more sophisticated and exotic features found only in professional editing applications.

Astral Development's $695 ($500 discounted) *Picture Publisher Plus* weighs in as one of the least expensive yet comprehensive professional editing applications available. Here, the term *least expensive* is relative.

For example, *Publisher Plus* runs under *Microsoft Windows* ($125 street price). And since time is money for professionals, add two megabytes of extended memory ($200–$600) to keep the current image in faster volatile memory.

This investment provides access to special effects such as texturizing, posterization, highlighting/shadowing, mosaics, multiple imported-image collages, interpretive resolution changes, paint smears, scatterprinting, vignettes, and silhouettes. Additionally, *Publisher Plus* imports scanner images (it contains a universal scanner interface) and captures images directly from selected high-end digitizer boards.

Publisher Plus includes two tutorials and numerous sample images along with detailed step-by-step installation and operation instructions.

The original *Picture Publisher* (without the *Plus*) worked exclusively with gray-scale images (256 shades from black to white). The present manuals still emphasize gray-scale imaging and deal with color imaging in an all-too-brief addendum. Considering the wealth of features in *Picture Publisher Plus,* clarity of instructions is essential. According to the publisher, updated manuals to accompany a more color-oriented revision should be available this December.

You've captured and edited the image—now you want to do more than just display it on a monitor or television. You want to print it. One option is to purchase Hitachi's $1,400 entry-level color thermal printer (model VY-150A). You might also consider Hitachi's $4,000 computer-compatible VY-200A.

One less-expensive option involves using the printer you already own. Application Techniques' *Pizazz Plus* enables you to do exactly that. A well-behaved RAM-resident graphics-printing utility, *PZ+* captures text or graphics screens and provides extensive printing control along with some elementary image-editing features. One of the best of its editing features provides for printing unadorned black-and-white graphics in multiple shades of gray.

With more than 400 drivers, *PZ+* lets you print graphic images on a wide variety of dot-matrix, laser, thermal, monochrome, and color printers. This $149.99 ($70.00 street price) utility will prove invaluable if

THE HIGH COST OF COLOR

Electronic recording devices, including VCRs and still-video cameras, generate analog signals. The number of colors in an analog signal ranges to infinity. When converting the camera's analog signal into a digital form, video capture boards reduce the number of colors in the signal to either 16 or 256. Why? Because, in a digital format, having more colors requires more memory and incremental technology. That translates into higher prices and consumer resistance. High-end realtime digitizers from Everex, Truevision, and Matrox, for instance, cost $2,000 or more.

SETTING STANDARDS

When IBM defined the 256-color VGA graphic standard, it stopped at 320 × 200 resolution. While every major video-board manufacturer adheres to that standard, it's inadequate for image editing. At least a dozen strategies from as many vendors exist to extend VGA up to 1024 × 768 resolution with 256 colors. Therein lie the seeds of chaos.

Implementing these SuperVGA standards requires cooperation between software publishers and board manufacturers. Within certain limits, these two groups do collaborate. As a result, most image-editing software supports the extended modes of selected VGA boards made by Video Seven, ATI, Orchid, Paradise, and STB.

One caveat: Before upgrading your video card or purchasing editing software, make sure that the hardware and software are compatible.

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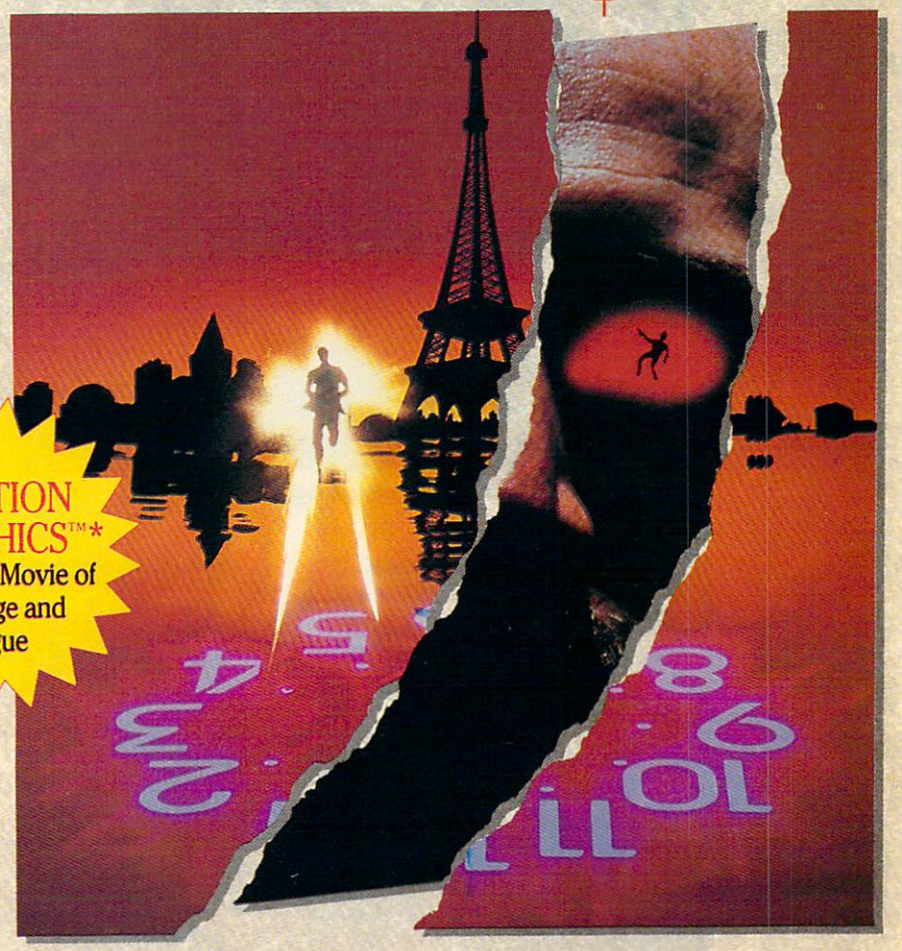

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This is the original video image of a building.

Using **Tempra**, *you could add an arching roof to the building.*

Or you could add colorful landscaping and a palm tree.

your graphics software omits your particular printer.

Yet a third option yields optimum full-color printouts while avoiding a sizable capital outlay. Have a graphics service bureau print your image from disk. Costs range from $10 to $25 per image.

TV or Not TV

With traditional point-and-shoot cameras available for about $100 and superb single-reflex 35mm cameras available for less than $500, why spend $1,000 (and eventually more) for electronic photographs? The answer depends on your purpose. If you simply want photos for the family album, then wait until prices decline as they inevitably will. If, however, you need a photograph for a newsletter or catalog, a client, or those times when "good enough" just won't cut it, you may be ready for still-image video. ⊡

VIDEO TO GO

For more information about the products mentioned in this feature, contact the companies listed below.

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Digital Vision
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Astral Development
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Londonderry, NH 03053
(603) 432-6800

Pizazz Plus
Application Techniques
10 Lomar Park Dr.
Pepperell, MA 01463
(508) 433-5201

Splash!
Spinnaker Software
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Cambridge, MA 02139
(617) 494-1200

Tempra
Mathematica
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Lakeland, FL 33801
(603) 432-6800

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Stamford, CT 06902
(203) 964-9000

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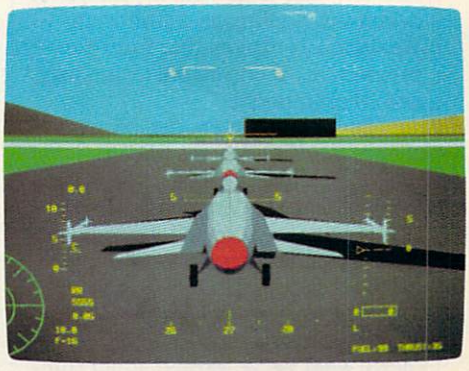

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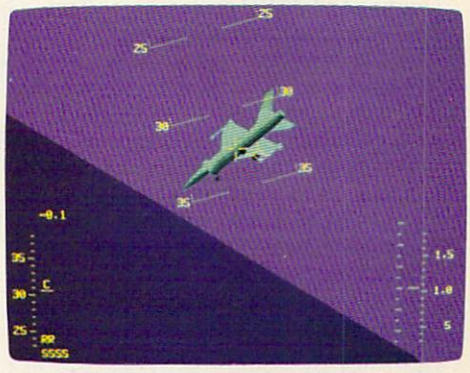

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CONVERSATIONS

KEITH FERRELL

The Media Lab at M.I.T. just might be the hottest of all the world's hotspots for research into the future of television. In fact, *future television* is too narrow a phrase to describe all the areas Media Lab researchers are looking into.

"The focus of what we do and have been doing for 15 years," says Andrew Lippman, the Lab's associate director, "has to do with the merger of computing and image distribution. We variously explore that from the perspectives of education, technology, and entertainment."

Do those different perspectives change the nature of the research?

"Sometimes," Lippman says, "you think of that as interactive systems, and sometimes as high-definition television. But fundamentally and underneath those superficial distinctions, a lot of the work is very similar. It all addresses how you can smoothly merge what we've learned about computing and digital processing and image communications systems."

That smooth merger faces some obstacles, many of them imposed on television years ago. To understand the obstacles, Lippman compares TV's approach to images with the approach taken by computers.

"The focus on high-definition television, here," Lippman says, "can be encapsulated in one word: *scalability*." For example, the Macintosh's small screen has 480 lines; the screen on a NeXT computer has 700 or 800 lines. An even bigger screen would carry even more lines. "The constant in these kinds of systems is the lines per inch, the density of lines," he explains. "And as you get a bigger screen, the density stays the same, and you get more lines."

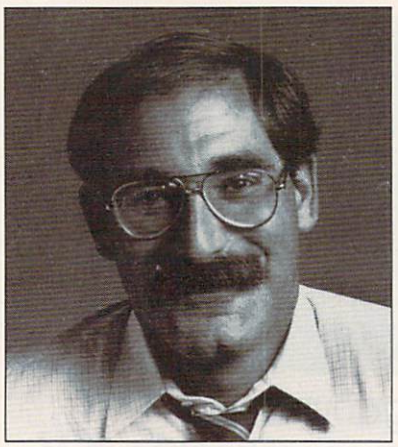
That might sound logical, but it isn't the way television works.

"Only in television do you fix the number of lines," Lippman says. "And when you want a bigger display, [you] literally take those lines and spread them farther apart. That is counterintuitive; it just doesn't make any sense.

"We might do better in the next round if, instead of designing a TV system to be 500 lines, or 1000 lines, or some number like that, we optimized it for a system where [the number of] lines was not the number you specified, just like it isn't on a computer screen."

How would such a design change our household TVs?

"Your little TV under your kitchen counter might have 500 lines on it because it's only 4 inches high," Lippman says. "The one at the foot of your bed, which is a 19-inch set, might have 1000 lines. And the one that's on your wall—the lines on that will depend on your architect more than [on] the designer of your television."



Andrew Lippman

Designer TV sets? Sure. "Likewise," Lippman says, "the *shape* will depend on your architect, as opposed to a Standards decision made in Washington. Kind of like theaters, where the shape of the screen is really the shape of the room. Maybe you should get your television set so that it's shaped to fit above the mantel, or along the wall. Scalability is the key."

The signal that scalable TVs would receive is as important as the sets themselves. "Having it be an end-to-end digital system at all phases is crucial because of the increasing number of digital channels and the increasing degrees of freedom that are afforded by digital representations," Lippman says.

Marrying scalable television sets with digital signals lays the groundwork for future television.

"If you can do *that*, then you have sown the seeds for future development of the medium," Lippman says. "You're no longer just sending out an analog 30-frame-per-second, or 50-frame, or 60-frame, motion picture; you're sending out *data*."

And that is the heart of the PC-TV connection. "Your [future] TV set has already got the processing needed simply to turn that data into a picture," Lippman explains. "That's 90 percent of a sophisticated computer. We can add the other 10 percent, give the TV some smarts, and let it start to help you make up the programs."

How dramatic a shift will this be for viewers accustomed to passive television viewing?

"You know, some [personalized TV technologies] are out there, in funny ways that you don't recognize," Lippman says. He cites a viewer's ability to program a VCR to tape programs for later viewing. "You're making up your own television, but it is a crude job," he says. "The control is pretty limited. All you can tell it is clock time and TV station to tape."

Tomorrow's television, thanks to computers, will offer more control. "If I can add content decisions to that, [for example:] 'Watch the TV *all* the time for me, and if you see anything interesting about the world oil crisis, *grab* it, and I'll ask you later.' That seems like a large step, but it's not," Lippman says.

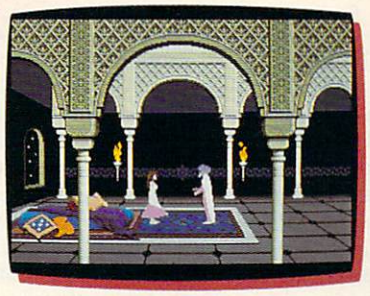
Whatever the capabilities of upcoming television sets and systems, Lippman argues, the technologies must evolve on several fronts at once.

"The point is, can you make systems that, as they improve picture quality and give, strictly by fidelity, new degrees of freedom to existing uses like entertainment, can [those systems] also have the seeds of growth embedded within them?" ⊡

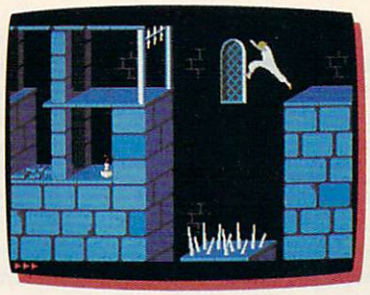
"You really have to see it to believe it."

Computer Entertainer

"Entertainment Program of the Year" Computer Entertainer



VGA SCREEN



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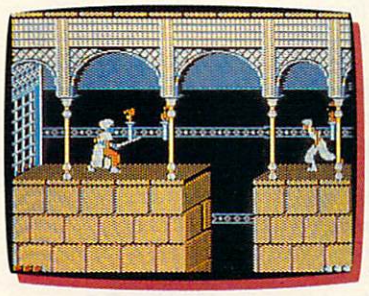
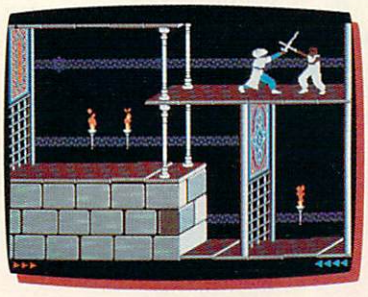
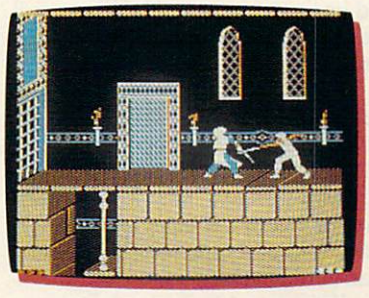


APPLE SCREEN



EGA SCREEN



APPLE SCREEN

It's like an Arabian nights movie come to life . . . with you as the star! In Prince of Persia, you'll plunge into an exotic world of challenging puzzles, tumultuous action and animation so fantastic it has reviewers reaching for superlatives:

"(★★★★/★★★★) Incredibly realistic. . . . The adventurer character actually looks human as he runs, jumps, climbs and hangs from ledges."

Computer Entertainer

"An unmitigated delight . . . comes as close to (perfection) as any arcade game has come in a long, long, long time . . . what makes this game so wonderful (am I gushing?) is that the little onscreen character does not move like a little onscreen character—he moves like a person."

Nibble

"Superb double-high-resolution graphics images and responsive, smooth animation work beautifully together to create an almost cinematic experience."

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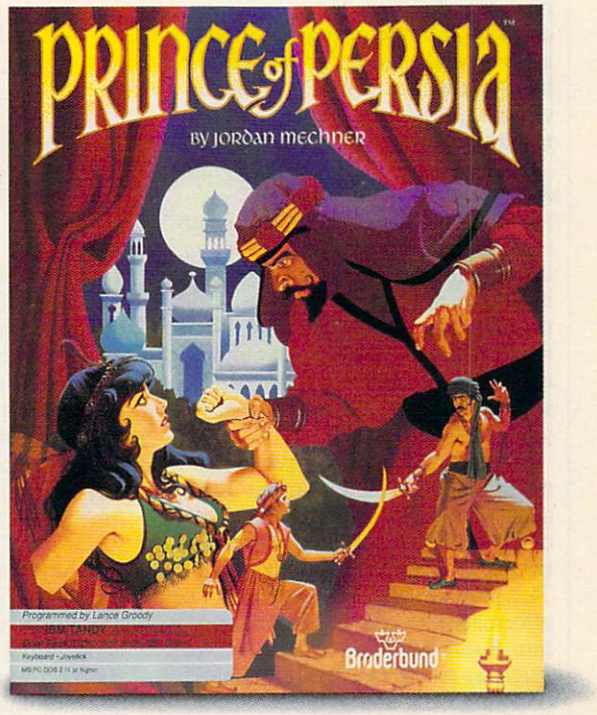
"A tremendous achievement . . . Mechner has crafted the smoothest animation ever seen in a game of this type. "*Prince of Persia* is the *Star Wars* of its field."

Computer Gaming World

But don't take their word. You really *do* have to see it to believe it.



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SHAREPAK

RICHARD C. LEINECKER

Listen to the computer press, and before long you'll hear the term *multimedia.* It's the merging of different technologies for more powerful presentations. Videotapes interact with computers and stereo sounds to make presentations come alive and underscore their messages. Although these high-powered applications are out of reach for most home and business computers, you can still use yours to get the most out of your stereo and VCR.

Since this month's In Focus theme is multimedia, we've filled the *SharePak* disk with programs that will help you manage your home entertainment systems. Now you can keep track of your VCR tapes and audio collections and tune your monitor for peak performance.

We screen hundreds of programs each month to bring you these fine collections. If you had downloaded the programs yourself and paid the connect charges, you would've paid many times what we charge for this disk. You don't need 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.

Audiolog

It's hard enough to keep track of current albums, tapes, and CDs that you listen to often; last year's favorites may have faded from memory. This program keeps you organized and on top of things by cataloging your audio collections. Just run the program and search one of six indexes to find what you're looking for.

Whether it's a Beethoven symphony, a golden oldie from the Tams, a big band classic from Glenn Miller, or a country ballad, you won't have trouble locating the right recording. This program tracks more than enough information to give you the full picture. Besides the title, artist, and type, *Audiolog* records the medium, label (Polydor, CBS, and so on), and comments you've entered. You can search and edit the database or browse through it with a special option.

Printing reports is a breeze—a single keypress does it. The program runs in 256K with any monitor, so there won't be any systems left out. You don't have to be a computer expert to use the program, either. A simple, easy-to-use interface makes it a snap for even novices to use.

For audiophiles, this program is a must. Keep track of your state-of-the-art audio collection with a computer and enter the information age at home.

VideoTest

Today's monitors have come a long way from those amber and green monochrome systems. Plenty of people have graphic capabilities that make computers more friendly, pleasant, and fun. But it's hard to enjoy a fuzzy, out-of-focus game or desktop publishing program. *VideoTest* will help you adjust your monitor for maximum performance across the spectrum of applications.

And there are detailed descriptions of the internal workings of your monitor so that you have a better understanding of what's going on. (The program warns you not to open your monitor unless you're trained to do so.) You can put up dots, lines, and crosshatch patterns for focus and contrast. Color bars will help you adjust the hue, tint, and saturation.

Of course, you could load a game or graphic application and do the adjusting. But then you may find another program doesn't look as good. *VideoTest* lets you maximize performance in a more exacting way so that your system is tuned for peak performance in a wide variety of uses.

You don't have to be technical minded to use the program, either. Simple menus let you navigate with single keypresses. If you want to maximize your enjoyment and productivity by making sure that your monitor is perfectly adjusted, this easy, straightforward program is for you.

Video Librarian Version 2.1

Most households have at least one VCR. And the more people who use it, the harder it is to find the tape you want to view. That's why *Video Librarian* is so valuable. You can enter all of the information about a tape, and then the program worries about remembering the details.

There's room for everything you'd want to record. You can enter the title, starring and costarring actors, the production company, the release date, and personal comments. And it's easy to use. Options are clearly labeled along the bottom of the screen and are activated with a single keypress.

You can print reports to the printer, the screen, or a disk file. You can also generate labels for your library. Numerous search and sort options give you a lot of flexibility and power. Joining files is a single keypress away, too. The program merges all of your library entries into a single file.

Video buffs who use this program will soon be asking how they did without it. You'll never come up short when you look for your favorite Star Trek adventure. And if you're in the mood for a Woody Allen movie, let *Video Librarian* show you the list. ⊡

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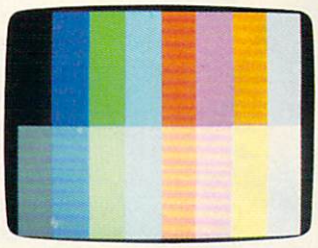
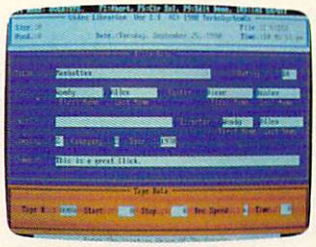
Audiolog



VideoTest



Video Librarian 2.1

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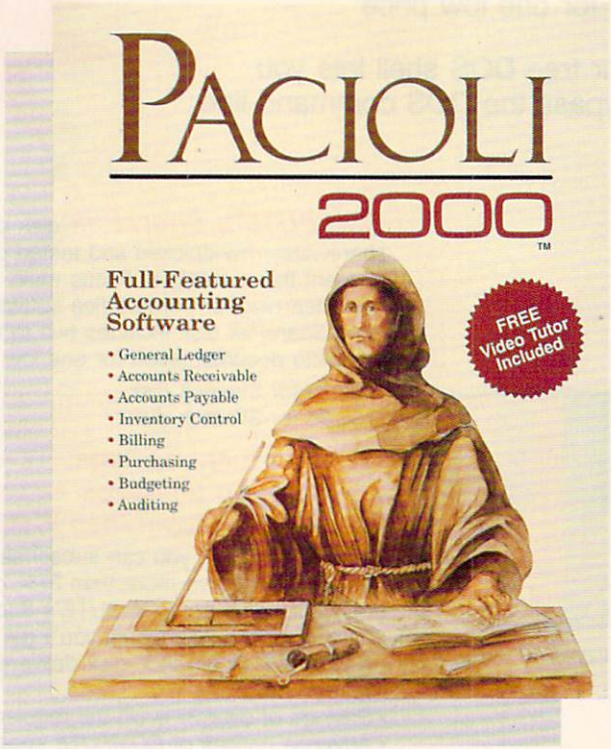


COMPUTE CHOICE

IF YOU'VE GOT ACCOUNTING SAVVY, THIS PROGRAM OFFERS YOU ALL THE TOOLS YOU'LL NEED TO KEEP A TOP-FLIGHT SET OF BOOKS FOR YOUR HOME OFFICE

TONY ROBERTS

In our dreams, many of us picture ourselves running businesses, making fortunes, and laughing all the way to the bank. That success, however, doesn't come easily. It requires a good idea, hard work, and careful control of every penny.

Even if an outside accountant is hired to help count the beans, the business owner must keep tabs on things as well. The owner needs a system of procedures and controls designed to keep financial data straight.

Pacioli 2000 is an accounting package that offers a growing business all of the tools it needs to organize a top-flight set of books. It's a full-featured program that you would expect to cost several times its $49.95 price. The package includes a general ledger, accounts receivable, accounts payable, billing, inventory control, purchasing, budgeting, and auditing functions.

The options available in each of these modules give you enough latitude to customize *Pacioli 2000* to your business's needs. You can choose among five inventory costing methods, you can automatically compute finance charges due on past-due accounts receivable, and you can print checks, purchase orders, receiving slips, and invoices. All of these modules are organized in a single system, so data entered in one module is available to all the other modules.

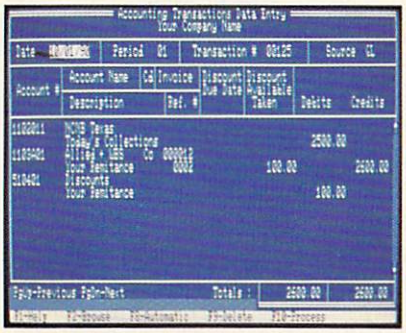
Pacioli 2000, named for Fra Luca Pacioli, the inventor of double-entry accounting, has the flexibility to handle cash accounting, accrual accounting, inventory accounting, or accounting for a service-based company. If you're a real wheeler-dealer, this program will keep the books for up to 999 separate companies.

FFICE

MARK WAGONER © 1990

Pacioli 2000 comes with a three-part videotape to get you started. The tape includes a general section on accounting, a step-by-step section on how to use *Pacioli 2000* itself, and a DOS tutorial. For those who prefer book learning, these three sections are covered in the manual as well. Although the accounting primer is aimed at those who have a scant knowledge of accounting, no short videotaped tutorial can turn a novice into a fearless number cruncher. The video does provide plenty of basic information, however, that will give *Pacioli 2000* users a better understanding of what they're doing and why.

Help is available in most parts of the program, and it's often context-sensitive. If only a general help screen appears, there's an option to search the help index for the appropriate topic. An interesting feature of the help screen is the Date function. This permits you to change the program date without affecting your computer's system date. You can tell the program it's yesterday and finish up yesterday's transactions without changing your computer's clock settings. If you exit *Pacioli 2000* without resetting the date, DOS will still know the correct time, your pop-up calendar will function normally, and you won't be late for that lunch date.



***Pacioli 2000* lets you enter different transaction types from a single screen.**

Once the system is set up and operating, it's easy and straightforward to use. However, unless you're familiar with accounting, setting up *Pacioli 2000* is likely to be befuddling and confusing—but not by any fault of the program. Accounting involves difficult concepts and procedures that can't be fully absorbed in a quick scan of the manual or a short videotape session. You can't invent an accounting system on the fly when using *Pacioli 2000*. You need to know what you're doing, then use *Pacioli 2000* to implement it.

One of *Pacioli 2000*'s strong points is that it does things by the book. It's rigid and strict in what it requires of its operators. The system refuses to let you exit an incomplete transaction, gently prompting you to fill in the incomplete fields. *Pacioli 2000* maintains a complete audit trail of all transactions, even aborted ones. Once transactions have been posted, you can't go back and change information. When you review your daily journal, you'll see every completed transaction, every voided transaction, and every adjustment.

Pacioli 2000 provides a complete chart of accounts that can be used by most businesses, and it's easy to add new accounts when needed. When you're prompted for an account number by one of the modules, you can either enter the number if you remember it or press F2 to browse through the account list. If you can't find what you're looking for, you can create a new account on the spot.

The key to using *Pacioli 2000* is in creating new accounts. You create accounts for each vendor, each customer, and every product you buy or sell. As you create these accounts, you fill in an information screen that includes such entries as the customer's name and address, shipping information, and discount levels available to that customer. The next time you do business with that customer, creat-

continued on page 38

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First time ever! Now you can have Northgate Elegance™ power, speed and performance in our popular space-saving SlimLine case! Elegance 386 computers shocked the industry with a #1 and #2 sweep of *Infoworld's* 1989 best product awards; AND three Editors' Choice awards from *PC Magazine*.

Cache! Cache! Cache! Like our powerful Elegance systems, Slimline 386 features 64K SRAM cache to zip through the execution of instructions. For even more speed, we've added a hard drive cache that makes short work of I/O transactions. To top it off, SlimLine 386 comes with Smartdrive DOS disk caching software that anticipates the information you'll need and brings it into the cache for fast access.

Better features across the board! SlimLine's motherboard is fully integrated, allowing maximum system features in the smallest possible space. There's room for up to 16Mb of 32-bit RAM, one parallel and two serial ports, a built-in floppy disk controller and IDE hard drive controller. Plus an integrated SVGA video with 512K video RAM to speed bus throughput—makes the system faster and more reliable! And there's plenty more room for add-on peripherals—with SlimLine you get five open expansion slots.

33 Cache Systems!

Two speeds! SlimLine 386 comes with your choice of 386DX 25 or 33MHz processors. For faster math-based applications—budgets, forecasts, spreadsheets and databases—both models feature 80387 coprocessor support for adding floating point unit (FPU) speed enhancements.

All purpose systems! SlimLine Cache is the perfect network workstation or stand-alone system for business and home use. It also provides excellent support for advanced desktop publishing and graphics applications.

Or select our SlimLine 386 Power System—the same great features of the base system plus:

- 200 Mb hard drive—15ms access
- 14" VGA color monitor
- Both 5.25" and 3.5" floppy drives
- Microsoft® Windows™ 3.0, Samna® Ami™ Professional word processing software, Informix® Wingz™ graphics spreadsheet and database software. A $1139.00 suggested retail value at NO EXTRA CHARGE!
- Mouse

Industry's finest 24-hour toll-free technical support! Your SlimLine 386 Cache is backed by expert technical support any time you need it. Call toll-free, 7 days a week, 24 hours a day. PLUS, free on-site next day service to most locations if we can't solve your problems over the phone.

More great support! Your new SlimLine 386 Cache also comes with a one year warranty on parts and labor; five years on the *OmniKey* keyboard. And, if a part fails, we'll ship a replacement to you overnight at our expense — before you return your part!

SlimLine 386 Base System Features:

- 25 or 33MHz Intel® 80386DX processor
- 4Mb of 32-bit DRAM (expandable to 16Mb on motherboard)
- Down-scaled, U.S.-made motherboard
- 40Mb fast access hard drive; AT bus interface; 1:1 interleave; 32K look ahead disk caching
- 64K SRAM memory cache; read/write-back caching
- High density 1.2Mb 5.25" and 1.44Mb 3.5" floppy drives; also read/write low density disks
- Five open expansion slots; three full length 16-bit and 2 half length 8-bit
- 25 or 33MHz 80387 or Weitek coprocessor support
- One parallel and two serial ports
- Built-in 16-bit SVGA with up to 1024 x 768 resolution; 512K video memory
- Clock/calendar chip rated at 5 years
- 100 watt power supply
- Small footprint SlimLine case with room for two exposed and 1 internal half-height devices
- Front mounted reset and high/low speed controls
- Exclusive Northgate *OmniKey* keyboard
- 12" VGA monochrome monitor
- MS-DOS 4.01 and GW-BASIC software installed
- On-line User's Guide to the system and MS-DOS 4.01
- QA Plus diagnostic and utility software
- Smartdrive caching software
- 1 year warranty on system parts and labor; 5 years on keyboard
- FCC Class B Certified

Now use SlimLine for 60 days—Risk Free! We're sure you'll want to keep your SlimLine Cache—so we won't rush you. Put it to the test in your office or home for a full 60 days. If it doesn't live up to everything we say, return it for a full refund—No questions asked.

Order Today!

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Power system $4199.00

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Circle Reader Service Number 264

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continued from page 33

ing an invoice is quick and easy: Simply type in the account number or select it from the accounts list, and the pertinent information is pasted into the invoice. Then type in the product numbers for what the customer ordered, and product descriptions and prices are filled in, and the appropriate discounts for that customer are applied.

You can operate *Pacioli 2000* by using the keyboard, mouse, or both, but mouse support is limited in some areas. For example, when scrolling through the chart of accounts, you'll need to use the keyboard Page-Up and -Down keys if you want to move more than a line at a time. The scroll bars aren't as fully featured as you might be accustomed to.

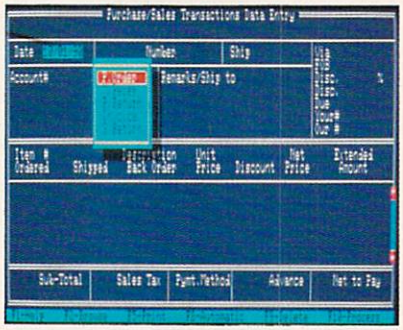
This system is designed for daily use. Transactions are entered as they occur; then, at the end of the day, the printer goes to work, churning out the results of the day's activities. Invoices, packing slips, receiving slips, credit memos, account statements, and checks can be printed on forms available from M-USA. Then the daily journals are printed, reviewed, adjusted, and reprinted if necessary.

Once the daily journals are correct, the transactions are posted. Posting is the process of placing all of the day's transactions into the various accounts your company uses. During posting, several files are modified, and both the manual and the program are quite insistent that you back up your data files before posting. *Pacioli 2000*'s posting process involves a fairly painless, though time-consuming, backup process that utilizes the DOS Backup command. The procedure is automated and requires only a keypress or two to complete.

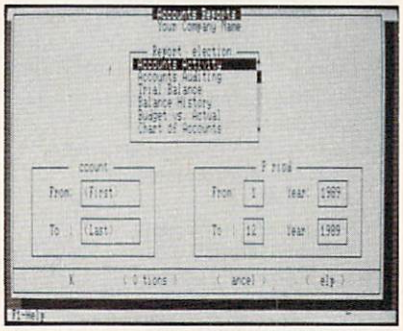
Pacioli 2000 also can be used as a point-of-sale system, printing out invoices and receipts on the spot.

The system uses specially designed teal and gray, multipart, carbonless forms for invoices, statements, and checks. These forms and associated envelopes, cards, and labels are available by mail order from M-USA. Samples of each of the forms and checks are included in the package, so you'll be able to check with local printers to see if any of their stock matches that used by *Pacioli 2000*. M-USA claims to have the only official forms for use with the program, but purchasing forms locally, if they're available, is usually less expensive and faster.

By using *Pacioli 2000*'s checks and forms, you can significantly simplify your bookkeeping work. Write a check or process an invoice, and the appropriate transactions are entered automatically in the daily journal. If you choose not to use the special forms and checks, you can still benefit from *Pacioli 2000* by writing checks and invoices manually and then entering the transactions into the system. *Pacioli 2000* will keep up the daily journal and general ledger. A disadvantage of this approach, besides time lost, is that you increase the chance of error because data is entered twice.



Track purchase orders and sales invoices—even with no inventory on hand.



***Pacioli 2000*'s dialog boxes can be accessed using the keyboard or mouse.**

Pacioli 2000 is fairly rigid in its output. You can't adjust the check, invoice, or statement output formats. In the printer setup menu, the only options you can modify are the page length and the control codes for normal, compressed, and expanded type. A dot-matrix or other impact printer is required to print checks or forms, and the manual recommends using such a printer for reports as well. Laser printers aren't supported to any degree.

All forms and checks are sent to the LPT1 printer port, and there's no provision for redirecting them. Reports, however, can be sent to the screen or be redirected to a file, which you can edit or print later.

While using *Pacioli 2000,* you'll amass a great deal of information about your company and its vendors and customers. The program's report section gives you the tools to manage that information. The system includes several predefined reports that will satisfy most of your needs, and it includes a report generator that can be used to arrange the information for more customized reports. *Pacioli 2000* keeps up to 36 months of accounting data online, so reviewing recent history is as easy as looking at yesterday's data.

Pacioli 2000 puts a lot of accounting power into your hands. It's network ready, it offers a tiered password system to protect your data, and it allows you to enter terms and discounts on a customer-by-customer basis. The program also includes an auditing module to help you reconcile your checking accounts, verify the accuracy of your records, and keep an accurate count of your inventory. *Pacioli 2000*'s budgeting function will help you create future budgets based on past performance.

There's a great deal of capability here for a relatively small price. With *Pacioli 2000,* small and growing businesses can set up an accounting system without worrying that they're spending a lot of money on something that won't work for them. M-USA promises free customer support for registered users.

If nothing else, the experience of working with *Pacioli 2000* and coming to understand your company's financial data will make you better able to hire an accountant to do the books. As the owner, you're responsible for everything, and you can't afford to give up control of something as important as your money.

Ease of Use	★★★
Documentation	★★★
Features	★★★★
Innovation	★★★

Pacioli 2000

IBM PC and compatibles with 640K, DOS 2.1 or higher (DOS 3.1 or higher for network use), and hard drive—$49.95

Package includes two 5¼-inch and one 3½-inch disk, tutorial videotape, 354-page manual, sample forms and checks, and forms catalog.

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Circle Reader Service Number 250

OPEN YOUR CREDIT CARD ACCOUNT BY FILLING OUT THE APPLICATION BELOW.

Please complete all appropriate sections, providing at least two years residence and employment history. If you are self-employed, please be sure to complete section d. **THIS IS NOT A CREDIT AGREEMENT!** One will be sent to you upon authorization of an account. (This Form Must Be Signed To Process Your Order.) All Financed Purchases Are Subject To Credit Approval. **If You Have Any Credit Questions, Please Call For Assistance.** Thank You!

A married person may apply for individual credit. I am applying for (check one box, please):
☐ JOINT CREDIT with another person. Complete entire application.
☐ INDIVIDUAL CREDIT complete only individual section.
☐ INDIVIDUAL CREDIT but rely on income of another. Complete entire application.
*If you are a married Wisconsin applicant, you must provide your spouse's information as indicated, even though your spouse may not be signing the contract.

NOTICE TO WISCONSIN APPLICANTS
You must disclose your marital status:
☐ married
☐ unmarried
☐ legally separated

a. Personal Information

NAME _____ HOME PHONE (___) _____
SOCIAL SECURITY NUMBER _____ DATE OF BIRTH ___/___/___
PRESENT ADDRESS _____ CITY _____ ST _____ ZIP _____
DATE OF RESIDENCE MO. _____ YR. _____ BUY☐ RENT☐ OTHER☐ _____
PREVIOUS ADDRESS _____
EMPLOYER _____ DATE OF EMPLOYMENT MO. _____ YR. _____
MONTHLY GROSS SALARY $ _____ BUSINESS PHONE (___) _____
PREVIOUS EMPLOYER _____ DATES OF EMPLOYMENT _____ TO _____

Income from alimony, child support or separate maintenance payments need not be disclosed if you do not wish to have it considered as basis for repaying the obligation.

ADDITIONAL MONTHLY INCOME $ _____ SOURCE _____

b. Credit Information

PLEASE TELL US IF YOU HAVE: CHECKING ACCOUNT (Y/N) _____ SAVINGS ACCOUNT (Y/N) _____
BANK LOAN (Y/N) _____ HOW MANY? _____ VISA (Y/N) _____ HOW MANY? _____
MASTERCARD (Y/N) _____ HOW MANY? _____ FINANCE COMPANY LOAN (Y/N) _____ HOW MANY? _____
DEPT. STORE CHARGE CARD (Y/N) _____ HOW MANY? _____ CREDIT UNION ACCOUNT (Y/N) _____ HOW MANY? _____
OTHER MAJOR CHARGE CARDS (Y/N) _____ HOW MANY? _____

c. Joint Applicant's Personal Information

JOINT APPLICANT'S NAME _____ HOME PHONE (___) _____
SOCIAL SECURITY NUMBER _____ DATE OF BIRTH ___/___/___
ADDRESS _____ CITY _____ ST _____ ZIP _____
DATE OF RESIDENCE MO. _____ YR. _____
JOINT APPLICANT'S EMPLOYER _____ DATE OF EMPLOYMENT MO. _____ YR. _____
MONTHLY GROSS SALARY $ _____ BUSINESS PHONE (___) _____
NAME AND ADDRESS OF NEAREST RELATIVE NOT LIVING WITH YOU _____
_____ RELATIONSHIP _____

d. Self-Employment Information

BUSINESS NAME _____ BUSINESS PHONE (___) _____
TYPE OF BUSINESS ☐Proprietorship ☐Partnership ☐Corporation IN BUSINESS SINCE _____
YOUR ANNUAL INCOME FROM BUSINESS Gross $ _____ Net $ _____
PERSONAL BANKER'S NAME _____ BANKER'S PHONE (___) _____

e. Customer Authorization

I authorize Northgate Computer Systems or its assignees to investigate credit records and to report my performance hereunder to credit agencies. I hereby certify that the following information is furnished to you for the purpose of obtaining credit and is true and correct of the best of my knowledge and belief. There are costs associated with the use of this credit card. To obtain more information about these costs, call us at 1-800-548-1993 or write to P.O. Box 59080, Minneapolis, MN 55459-0080.

NY—A consumer credit report may be requested in connection with this application or in connection with updates, renewals or extensions of any credit granted as a result of this application. If I subsequently ask for this information, I will be informed whether or not such a report was requested and, if so, the name and address of the agency that furnished the report.

OH—THE OHIO LAWS AGAINST DISCRIMINATION REQUIRE THAT ALL CREDITORS MAKE CREDIT EQUALLY AVAILABLE TO ALL CREDIT-WORTHY CUSTOMERS AND THAT CREDIT REPORTING AGENCIES MAINTAIN SEPARATE CREDIT HISTORIES ON EACH INDIVIDUAL UPON REQUEST. THE OHIO CIVIL RIGHTS COMMISSION ADMINISTERS COMPLIANCE WITH THIS LAW.

APPLICANT'S SIGNATURE _____ DATE _____

JOINT APPLICANT'S SIGNATURE _____ DATE _____

FOR MARRIED WISCONSIN APPLICANTS:
I acknowledge that the obligation described herein is being incurred in the interest of my marriage or family.

BUYER'S SIGNATURE _____ DATE _____

*You must request deferred billing when ordering. Payments will be deferred for three billing cycles after shipment. Interest will accrue during the deferred period at a rate of 1.5% per month (18% APR).
This is not an application. A completed application and agreement must be on file prior to approval for credit.

WORKPLACE

DANIEL JANAL

Think back to your office days when a bunch of people would meet at the water fountain, gossip, discuss the ball game, and talk shop. Then someone would say something, and a thunderbolt would go off inside your head. A brainstorm!

You learn from your co-workers' experiences. They stimulate your thoughts. They inspire you toward greater heights.

Are you fertilizing your mind with new ideas in your home office? You can if you follow these steps: Listen to audio cassette tapes on business topics. Join professional organizations. Attend educational seminars. Share ideas with a colleague over lunch. Talk to a customer every day.

Audio cassette tapes cover such business topics as goal setting, time management, motivation, coping with difficult people, and sales. These 1- to 3-hour audio programs are informative and convenient. You can listen to an entertaining and thought-provoking discourse on a favorite topic as you drive to an appointment, jog a mile, or take a shower.

An inexpensive way to listen to the best business audio tape programs is to subscribe to The Personal Progress Library (818-242-9583), a lending library of more than 600 tapes covering management, communication, negotiation, sales training, time management, and marketing. Its authors include Ken Blanchard *(The One Minute Manager),* negotiating expert Roger Dawson, telephone communications guru George Walther, management author Peter Drucker, and customer service visionary Michael LeBoeuf.

The $199 annual fee entitles you to borrow an unlimited number of tapes. You must pay a $7 postage charge for each tape program. This is a small price compared to what you would pay to buy the tapes.

One of the largest and most diverse collections of business and motivational tapes is offered by Nightingale Conant (N-C, 800-323-3938). If you've ever listened to the taped interviews and motivational speeches on airplanes, you've heard N-C authors, including Zig Ziglar. The most recent catalog features the audio cassette adaptations of such best sellers as *Wealth Without Risk* by Charles Givens, *Thriving on Chaos* by Tom Peters, *What They Still Don't Teach You at Harvard Business School* by Mark McCormack, and *Swim with the Sharks Without Being Eaten Alive* by Harvey Mackay. Each sells for $59–$69 and lasts about four hours. The catalog features many original self-help tapes to improve memory, avoid procrastination, manage people, promote a positive outlook on life, sell real estate, and be more creative. N-C also has two tape-of-the-month club offerings: Sound Selling (120 minutes, $12.25 per month) and Sound Management (60 minutes, $13.90 per month).

SAVVY SOURCES FOR YOUR BUSINESS

If you don't have time to read the best-selling business books, you might consider Fast Track (800-257-8345). It offers 40-minute abridgements of two books each month plus 5-minute interviews with the authors. An annual subscription costs $132 a year, a bargain compared to the $720 you would spend for two books a month at an average price of $30. Recent titles include *Megatrends, Confessions of an SOB,* and *The Wall Street Journal on Managing.*

Employing a self-study approach complete with tapes and workbooks, The American Management Association (518-891-5510) features approximately 100 programs on business topics such as marketing, finance, service organization, and manufacturing. You can learn how to write a business plan, plan your business's cash flow, write marketing plans, and analyze the competition. Prices range from $79 to $249, with minor discounts for AMA members.

To increase your expertise and get different perspectives on business, join a professional organization or general business group, such as the Rotary Club or the Chamber of Commerce.

Through community colleges, training companies, and numerous professional organizations, you can learn how to design newsletters, supervise people, read a balance sheet, or troubleshoot computers. Prices range from $95 to $895 a day. Many courses offer discounts if several people from the same company attend a session. Fred Pryor Seminars offers day-long seminars for $99 on a variety of subjects all across the country. Call (800) 255-6139 for information.

Nothing beats face-to-face contact. Take a colleague to lunch or breakfast. You can learn from each other's experiences. Don't worry about giving away your trade secrets. The expertise you bring to your work will differentiate you from the others. After all, a competitor can't steal your creative style and personal panache that win clients. Meanwhile, you can pick up invaluable tips that can save you time and money.

Want to do your job better and prepare for the future? Who knows what your customers want better than your customers? Call a customer or prospect every day. Don't try to sell, however. Talk to learn. Ask customers: What trends are shaping the industry? What products or services will be hot in the future? What do you like or dislike about my service?

You'll be amazed at what you learn from others. ⊡

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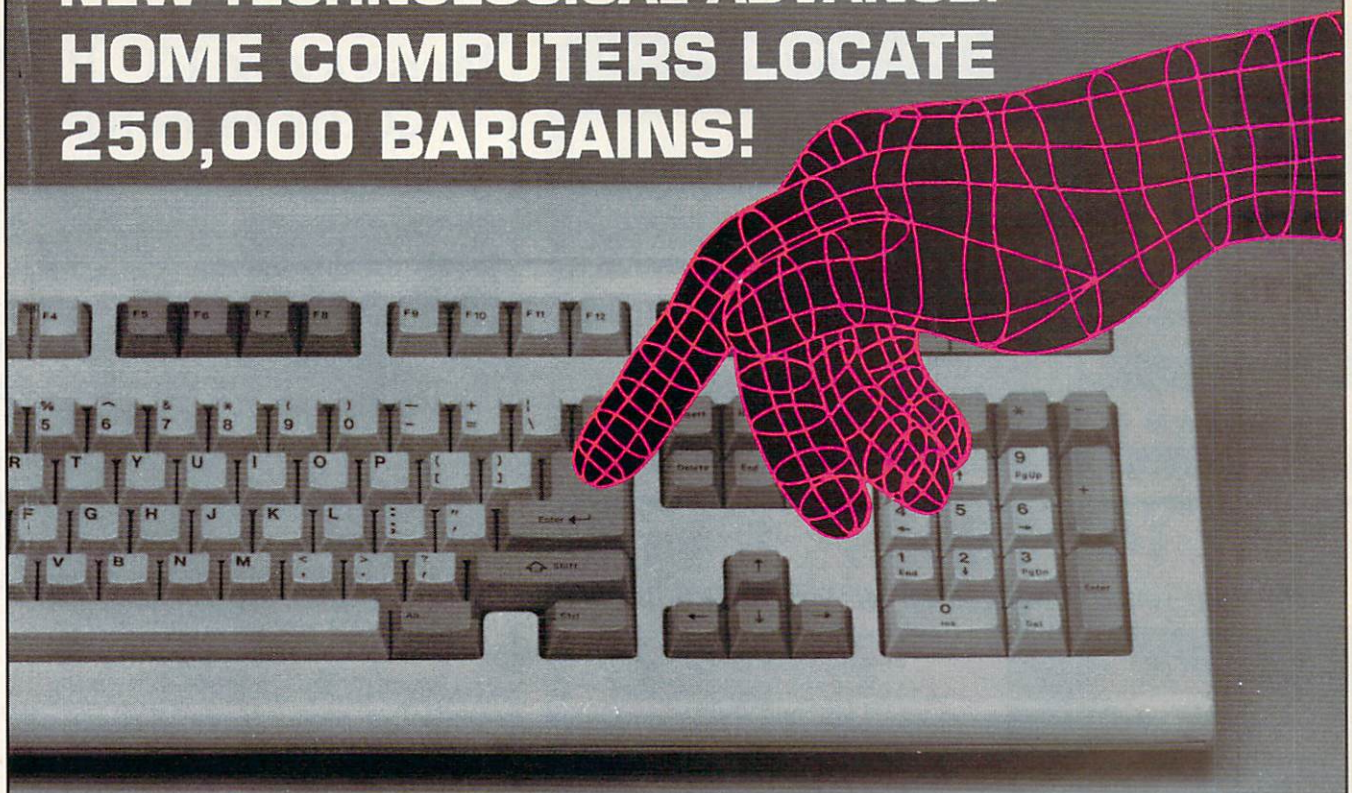

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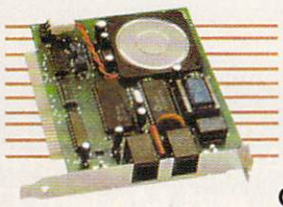

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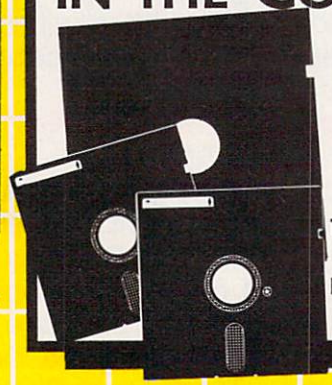

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Ergonomic design, Logi Menu software, Mouse 2-3 menu software for Lotus 1-2-3, Lifetime warranty. Minimum 256K memory, IBM PC, XT AT, PS/2 or compatibles

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The world's first high performance joystick. Trigger finger firing, fits in the palm of your hand. IBM PC & compat.

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LOGITECH

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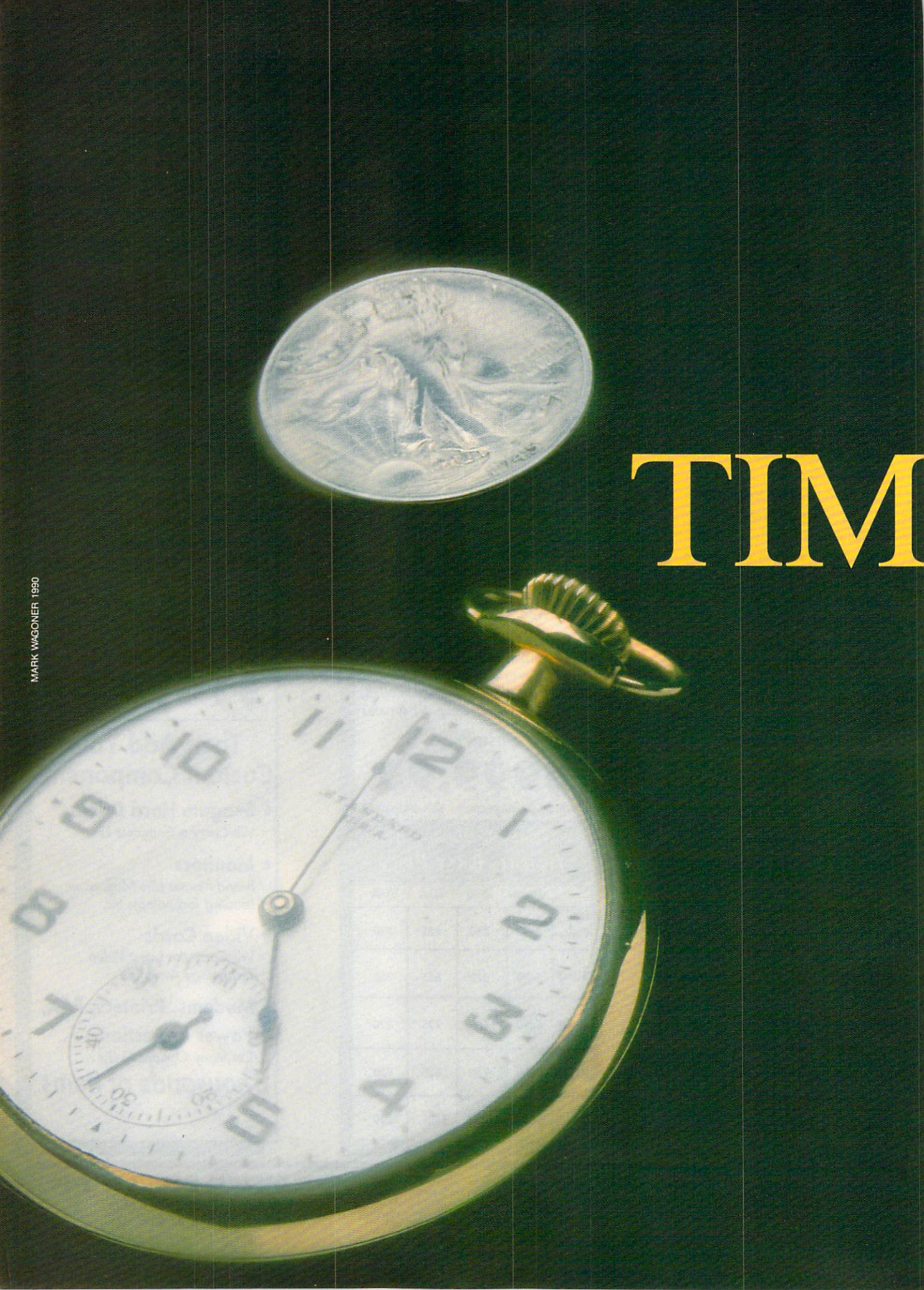
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E IS MONEY

RICHARD O. MANN

Time is money. You spend time steadily, hour after hour, week after week, wisely or foolishly. You use time to make money or—by not using time efficiently—to lose money. This alarming realization has helped fuel the boom in datebook organizers, those ever-present leather notebooks so many people carry. Software developers, ever alert to a trend, have created equivalent time-management systems for personal computers.

The computer is a valuable ally in the struggle to convert time into money. Three classes of software assist in this battle: time managers, personal information managers, and time-tracking and billing programs. ▷

USE YOUR COMPUTER TO MANAGE YOUR TIME

Principles of Time Management

"Classic time management hasn't changed in 2000 years," says Hyrum Smith, founder of the Franklin Institute, a national time-management training firm and publisher of the best-selling *Franklin Day Planner.* "Time management is simply the controlling of events. The issue is deciding which events you can control and learning how to control them."

The basic elements of time management are well known: determine goals, set up a prioritized schedule or calendar, keep notes on your daily activities, and maintain a database of important contacts and clients.

Goals. First, determine your goals. This is an essential step too often left out of time-management advice. Without clear goals, you can manage every minute of your day with perfect efficiency and still never accomplish anything worthwhile. Good time managers ensure that the right events take place.

Prioritized to-do list and calendar. Second, identify activities that lead to your goals. Put them on your daily to-do list, the basic tool of time management. Each day you need a clear picture of what you want to accomplish.

Once you have the list of your day's activities, analyze it carefully and assign priorities. When you plan the next day, carry unfinished tasks forward.

Your day-planning sheet should also have a place to show your appointments. Keep a set of monthly calendars showing your time-related commitments.

Notes on daily activities. To manage time efficiently, you need a place to keep the important notes usually written on scraps of paper and lost. If you promise to call someone next Thursday or meet with the PTA on the second Tuesday of each month, you'd better write it down where you can find it.

Personal database. Finally, you need a personal database. Addresses, phone numbers, bank account numbers, important dates such as anniversaries, and your notes from the last time you talked to someone—capture all these things in a single, accessible place.

Time-Management Style

How you choose to apply these principles will vary greatly. What works for you depends largely on your view of life, your way of thinking, and your personal style. Some of us focus on time itself while others focus on tasks, projects, and processes. Still others concentrate on the people involved. Some key on goals or results; the end is ever in mind, and all else exists merely to create it.

How do you design a single piece of time-management software that appeals to everyone? You can't. Instead, software developers have created a variety of products, appealing to individual styles of time management.

These programs range from personal information managers (PIMs), such as *Arriba* and *Instant Recall,* to simpler daily schedule managers, such as *Top Priority, who-what-when,* and *OnTime.*

These programs reflect their designers' personal styles and time-management beliefs. If you find a program that shares your style, you'll really like it. If you end up with a mismatch, you'll be frustrated, wondering why the dolts who designed the program won't let you organize and manage things logically.

Fair Warning

Before we discuss these programs, you need to be aware of a problem. Smith's Franklin Institute found out the hard way that once you've used a good datebook organizer, you're unlikely to be happy with a computer-based system for long. Two years ago, a $70,000 development effort produced the *Franklin Day Planner* on a disk. The beta testers—techie power users, all—went back to their *Franklin Day Planner* books quickly, even though the software worked perfectly.

Why? Smith says that the need to have their schedule and personal database with them at all times outweighed the benefits of computerization. "If you're into a computer for managing your time, you're into a double-entry system, like it or not," he says.

Smith's beta testers were accustomed to a superb paper-based system. For the great majority who now do little or no formal time management, however, these easy-to-use computer-based systems provide an excellent introduction to the marvels of mastering time.

Time Managers

Here are a few of the best and most popular time managers on the market.

Top Priority. The time manager known as *Top Priority* focuses on the day's activities, both to-do items and appointments. Its printed daily schedule page is a work of art, duplicating what you'd find in a normal datebook organizer, printed using decorative fonts, boxes, and lines. It provides room for handwritten changes and notes.

Top Priority's excellent manual gently teaches time-management concepts, including the importance of setting goals and relating them to your daily tasks. It encourages you to organize your tasks into projects, with step-by-step tasks as subtasks, yet it handles tasks not related to a project just as easily. Priorities range from *A* to *Z,* with subtasks getting an individual subpriority.

Top Priority has no extra personal database features, but it exchanges data with Power Up!'s market-leading powerhouse *Calendar Creator Plus.*

who-what-when. Although best suited to managing projects, *who-what-when* provides dynamite ways of gaining alternative perspectives. It looks at projects from a *what* viewpoint (what's being done), a *when* perspective (how the events are sequenced and the stages of project completion), and a *who* outlook (lists of tasks assigned to different people).

While it shines at managing projects, *who-what-when* feels cumbersome when managing masses of small, unrelated tasks. It lacks a usable overall calendar view of your schedule, though it has a report showing which days have tasks in them. It has a limited priority scheme, and its old-fashioned, plain-text reports can be hard to read and use.

who-what-when excels at managing large projects, especially if there are several people involved. It compares schedules, reviews delegations, and cross-tabulates relationships among people and projects in every way imaginable.

OnTime. If you're looking for a lean, highly effective daily scheduling machine, you're looking for *OnTime.* It works on appointments and to-do items only and doesn't rely on your being at the keyboard throughout the day.

You plan your day ahead with *OnTime* and print a single two-sided planning sheet, which folds into thirds and slips into your purse or coat pocket. Inside the folded sheet is a detailed appointment calendar covering daily appointments for as many as seven weeks.

The outside fold shows today's appointments with room to add more by hand. The second fold shows your day's to-do list, sorted by priority. The final fold contains an annual calendar.

This single sheet of letter-sized paper contains all the basic information you need to manage your day. It's an elegant solution to basic time-management needs, but it doesn't capture any other data. It's direct, simple, and easy.

Personal Information Managers

One step up from the simple time managers are personal information managers. Here's a look at some of

continued on page 52

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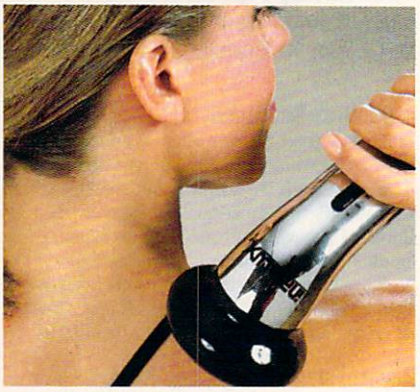

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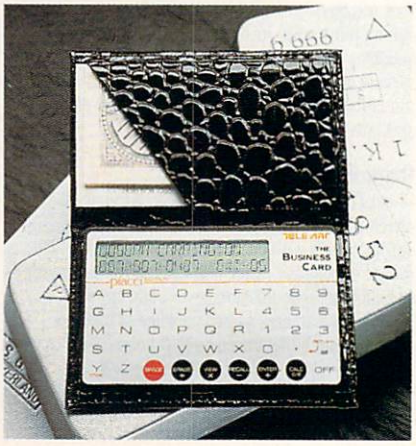

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continued from page 48

the best and the brightest.

Arriba. The way to visualize *Arriba* is to picture a file cabinet full of folders. In each folder is a set of related information, which can be anything from simple text to a structured minidatabase of your own design. There are built-in folders for to-do list processing, a phone list, and other functions.

Arriba is fast. If you know that somewhere in all your folders is a note containing the birthday of the daughter of the president of ABC Company, for example, just search for *ABC* and *daughter.* The note is onscreen almost instantly.

But how is it for time management? It's adequate, but that's not its strong point. If you need some of the finer elements of to-do list processing and calendaring, look elsewhere. If your time-management needs are modest but the prospect of custom minidatabases is alluring, *Arriba* is for you.

Instant Recall. A fast PIM with an entirely different outlook is *Instant Recall.* It provides four basic ways of viewing your personal database: notes, tasks, schedule, and people. Depending on your style, any of these views can become the primary focus.

The step-by-step task/subtask processing of *who-what-when* and *Top Priority* won't be found in *Instant Recall,* making it more suited for work that doesn't involve a time-related series of component tasks leading to completion of an overall task.

The strength of *Instant Recall* is that it can run as a memory-resident program, ready to instantly pop up over other applications. Bigger PIMs have TSR modules that run a subset of the program, but *Instant Recall's* entire program is there whenever you pop it up, and it only takes about 28K of RAM when dormant. *Arriba* uses about 200K to do the same thing.

Time-Tracking and Billing

If you bill clients for your time, you need a time-tracking and billing program. It simplifies your recordkeeping process and handles the drudgery of accumulating information from original sources into sorted, detailed, priced invoices for your clients.

Even if you aren't at your computer all the time, the amount of work these programs do behind the scenes justifies the occasional double-entry process of copying handwritten notes into the computer. Don't lose money because you didn't track your time well enough to bill it accurately.

TimeSheet Professional. A time sheet is a document that lists client tasks down the left and hours in columns under day headings across the top. *TimeSheet Professional* automates the process of maintaining a time sheet. You can enter time and expense amounts in any slot on the time sheet and attach long notes using a pop-up window. Notes and expenses can be printed on bills at your option.

And, of course, *TimeSheet Professional* keeps track of time for you. You just put the cursor in the cell for the job you're doing and hit a key, and it starts timing. When you stop the timer, the elapsed time is charged to the job for you.

Timeslips III. The market leader in time-tracking and billing programs is *Timeslips III.* Its metaphor isn't the time sheet but a time slip, a small piece of paper on which you write a code and the time spent on a job. These are typically accumulated and processed by an accounting clerk who turns them into invoices. Time slips are often used by law firms and others who have too many active projects going to fit neatly onto a time sheet.

Timeslips III does more than *TimeSheet Professional.* It offers more codes, more classifications, more ways to determine billing rates, and, unfortunately, a few more ways to get confused. That's offset by an outstanding, clearly written manual.

Timeslips III is really a billing program, producing professional-looking invoices effortlessly in a variety of formats. It gets downright serious about tracking what's owed to you, even supplying aged accounts-receivable reports.

A Final Caution

These programs are fun—maybe too much fun. You can get so caught up in managing your time that you fritter away the very thing you're working to conserve. Add a computer to the mix, and the temptation to really get organized can end up eating away your precious time. Don't be overorganized, more interested in being organized than in accomplishing anything. Time management is doing the right things at the right time, not just keeping track of what you've done. ⊡

Richard O. Mann is an internal auditor for the Church of Jesus Christ of Latter-day Saints. His book, *Working with Windows 3,* will be released in the spring of 1991.

***Arriba* 1.01**
PC compatibles with 384K and a hard disk
$195.00
Good Software
13601 Preston Rd.
Dallas, TX 75240
(800) 272-4663

***Franklin Day Planner* (a book)**
$24.95
Franklin International Institute
P.O. Box 25127
Salt Lake City, UT 84125-0127
(801) 975-1776

***Instant Recall* 1.2**
PC compatibles with 512K and at least a 720K floppy or a hard disk
$99.95
Chronologic
5151 N. Oracle, #210
Tucson, AZ 85704
(800) 848-4970

***OnTime* 1.2**
PC compatibles with 320K
$69.95
Campbell Services
21700 Northwestern Hwy.
Suite 1070
Southfield, MI 48075
(313) 559-5955

***TimeSheet Professional* 1.2**
PC compatibles with 512K; hard disk recommended
$149.95
Software Partners
999 Commercial St.
Palo Alto, CA 94303
(415) 857-1110

Timeslips III
PC compatibles with 448K and a hard disk
$299.95
Timeslips
239 Western Ave.
Essex, MA 01929
(508) 768-6100

***Top Priority* 1.00**
PC compatibles with 384K
$99.95

***Calendar Creator Plus* 3.0**
PC compatibles with 320K or Macintosh
$59.95
Power Up! Software
P.O. Box 7600
San Mateo, CA 94403-7600
(800) 851-2917

***who-what-when* 2.0**
PC compatibles with 512K and a hard disk
$189.95
Chronos Time Management Software
555 De Haro
Suite 240
San Francisco, CA 94107
(415) 626-4244

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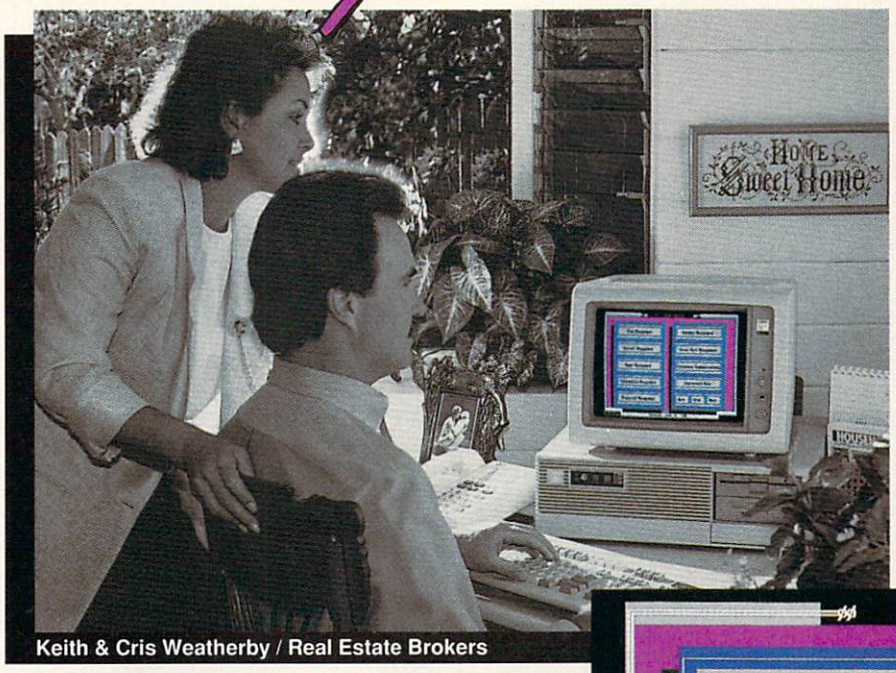

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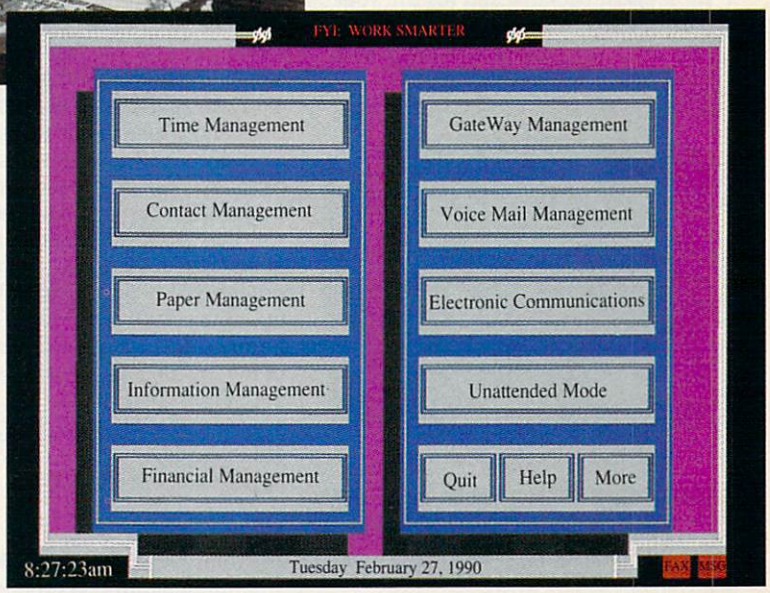

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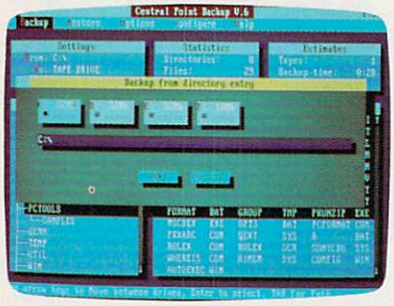
NEW PRODUCTS

EDITORS

Backup Zinger

Central Point Software is now offering the backup program in its *PC Tools Deluxe* Version 6.0 package as a stand-alone program—*Central Point Backup.*

The new interface in *Central Point Backup,* the most graphical in any character-based DOS backup program, makes it easier to select files and options and thereby encourages you to perform regular backups. You can save the program's options and selections, making it easy to launch subsequent backups and restore your data directly from the DOS command line. With the built-in scheduler, you



***Central Point Backup* has an easy-to-use interface that simplifies backups.**

can perform unattended backups. To help ensure data integrity, the program offers complete bit-for-bit verification of all backed-up data, as well as a Compare feature, which checks the backup against current files. National Software Testing Laboratories tests have shown *Central Point Backup* to be the fastest backup program on the market. The program also compresses data by as much as 60 percent without increasing backup time.

Central Point Backup lists for $99, and you can upgrade to *PC Tools Deluxe* for an additional $50.

Central Point Software, 15220 NW Greenbrier Parkway, #200, Beaverton, OR 97006

Reader Service Number 351.

Opening Up Windows

Microsoft is offering its Supplemental Driver Library (SDL), a collection of device drivers supporting approximately 126 hardware peripherals, including printers, video displays, pointing devices, and other peripherals that run under *Windows* 3.0. Some of the drivers provide support for new peripherals, while others provide enhanced performance or new features for previously supported peripherals. This is the first in a series of periodic releases of additional *Windows* device drivers.

The SDL has a broad distribution scheme to give you fast and easy access to the drivers you need. Moreover, the SDL disks can be freely copied and distributed among licensed *Windows* users within a company. You can download the SDL from online services such as Microsoft OnLine, CompuServe, and GEnie at no charge. Optionally, you can order the SDL from Microsoft directly by calling (800) 426-9400. There's a nominal $20 charge to cover the cost of the 3½- or 5¼-inch disks on which the SDL is distributed.

Microsoft, One Microsoft Way, Redmond, WA 98052-6399

Reader Service Number 352.

Micro Micro

Isotropic Computer, a PC designer and manufacturer, is producing the smallest 80286-based motherboard on the market. Based on the revolutionary Chips and Technologies Single Chip AT (SCAT) product, the diminutive board measures 4 × 7 inches. It operates at 12 MHz or 16 MHz, and plans call for a version that would operate at 20+ MHz (as soon as C & T offers the faster chip). Features include a variety of memory configurations—up to 16MB—with a selection of plug-in memory boards, selectable wait states, full LIM EMS 4.0 support, BIOS shadow ROM support, and a socket for an 80287 coprocessor. Isotropic is the first manufacturer to develop and release a system board based on this C & T design.

Isotropic's motherboard will be 100-percent IBM compatible and will initially be offered in a slimline cabinet and a regular AT-style cabinet.

Isotropic Computer, E. 5920 Seltice Way, Post Falls, ID 83854

Reader Service Number 353.

Fun with Words

Ever wish you could supply the definition and have your computer come up with the right word? Now you can with *Inside Information* from Microlytics. It's a comprehensive hierarchical dictionary that organizes the English language into categories of defined words. According to the company's president, Mike Weiner, "*Inside Information* presents the ideal organizational structure for language in the electronic age."

The program begins with seven general word classes: Nature, Science & Technology, Domestic Life, Institutions, Arts & Entertainment, Language, and the Human Condition. The seven classes are broken down into 20 subclasses, 125 categories, 700 subcategories, and more than 65,000 root-word entries. You can view the words with an Outline view, which lists the information vertically, or with the Reverse Dictionary view, which lets you type in a few descriptive words and receive a list of possible answers. For example, with the Reverse Dictionary, you could type in *left side of ship* and get back *port.* The MS-DOS version of *Inside Information* is available for $119.

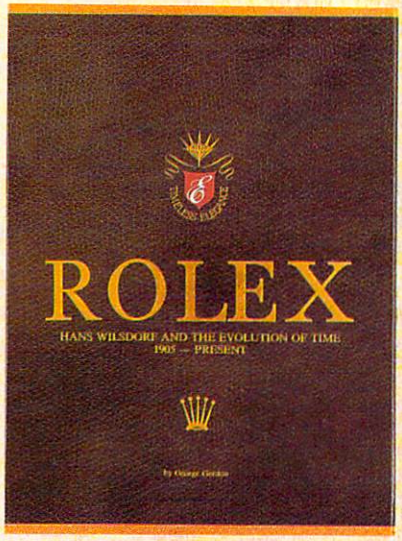
Microlytics, Two Tobey Village Office Park, Pittsford, NY 14534

Reader Service Number 354.

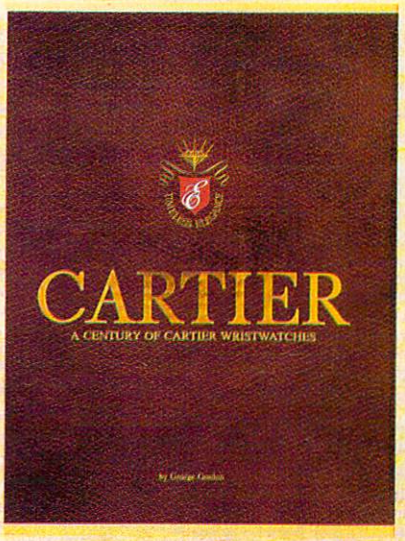
Friendly Persuasion

Presenters interested in winning friends and persuading strangers will want to know about *Persuasion* 2.0. It makes presentations easier and more intuitive by using the advanced graphics capabilities of *Windows* 3.0. Not only does it present pretty pictures and graphs, it also incorporates an outliner and a word processor, which can help you prepare speaker's notes ▷

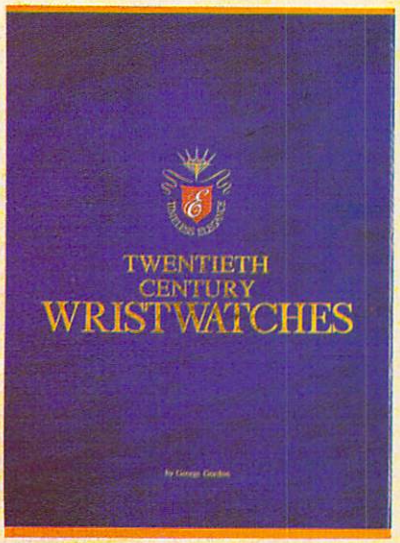
THREE OF THE MOST LAVISHLY ILLUSTRATED BOOKS EVER PUBLISHED ON WATCHES



☐ **Rolex: Timeless Elegance**
by George Gordon. 12¼ × 9¼in./310 × 234mm. 350 pages, 292 colour illustrations, in slip case. A Certificated Limited Edition. ISBN 962 7359 01 7. Features the company's original designs, period advertisements and certificates. However, the highlight of this luxurious volume is the sumptuous modern colour illustrations of 635 Rolex watches of all ages. $160.



☐ **Cartier: A Century of Cartier Wristwatches**
by George Gordon. 12¼ × 9¼in./310 × 234mm. 552 pages, 450 colour illustrations, in slip case. A Certificated Limited Edition. ISBN 962 7359 02 5. Louis Cartier created the first man's wristwatch in 1904 and this book illustrates them from this date to the present day. The hallmark of this book is the lavish, high quality, modern colour illustrations of 1002 wrist watches. $225.



☐ **Twentieth Century Wristwatches**
by George Gordon, 12¼ × 9¼in./310 × 234mm. 364 pages, 300 colour photographs. ISBN 962 7359 03 3. Twentieth Century Wristwatches is a look at the development of wristwatches during this century. The finest wristwatches by the greatest Swiss companies from the beginning to their finest productions of the 1920-1950s have been assembled in this unique book including beautiful photographs and complete descriptions. $180

Please add $10.00 per book for airmail. Send your check or money order to: Timeless Elegance c/o Michael Stevens, General Media, 1965 Broadway, New York, N.Y. 10023 Tel: 212 496-6100. Fax: 212 874-1349. (N.Y. residents add sales tax.)

INTERNATIONAL COLLECTORS OF TIME ASSOCIATION

A new international club for collectors and dealers of wristwatches is being formed with headquarters in four cities, Milan, London, New York and Hong Kong. Called "International Collectors of "Time Association", the club's purpose is to provide an avenue for the exchange of ideas and information between wristwatch collectors.

Each chapter will have its own Board of Directors to oversee that area's activities.

Four meetings of the International Collectors of Time Association (ICTA) are planned per year. The first meeting will be in May, 1990 in Hong Kong at the Park Lane Radisson. The second meeting is scheduled for September, 1990 in London at the Churchill Hotel, followed by the third conference in New York in December, 1990. More details will be provided later, but the Hong Kong meeting will give collectors an opportunity to meet other collectors and dealers from around the world.

We want to organize meetings in Italy, Japan, France and Germany. If you would like to help organize one of these meetings, or any of the three already scheduled, please contact one of the clubs.

A magazine comes complimentary with your membership. Published in English, bi-monthly, it will contain reviews on what's happening in the wristwatch market around the world with reports on sales and auctions, and news about new products just being designed. There will also be a question and answer column for collectors and dealers, as well as a column where watches can be sold or bought. If you have any interest in writing an article for the magazine, sharing an old catalogue or have stories about yours or others' wristwatches, the editor would like to hear from you. The association plans a new book next year, and your wristwatch could be included if you so desire.

Membership fees are US$75.00 per year. (If you require your magazine sent airmail, there is an additional US$25 charge.)

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☐ I want to become a member of the London, Hong Kong, New York, Milan chapter of ICTA (circle one). Enclosed is my cheque for US$_____ to cover membership fees plus any airmail charges.
Cheque made payable to International Collectors of Time Association

☐ I might be interested in attending the Hong Kong, London, New York meeting. 'Please send me more information.

☐ I have an interest in writing/contributing information to the magazine.

☐ I want to help organize one of the meetings, Location:_____

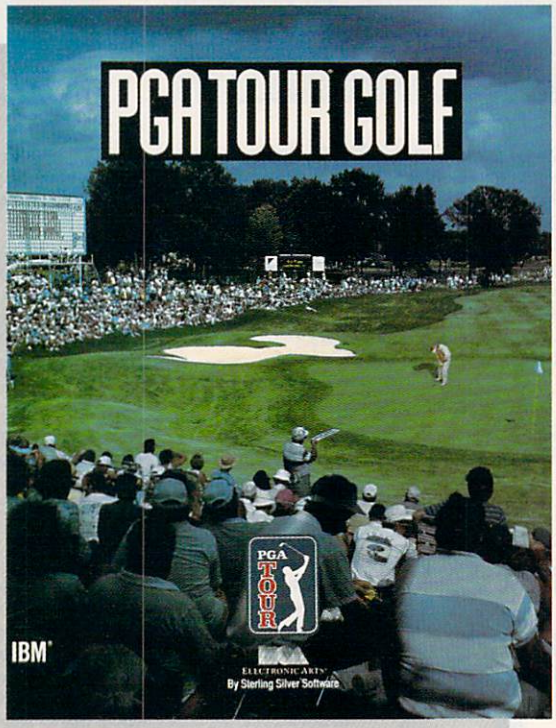
INTERNATIONAL COLLECTORS OF TIME ASSOCIATION

U.S.A.: 1 Old Country Road, Suite 330, Carle Place, New York 11514
Tel: 212 838-4560 Fax: 212 838-9737

U.K.: 173 Coleherne Court, Redcliffe Gardens, London, England SW5 0DX, United Kingdom.
Tel. 44-71-373-7807 Fax. 44-71-373-0347

ITALY: Viale San Michele Del Carso, 5, Milan, Italy. Tel. 39-2-498-0464 Fax. 39-2-469-0890

H.K.: 224 Pacific Place, 88 Queensway, Hong Kong. Tel. 852-845-7514 Fax. 852-877-0518



COMPUTE CHOICE

COMBINE REALISTIC PLAY, SPECIAL EFFECTS, TOURNAMENT PLAY, AND THE ABILITY TO PLAY WITH SOME OF THE PGA'S TOP GOLFERS, AND YOU HAVE A GOLF GAME THAT SCORES AN EAGLE

PETER SCISCO

The key to any sports simulation lies in its ability to mimic the real thing. Most golf games pin their hopes on copying famous courses and in offering PC duffers a choice of clubs. Some go so far as to include wind and other environmental factors. *PGA Tour Golf* does all of these things and goes one better: It puts you on the professional tour, where you play against the big boys.

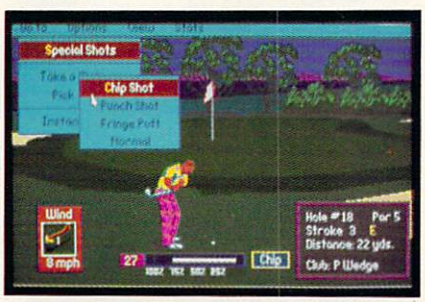
Put your skills to the test on any of three Tournament Players Club golf courses: Avenel, Sawgrass, or the PGA West Stadium. But before you go out on the tour, you'll want to visit the Pro Shop. This opening screen provides menus for Play, File, View, Stats, and Options and is a good example of the detail built into the *PGA Tour Golf* interface. You can pull down menus and play the game with keyboard commands, a mouse, or a joystick. From the Pro Shop Play menu, for example, you can hone your driving and putting skills, play a Practice Round, or move to a Tournament.

The other Pro Shop menus handle game files, scorecards, and statistics. Every time you play, *PGA Tour Golf* adds to your stats, giving you a steady chart of your progress—or lack of it. The Tour, after all, consists of more than one game. Trying to stay at the top of the rankings is as much of a challenge as is sinking a 40-foot putt.

INMENT

MARK WAGONER © 1990

The mechanics of *PGA Tour Golf* follow the traditional power-bar method: You aim your shot by moving a cross-hairs cursor to the right or left; then you press the space bar or a button (joystick or mouse) for distance and accuracy. Overswinging (moving past the 100-percent power line) increases the chance of a hook or slice. Accuracy depends on your striking the space bar or pressing the button at the point at which the power indicator returns to the 0-percent line. Hooking and fading the ball around obstacles plays a role as well, and it's good to practice these techniques on the driving range.



An arsenal of special shots enhances the realism in this duffer's dream.

Graphically, the game is a pleasure to watch. Until you strike the ball, your view is from behind your player, looking down the course toward the green or fairway. Once you've struck the ball, however, the view switches to a point farther down the links, and you have a TV view of your ball as it lands in the fairway—or as it misses its target and falls into the rough or another hazard. The bounce and roll of the ball is very realistic, with some shots spinning back or rolling forward depending on how you strike the ball.

The graphic presentation is enhanced with fly-by views of each hole, accompanied by a tip from a top PGA golfer. Beginning at the pin, the camera rolls back down the fairway toward the tee, illuminating the approach to the green and the hazards that threaten your success. On a fast machine, say a 12-MHz 286 or a 386SX, these views are a lot of fun to watch (at least at the beginning). But I turned them off when playing the game on a Tandy 1000 because it took so long to run the graphics sequence. To its credit, *PGA Tour Golf* allows you to make such adjustments, enhancing your enjoyment of the game no matter what kind of computer you own.

Out on the links, the game suggests the right club for every situation, but you can put it back in your bag

and choose another if you like. You can even choose the mix of clubs you want in your bag at the start, which lets you customize the game to your golfing style. Unlike most golfing simulations, the club you have at any given point on the course is not simply rated at a certain distance at 100 percent (that is, a 9 iron isn't always rated at 112 yards); rather, the potential distance of any club is affected by the lie of the ball. For example, that same 9 iron might be rated at 112 yards from the center of the fairway but only 57 yards from the deep rough—and even less if your ball is half-buried in the rough.

Once you're on the fairways, it's easy to see why this game earned the endorsement of the PGA Tour: The detail of play is accurate right down to the lie of the ball and unpredictable gusts of wind. The wind meter at the bottom left of the screen swings around with every gust and stops only when you begin your swing. On a long hole, you may want to wait for the wind to swing your way before trying that long drive.

You not only have to deal with the wind, but you also must contend with the vagaries of the ground. If your ball is sitting in the fairway, for example, you would get a better shot than you would if the ball is half-buried in heavy rough. Special pop-up overlays describe the condition of your lie before every shot except for the drive off the tee. I found the information crucial to my making decisions along the course, but if you find these screens distracting, you can turn them off.

Golf is a lot more than just swinging a club, of course. Like great pool players, great golfers know how to work a ball to get the best roll, the fortuitous bounce. When you're approaching the hole, *PGA Tour Golf* gives you a choice of shots to make from its Options menu when you select Special Shots. Shortcut keys for these shots are also available, so you don't have to go through the motions of pulling down the menus. The F7 key, for example, lets you chip your shot. There are also options for punching your shot (great for getting out of deep rough with some measure of accuracy, with the sacrifice of distance) and for pitching your shot out of bunkers.

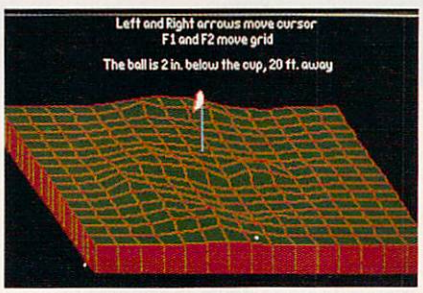
In any case, whether you chip the shot from 13 yards out and send the ball rolling across the green for the birdie, punch the ball low to get out of the rough, or putt the ball from the fringe of the green, you'll appreciate the variety and realism that these shot options add to the game.

When you do reach the green, *PGA Tour Golf* brings to the screen a topographical representation of the green, with a grid that helps you identify the breaks—both their angle and severity. Using the F1 and F2 keys, you can walk around the green to examine your shot from different angles. The distance your ball lies from the hole and the distance your ball sits above or below the cup are listed at the top of the grid screen. That information is indispensable to making a successful putt. In a nice touch, the game allows you to aim your shot from the grid screen by positioning the crosshairs; when you return to the normal view, your target position is carried over.

After a few practice rounds, if you feel ready to go for the money, you can take your bag on the tournament circuit to compete against some of the biggest names on the men's tour. (It's unfortunate that Sterling Silver Software doesn't offer an LPGA mode. I should think that there are some women out there who'd enjoy a good computer golf game. Maybe in a later version or as an add-on disk—right, guys?)

Start the tournament at the pro tent.

Tips from the pros can help you plan a strategy from the tee to the green.



Use the game's topographic grid to read the green and sink that birdie.

The tournament mode brings in the great golfer's equalizer: psychological pressure. If you make the first cut, you advance to the second round (no mean feat). Make that cut and then the nest and you find yourself among the money winners. *PGA Tour Golf* keeps stats on all the golfers, including the pros, so that you can check your standings against the top money winners at any time.

The tournament mode brings in a few more graphical touches, such as a pop-up screen that announces the standings from time to time as you play. For example, before making your approach shot to the 8th hole, you may learn that Hale Irwin birdied the 16th to move into third place. At the end of each hole, the leader board screen gives you a quick picture of the standings. It lists the players, what hole they're shooting, and their stroke total. Page through the leader board to find out where you are in the pack; then plot your comeback or watch yourself fade. Without a doubt, you'll soon find yourself caught up in the action and trying to make up lost ground or trying to defend your narrow lead. But stay steady—golf is played by the stroke, not by the putt.

Golf is one of the fastest growing sports in the country, which may have something to do with the booming success of computer golf games. With its attention to detail, its special graphics effects, its tournament mode, and its realistic play, *PGA Tour Golf* scores an eagle.

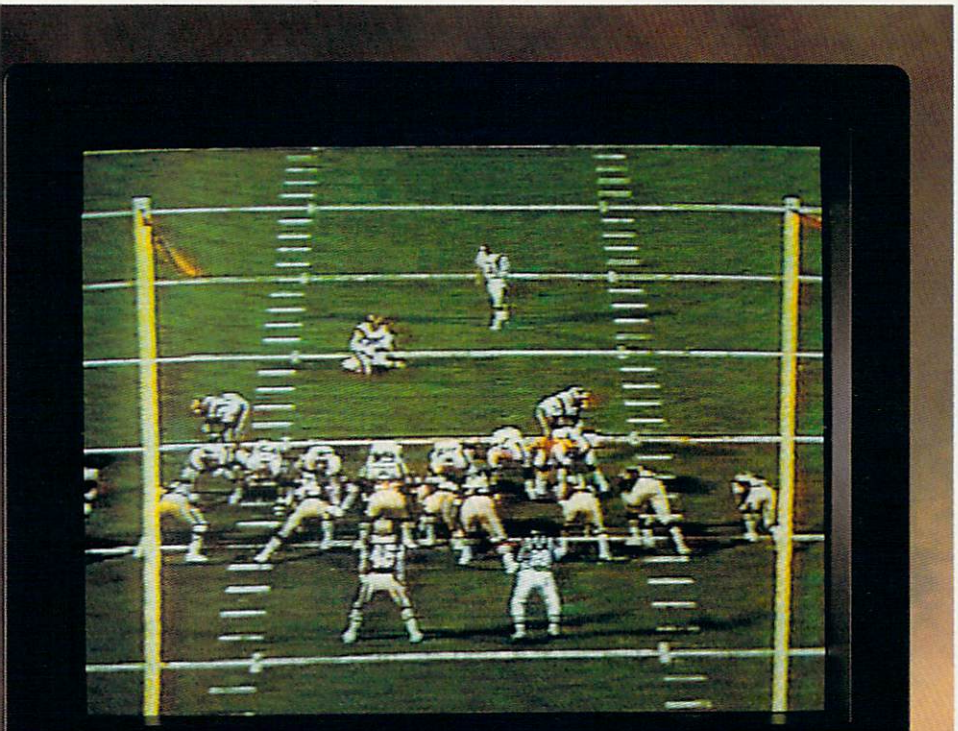
Playability	★★★★★
Documentation	★★★★
Originality	★★★★
Graphics	★★★★

IBM PC and compatibles with 512K—$49.95

Package includes 55-page manual, quick-reference card, golf scorecard, and two 5¼-inch disks

Sterling Silver Software
(Distributed by Electronic Arts)
1820 Gateway Dr.
San Mateo, CA 94404
(415) 571-7171 ⊡

Two ways to play an American tradition.



Play the Tape.

Then Play the Game.

Screens shown are from the IBM and Amiga versions. Other versions may vary. Brand or product names are trademarks or registered trademarks of their respective holders.
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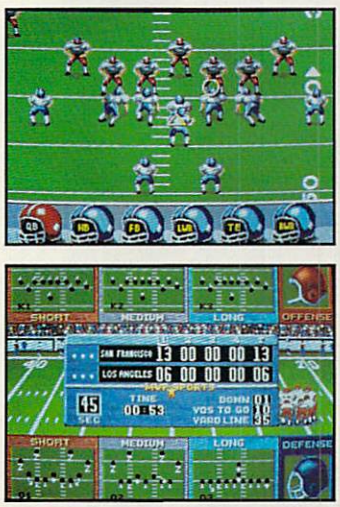
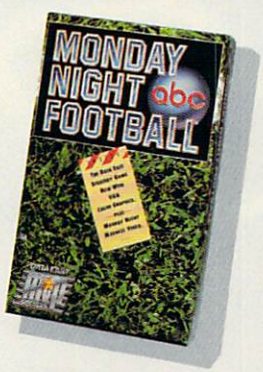
ABC's Monday Night Football is a tradition in more than 20-million American households. Now you can enjoy 20-years of highlights and then make some of your own.

The new ABC's MONDAY NIGHT FOOTBALL Entertainment Pack features the 20th anniversary *Monday Night Madness* videotape and *ABC's Monday Night Football* computer-software game.

ABC's MONDAY NIGHT FOOTBALL brings the tradition of football excellence to life in the most realistic computer-football game ever created. The IBM-PC game now features enhanced VGA graphics that put you right on the field. You'll even hear Frank Gifford make the broadcasting calls in key game situations.



MONDAY NIGHT MADNESS captures two decades of the most memorable moments from ABC's weekly football spectacle. There's nothing but action and excitement in this thrilling 48-minute VHS videotape never before available in stores.



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GAMEPLAY

ORSON SCOTT CARD

Some people judge a simulation game by how closely it resembles doing the real thing. I think those people are crazy. That's because most simulations represent tasks that real people do—as their jobs. As work. The people who really do these jobs usually find them to be so wearying and difficult that they can't wait to get home and relax by playing a game on the computer.

Admittedly, some people are frustrated with their careers and have fantasies of doing something else for a living. Those people probably appreciate a chance to do every tedious detail of somebody else's job. I don't think flight simulators are particularly fun. To me they seem like astonishingly boring work. Obviously, some people really enjoy these simulations.

Most of us, however, buy games not to work, but to play. To me that means the game author's job is to analyze the real-world job, discover the parts that are fun, and then let the player do only those parts while the computer takes care of all the icky boring tasks.

If this were done well, almost any job could become a game. But it isn't usually done well. Many game writers seem to work overtime to ensure that their simulations make the player do all the boring jobs while the computer gets to do most of the cool stuff.

There was only one *SimCity,* a unique bright spot in the endless tedium of simulation games. Then I played *Sid Meier's Railroad Tycoon* (Microprose).

After giving up on *Design Your Own Train* as a monster from Interface Hell, I had begun to despair of anyone's ever doing an adequate job of making a computer simulation of a model railroad.

Well, *Railroad Tycoon* is not a simulation of a model railroad. It's a simulation of entrepreneurial economics in the transportation business.

Of course, if they put "simulation of entrepreneurial economics" on the box, nobody would buy it. But if the interface is humane and the simulation lets you do the fun parts, almost anything can be fun.

Much of the freshness of the game comes from the fact that the landscape is never the same twice, both because the game is transformed by the player's choices and because every time you play, the landscapes are transformed so that towns that were big the last time you played are nothing much this time. The world is always new, and it's always different because you're playing.

SAME DISKS DIFFERENT GAMES

But there's something else going on here, too. Human beings have a fundamental hunger to create things, to make things grow. I think that's much of the appeal of Risk and its best-ever computer offspring, *Romance of the Three Kingdoms.* These aren't war games. They're games about assembling empires.

That's what the great entrepreneurs do, too. John D. Rockefeller didn't conquer his competitors in order to beat them—he was perfectly happy to buy their companies and leave them in command. He wasn't trying to win, nor was he trying to get rich (he gave away large amounts of money long before he had that much of it). Instead, he was trying to create the perfect oil company, one that included everything from the wellhead to retail sales. Like Alexander the Great, he didn't want to destroy his rivals; he simply wanted to become so large that he could contain them all. That's the impulse behind *Railroad Tycoon.* Or is it?

Here is what's really glorious about this game. The game's authors don't make you play it just one way. What if you're one of those crazy people who actually want to do the day-to-day work of scheduling a railroad? I know they exist—they're the ones who build the huge model train layouts in their basements, put on engineer's caps, and stay there for hours just running the trains and making them keep to a schedule without colliding. You can change an option in *Railroad Tycoon,* and the computer stops scheduling your trains for you. Now you get to do it, and if you blow it, trains crash.

That's the key: If you want to do the scheduling, you can do that, and the game will be fun for you. But if, like me, you think of it as having to do the scheduling, you can skip that, and the game will be fun for you.

And that isn't the only way that game writers have opened up the game for us. We can keep business competition on a friendly basis or make it a cutthroat kill-or-be-killed affair. We can fuss with the details of a complex economy, worrying about which cargoes will be carried where, or we can keep it simple and spend our time trying to grow the railroad into new markets.

The same great displays, the same intuitive interface, the same fun animation routines—but you're playing at running a railroad while I'm playing at building a transportation network, and she's out to kill the competition, and that truly crazy person over there is playing at macroeconomics. Same box. Same disks.

I tell you, folks, this is a dangerously radical idea–letting the player decide what kind of game he wants to play. If other game writers start doing the same thing, the real world might grind to a halt as games become so much more fun than reality that nobody can stand to go to work anymore. I know what I'm talking about. It's already happened to me. ⊡

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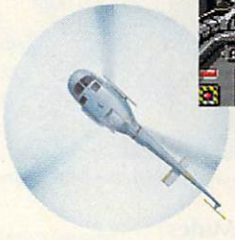

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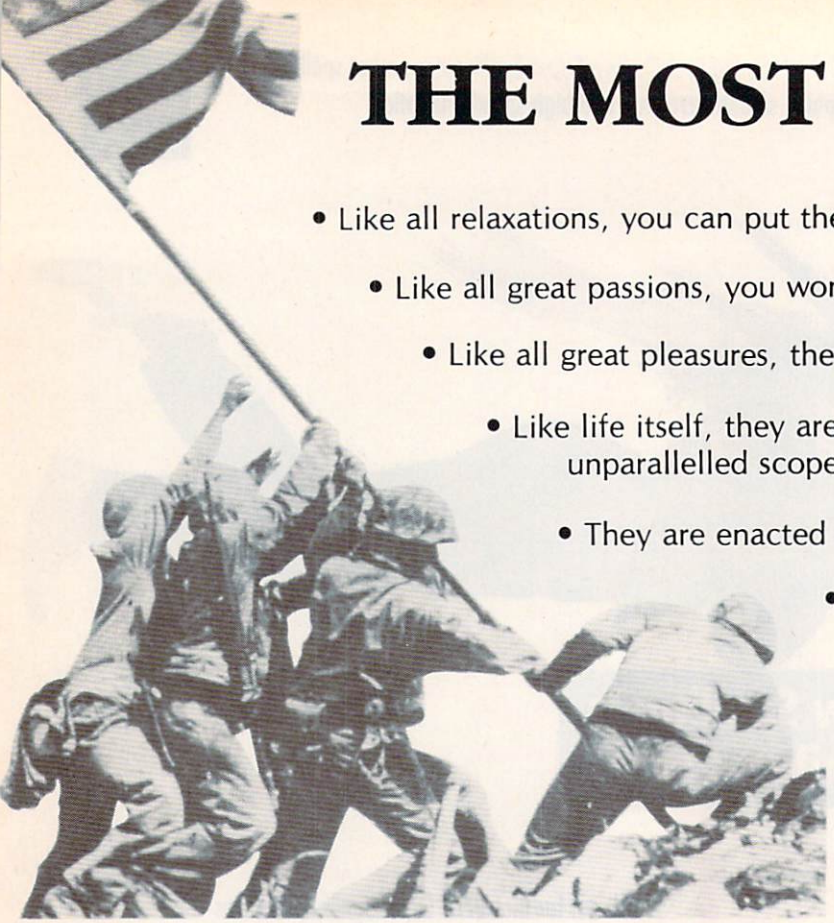
* Requires IBM PC or 100% compatible, 512K RAM and EGA or VGA. Joystick recommended. †If adequate use of this product fails to improve your child's spelling grades, Britannica Software will exchange it for another product of equal value or refund your money completely. See package for details. © 1990, Britannica Software, Inc.

THE MOST REMARKABLE



- Like all relaxations, you can put them down whenever you like.
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The Quebec Conference. From left to right, in the foreground: Mackenzie King, prime minister of Canada, Franklin Roosevelt and Winston Churchill.

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British ships of the line after Nelson's triumph at Aboukir Bay.

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A French hussar and a dragoon talk with their sentries posted nearby.

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Between 1798-1814 a straggle for world hegemony was waged.

From *Napoleon Buonaparte's* decision to invade Egypt, to *Alexander I's* to champion Mecklenburg, the decision which led to the downfall of *Napoleon,* the history of Eurasia twisted and turned. History could have diverged profoundly from its actual course. *Nelson* should have caught *Napoleon en route* to Egypt destroyed him and inadvertently preserved the Republic. *Napoleon* should have triumphed in 1813.

The tapestry of these struggles was dark to its creators, its final outcome obscure and inevitably the result of a panoply of individual efforts. For example, the French were undone in Spain by Napoleon's inability to personally supervise the campaign.

MUSKETS & MULES

During the years 1805-1810 a four-cornered struggle for hegemony raged over German and Italian speaking Europe. Empires rose and Empires fell. In the course of this epochal clash of powers the first French Empire under the Emperor Napoleon I broke the back of the Habsburg Empire, twice defeated the Empire of all the Russias and virtually dismembered the Kingdom of Prussia.

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(1 to 2)	*(1 to 2)*
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☐ **MUSKETS & MULES**

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Russian .....
Prussian .....

C-12

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MIND GAMES

ILLUSTRATION BY JANICE R. FARY

COMPUTE'S EDITORS INVITE YOU TO LEAP INTO THE WORLD OF IMAGINATION. ARE YOU GAME?

One of the joys of computer entertainment is the imaginative journey it takes you on. After playing games for a while, you might even begin to invent your own scenarios. That's just what our editors did, and this is the result.

Evolution from Stepping Stone Software

Up from the primordial ooze swims a tiny one-celled animal, searching for food. As our prehistoric Pac-Man gobbles its way toward the surface, make sure it avoids becoming someone else's meal. It must survive to produce future generations in this computer simulation called *Evolution.*

Use your joystick to guide your munching microbe through a miniature smorgasbord, where every choice affects future generations. Try to dine selectively, but watch the clock. Food is plentiful near the surface, but so is the sun's dangerous radiation. Should your character feast in the bright sun, or should it grow at a slower rate in deeper but safer water? Your choices will affect its descendants.

When and if your creature reaches a certain size, the game jumps a billion years to the age of dinosaurs. Your creature has evolved, but what it has become depends on your actions at the previous level. Too much red plankton and you're a Tyrannosaurus Rex, a nasty dinosaur—but one teetering on the edge of extinction. A diet of green amoebas, plus a sampling of air without too much radiation, produces something warm-blooded that crawls ashore on two legs.

On the next rung of this evolutionary ladder, your creature may resemble early man or something else entirely. If you've come up with three wings and five horns, you may find yourself in Mother Nature's garbage can with a *Do you want to play again?* message on your screen.

Qualities in a mate can also affect change. You can probably thank your grandparents for your big feet, blond hair, or tendency to gain weight. But remember, a few extra pounds might have permitted an early ancestor to survive a famine. When an Ice Age threatens, do you select a mate who looks good in a skimpy bearskin or one who can survive the winter on a single woolly mammoth burger?

How well you solve different problems determines the game's outcome. If you barely make it through each stage, make questionable choices, and show limited mental agility, you could end up on display in a zoo—or become vice president. But if you show some initiative, find food and shelter in a reasonable time, and use tools to good advantage, then your creature might end up looking something like yourself—sitting at a computer, playing a game.

If you solve every problem quickly and intelligently and demonstrate academic, artistic, or cultural tendencies, then your creature could become a genius—a scientist, perhaps, whose latest invention has just destroyed the world. Go that far and you may find yourself at the beginning again—as a tiny one-cell creature swimming toward the light in some primordial ooze, searching for food.

TOM NETSEL

Find the Public Bathrooms in New York City from After Hours Software

You and your family are vacationing in New York City, and your youngest needs to go to the bathroom. Your goal: to find a public bathroom in the shortest possible time. Ask for directions from the people you meet, but you'll lose points and valuable time if you mistakenly ask another tourist. You'll also lose points when you encounter angry store managers who yell *Employees only!* ▷

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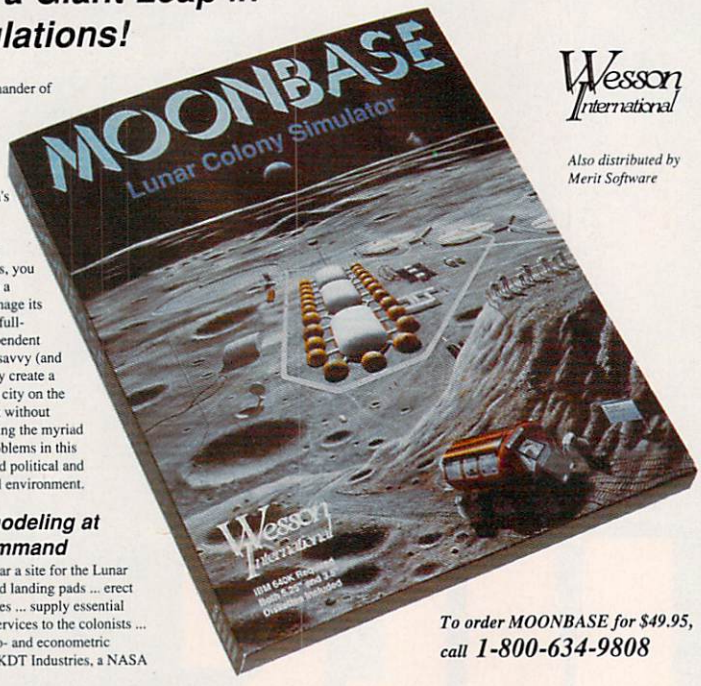

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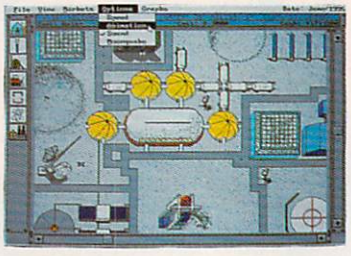

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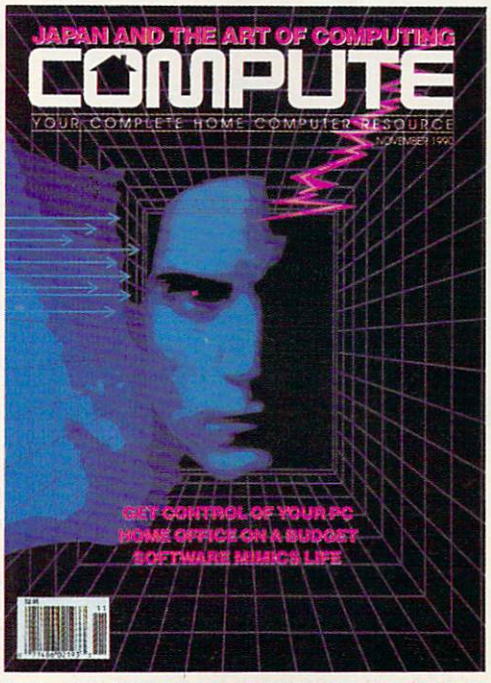

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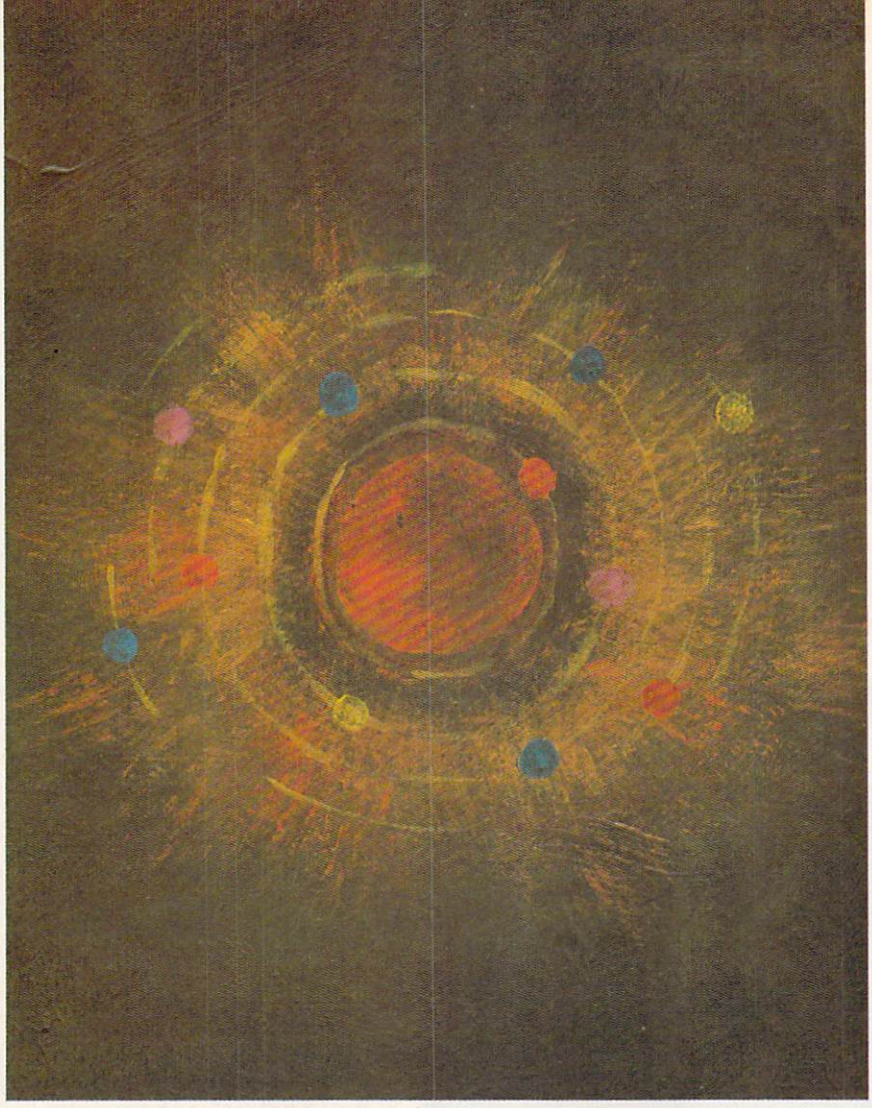

Your obstacles include 8th Avenue women-of-the-night *(Johnny! Suzie! Close your eyes!),* Canal Street cab drivers *(Sure lady, I know where that is.),* and Bowery bums *(Clean your windshield?).* The winning locations include any NYC public library, museums on free-admission days, most department stores, and your cousin Fred's condo over on the East Side.

The game uses sampled sound and digitized pictures. You'll hear the roar of real cars as you rush to cross the street ahead of the light. You'll see the variety of gestures New York cab drivers are famous for as they explain just where you should go. Experience the full palette of your graphics adapter when you become lost backstage during the July 4th extravaganza at Radio City Music Hall.

Earn additional points for spotting the English-speaking cab drivers, waiters who aren't aspiring actors, and lawyers who turned down the Trump divorce case.

A special version of the game called *Find the Public Bathrooms in Homer, Alaska* offers native New Yorkers a challenge of their own. Look for additional modules in the Find the Public Bathrooms series, including *Graceland on Elvis's Birthday* and *London During a Plumber's Strike.*

DAVID ENGLISH

Colony: A Universal Game from KF Software.

Science fiction that takes science and fiction seriously—this is the kind of game I've been waiting for.

The best of print science fiction endeavors to deal with the universe head-on, creating a self-consistent fictional environment with inviolate internal rules. Unlike cinematic science fiction, seriously written science fiction doesn't sport spacecraft making hard banking turns while firing all phasers. Alien civilizations are only rarely bent on conquest, and the universe is, if not hostile, at least not benign. The environments in which those stories play themselves out are rich but often bleak, and always unforgiving.

We've seen little of this in interactive science fiction. Most interactive science-fiction games involve either interstellar wars or interstellar trading, or some combination of the two. Virtually all of the games are laden with silly names for alien races, self-referential jokes and asides tossed out between combat encounters, and cleverness taking the place of thought.

It doesn't have to be this way, as *Colony* shows. Like much of the best science fiction, this game deals with the exploration of the universe, the discovery and colonization of new worlds.

Colony takes place in a rigorously Einsteinian universe. That means no faster-than-light travel; voyaging from solar system to solar system can take decades or even centuries. Sound boring? Not necessarily.

Time compression eliminates most of the tedium: One minute of realtime equals one year of travel time, for example. Much of the drama in the early phases of the game stem from precisely the amount of time and isolation your travelers must endure. Communication with the home planet grows more time consuming with each moment of travel. Gradually, the ship's complement develops its own social structure, different from that of earth. A generation is born in space with no memory of Terra.

There are technical and mechanical problems as well. Difficulties with the ship, scientific mysteries from the universe outside, or sociodynamic issues raised by the ship's self-contained population—there's plenty to do between the stars. Handled properly, a voyage of centuries flies by.

But this game doesn't end when you reach the destination star system; that's just the start. You must examine planets, analyze environments, and plan settlements. Or you may have to change plans: Close examination may show that your destination worlds are unsuitable for colonization. You may have to seek new worlds among the star systems, refurbish the ship, and begin the journey again.

The only way *Colony* really cheats is in the exuberance with which it tosses earthlike worlds through the firmament. Those worlds are needed for the game's next phase, colonization and expansion. There are globes to explore, filled with promise but also promising peril to the unprepared. Hundreds of scenarios are possible on each world. Some planets may bear intelligent lifeforms with whom interaction is possible. Others may harbor dread diseases—whose effects may not be evident until years of game time have elapsed.

This is a wonderfully open-ended game, without artificial time-length or number-of-turns rules. If a colony flourishes, for example, there's no reason why its citizens shouldn't decide to assemble and launch their own ex-

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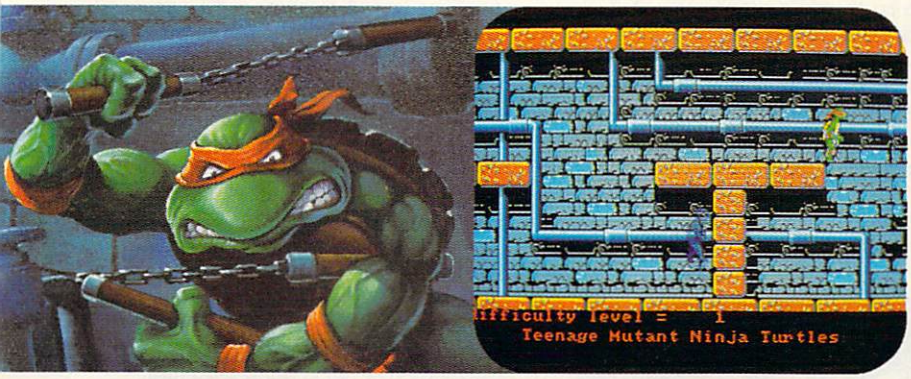

No computer will go unscathed, as Ultra's version of Teenage Mutant Ninja Turtles® storms into your disk drive to duke it out with Shredder™—a maniac more menacing than an army of mind-altered Bruce Lees.

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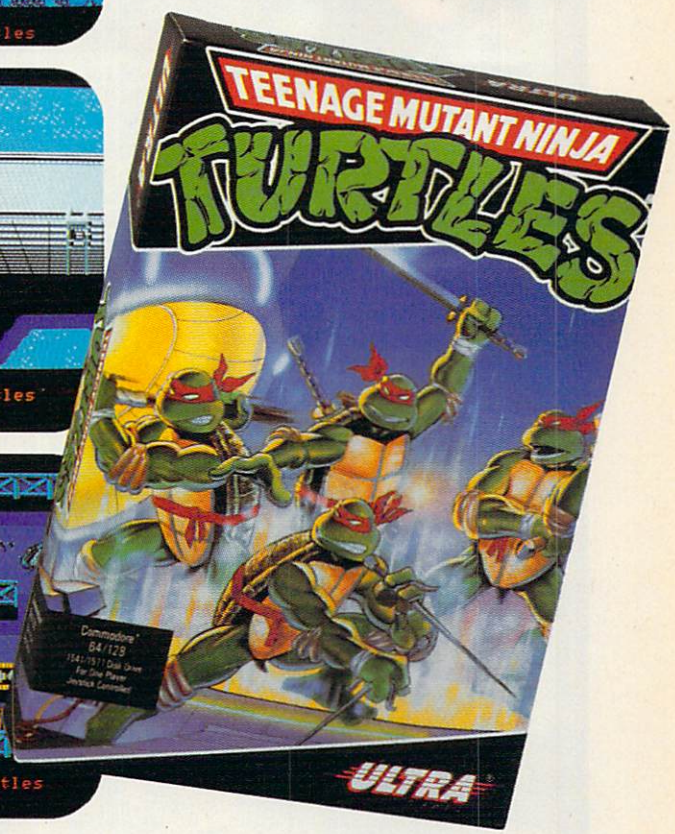

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Teenage Mutant Ninja Turtles is available for IBM, Commodore and Amiga.

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pedition to nearby stars.

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KEITH FERRELL

Rev One Point Oh! from Shrink Wrap License Software

Are you one of those folks who has to be the first on the block with the latest software package? Now you can relive those anxious moments when you first booted that new operating system with *Rev One Point Oh!*, a joint venture of some of the world's largest software companies.

Part game and part historical-education software, *Rev One Point Oh!* simulates the first releases of a number of famous software packages and operating systems. PC users will thrill to the experience of trying to get *Lotus 1-2-3* to run under *Windows* 1.0. Amiga users will meet their old friend, the flashing red Guru Meditation error, while running an eerily accurate simulation of *Kickstart/Workbench* 1.0. And Mac users will hardly be able to contain their excitement as they attempt to run Macintosh *WordPerfect* 1.0 under the first release of MultiFinder.

The object of *Rev One Point Oh!* is to try to get as much work done as possible before you crash the system. It's fun for the whole family. Cheer Dad on as he attempts to create a document in the first release of *PageStream. No Dad! Don't select Variable Zoom with the mouse accelerator active!* Too late. A flashing red *Game Over* box appears at the top of the screen. Watch the kids show up their parents by getting *Flight Simulator* 1.0 to run in the OS/2 DOS compatibility box.

Look for the new Gamers Edition of *Rev One Point Oh!*, in which you try to land your plane in the Atari ST *Falcon* 1.0 and attempt to launch a single attack in any of the first 16 releases of *Harpoon.*

Rev One Point Oh! version 1.032 costs $59.95. Bug-fix upgrades from version 1.031 are available for only $49.95—if you send in pages 13–20 of your manual and your copy-protected boot disk.

DENNY ATKIN

Blind Date Simulator from Take a Chance Technologies

Experience all the excitement and nervousness of a real blind date as your computer selects from thousands of character traits to create a unique partner for each new game. Use your mouse or joystick to select your on-screen personality—which may or may not be compatible with your blind date's personality.

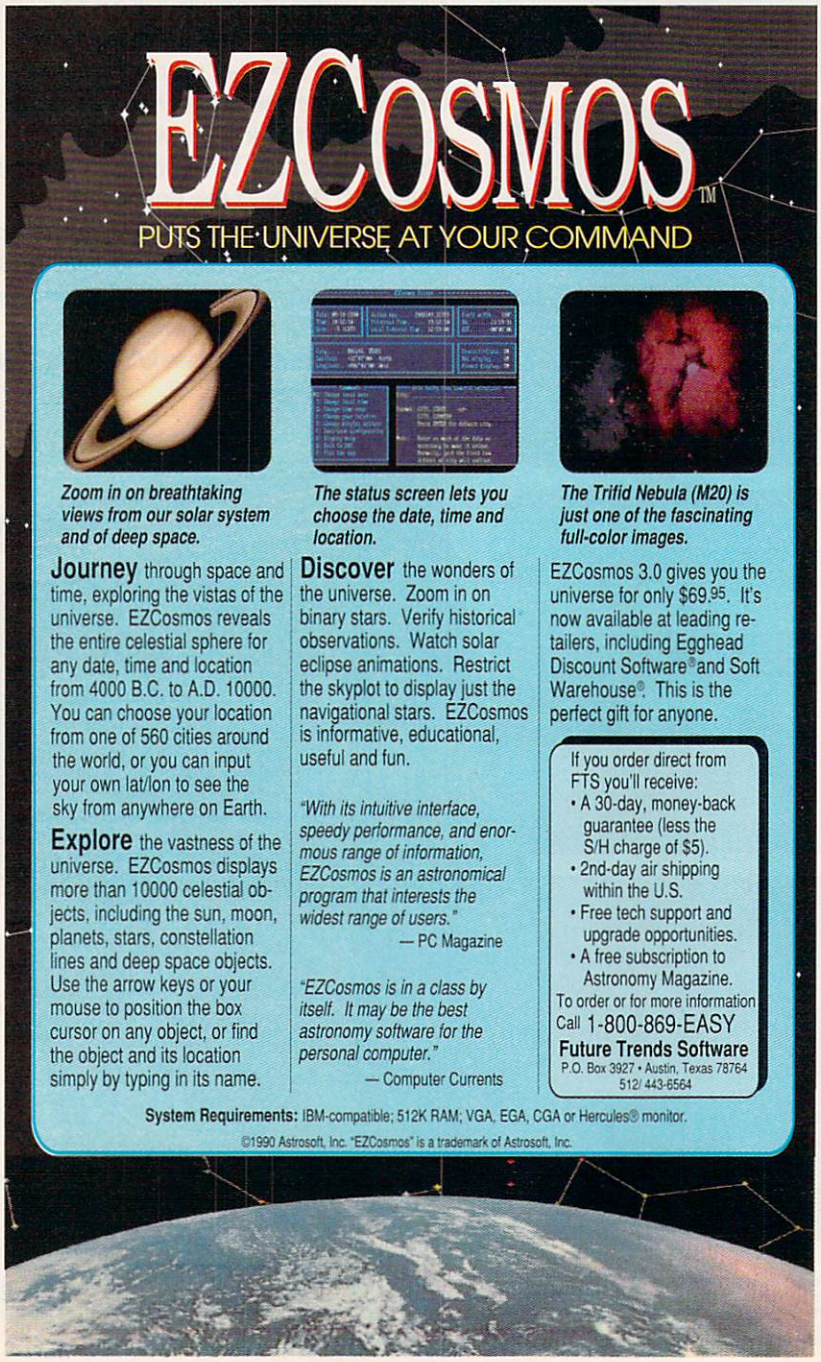
The game package includes rose-colored glasses *(Gee, you look just like someone I used to know.)* a fake beeper *(I'm sorry, but I reaaally have to go.)* and a stiff upper lip *(So, you're into Satanic rites. That's interesting.).*

You can choose from 20 different date scenarios, including your high school reunion (everyone's successful except you), an afternoon at the museum (your date thinks you're a celebrated artist), and a Wayne Newton concert (you wanted Mozart, your date wanted Romanian folk music, so you compromised).

The game provides for an optional modem hook up so two players can play together as a couple. Take a Chance Technologies is sponsoring a RoundTable on GEnie so players can find additional dates. You can contact other players by leaving online messages such as *Call Nancy for a good time* or *You smiled at me on the IRT to Houston Street. I was wearing the plaid tee shirt.*

Look for other exciting new simulators in the Blind Date series, including *Meet the Parents, Honeymoon in New York City,* and *Quick and Easy Guide to Divorce.* ⊡

DAVID ENGLISH



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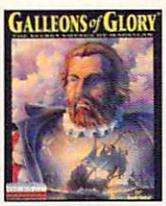

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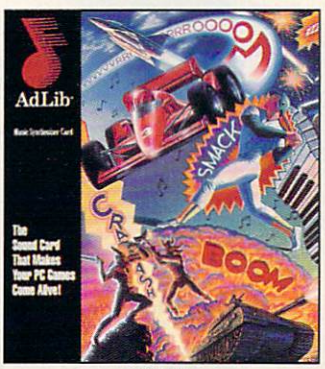

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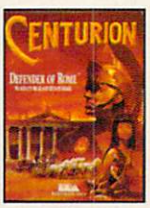

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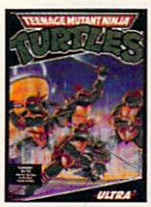

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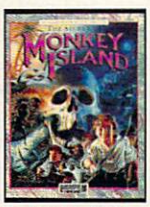

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DISCOVE

COMPUTE CHOICE

LEARNING MATH CAN BE A FUN AND EXCITING EXPERIENCE FOR YOUR CHILD

LESLIE EISER

Easy to understand, a cinch to use, and recognizably educational—since the early days of educational software, these qualities have contributed to the widespread popularity of drill-and-practice programs. Today, they continue to be one of the most popular kinds of applications.

The underlying premise is straightforward. You're given a simple problem to solve and instructed to type in the correct answer. If you get it right, you get a reward. If you miss it, the program shows you the right answer and repeats the question. After being endlessly and patiently tested on a specific subject, just about everyone finally memorizes the correct answers.

In many subject areas, this method is probably the most effective. After all, if you practice your math facts often enough, eventually you'll remember them or at least become faster at figuring them out.

While early versions of drill-and-practice programs were effective, students would often lose interest. Many times, the rewards were a simple "Very Good" or an animated graphic. But who really cares if the bunny hops across the screen or the bear reaches the berries? Kids often don't, and once a kid loses interest in the reward, that's the end of the drill as well.

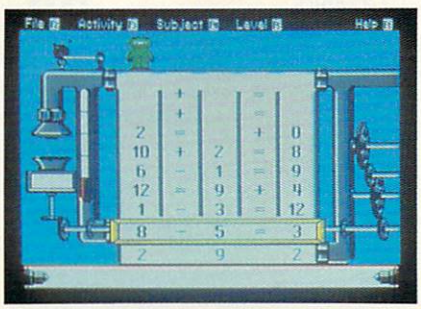
The programs kids don't like don't sell well, and eventually developers started to get the hint. While some developers completely stopped making drill-and-practice programs, others took a different approach—they took a good hard look at arcade

RY

games. To keep those quarters falling into the slots, arcade games must offer a specific challenge, have multiple levels to explore, and be fun to play. These developers speculated that drill-and-practice programs might be more successful if they managed to combine good educational theory with interesting rewards. In fact, a really well-crafted drill-and-practice program can provide almost as much fun as a good arcade game. And unlike an arcade game, it can provide excellent educational content.

Davidson & Associates' newest version of the very popular Math Blaster series is just such a program. The *New Math Blaster Plus* offers dynamic graphics and sound, an exciting new problem-solving game, and plenty of what Davidson is famous for—well-written, well-researched, and highly effective drill.

Just watching the opening credits is fun. Blasternaut and Spot, his one-wheel robotlike friend, zoom past in a spaceship and then stop to say hello. A main menu that looks reassuringly like other Math Blaster menus appears next. Tantalizing titles like Rocket Launcher, Trash Zapper, Number Recycler, and Math Blaster appeal to the children who will be using the program. Pull-down menus along the top of the screen let you or your youngster easily control the program options. There's even a record-keeping command to turn on if you plan to let the computer keep track of your student's progress. A built-in editor is provided to make it easy to design your own problems if you or your child wants to focus in on a particular concept.



Different levels of difficulty will keep youngsters challenged and interested.

And as for the sound and graphics, seeing and hearing are believing. On just a plain MS-DOS machine, the sound was good. On a machine equipped with an Ad Lib or Sound Blaster Music Card, the sound effects will blow you away. Even the graphics take advantage of the capabilities of the computer you use. In VGA color, the flying objects seem to take on a life of their own. But enough about the trappings. What is the program itself really like?

Of the four games included, Rocket Launcher is the easiest to recognize as drill and practice. There are two modes of play. In the Study mode, equations such as 6 + 7 = 13 are flashed on the screen, and then a second later one of the numbers in the equation is replaced by a blank line. Your goal is to solve the problem correctly by typing in the missing number and pressing Return. After several problems have been solved in this way, Blasternaut will board his space ship and head for the stars. In the Solve mode, equations always appear with the blank for the missing number. Again the goal is the same: Get enough answers right in a row to allow Blasternaut to take off.

Trash Zapper is a cute drill-and-practice game with a unique environmental theme. Because of the presence of Trash Aliens, the space near Blasternaut's planet has been polluted with old bottles, paper garbage, and even the rings from soft drink cans. Can you help out? For every five problems you solve correctly, you'll get to blow some trash out of the sky by moving the gun sights and firing the Zapper. Hit the trash directly, and it vanishes. Miss, and you'll have wasted a valu-

MARK WAGONER © 1990

able shot. When time runs out, it's back to solving problems again. The only way out of this cycle is to press Esc and return to the main menu.

In another of the four games, Math Blaster, Blasternaut has to fly up to the ship bearing the correct answer to the math problem displayed. To arrive safely, he'll need your help dodging the space trash circling the planet. Take too long maneuvering him around, and the Trash Aliens will descend to the planet's surface. Move too quickly, and you risk having Blasternaut hit by a flying brick. As in any good arcade game, you can gain additional lives, provided you correctly solve several problems in a row. Watch out, though; he'll lose those extra lives in short order if you don't learn how to maneuver him quickly. Every piece of trash he collides with slows him down and costs him a life. At higher levels, the speed at which the Trash Aliens descend increases, and there's more and more space trash to deal with. Just knowing the right answer isn't quite enough. Getting Blasternaut through the space trash unharmed before time runs out is harder than it seems.

So much for the drill portion of Math Blaster. What's the reward? After five correct answers, you have a chance to increase your point score by helping to feed Blasternaut. He's free to fly around the screen catching the food that appears randomly on the screen while he dodges the rocks and bricks floating through space. Everything he catches adds points to the total score. Interestingly, you receive extra points for choosing good things to eat. It's nice to know that fish and carrots count for more than ice cream sundaes, hamburgers, and French fries. Eventually, dinnertime is over, and then it's back to solving problems. When you've exhausted all of Blasternaut's extra lives, the game ends. Is your total point score good enough to put you in the hall of fame? If not, try again. If you make it, don't rest on your laurels; do it again!

Number Recycler isn't just good drill and practice; it's an excellent problem-solving game. At first, 18 numbers fill a grid separated by + and = signs. Your task is to create five different equations by sliding the numbers down a chute one at a time. If you slide down more than one number, the first ones will be zapped and put out of play. Planning ahead is essential if you plan to work your way past the fifth level. To make the game a real challenge, try using either a + or − in the equations. You get points for every correct solution, and you get plenty of practice making bad decisions before learning how to predict just which equations work out the best in the long run.

What shoves the *New Math Blaster Plus* up the ladder from good to excellent is the variety of possible levels and subject areas. This isn't a program your youngsters will outgrow quickly. First and second graders will be challenged by the addition and subtraction problems, third and fourth graders will find the multiplication and division problems hard to do quickly, and fifth and sixth graders can use the program to review and strengthen their arithmetic skills, even while they practice solving problems with percents. And their brothers and sisters in high school will be challenged by the upper levels in Number Recycler.

Avoid orbiting paper and other trash.

Choose from four different games.

Interesting graphics make learning fun.

Need to keep records of your youngsters' achievements? The handy recordkeeping routines will automatically track their progress. Each time a child solves a reasonable number of problems correctly, an entry goes into the record, and the program offers to print a reward certificate. These can provide students with a permanent memento of their achievements with the *New Math Blaster Plus.*

Potentially very important to the teachers or tutors who use this package is a handy test-printing routine. You can print out problems similar to those on the screen and let children work on them at home or as a timed review. These can be handy if you plan to quiz your child yourself and want a paper record of the results.

I had only a few problems with this generally excellent program. The older students found Rocket Launcher pretty boring. Even the second game could be quite a bit better if a scorekeeping mechanism were added along with a hall of fame. Speaking of halls of fame, it would be very nice if the names and scores on the list could be erased. That way children wouldn't have to compete with their best scores on lower levels each time they attempted a new level or a new subject group. And the lack of a speed control in the option menu meant that faster computers often played quicker than children could think. This became a problem only on the upper levels of Math Blaster, but it did prove rather daunting to the children who got that far only to be shot down completely.

If you're looking for a solid educational game that offers excellent practice in arithmetic for your children, look no further. With the creative enhancement of the drill-and-practice motif, I can solidly recommend the *New Math Blaster Plus.* It's colorful, it's effective, and it's fun!

Educational Value	★★★★★
Documentation	★★
Originality	★★★★
Graphics	★★★★

New Math Blaster Plus

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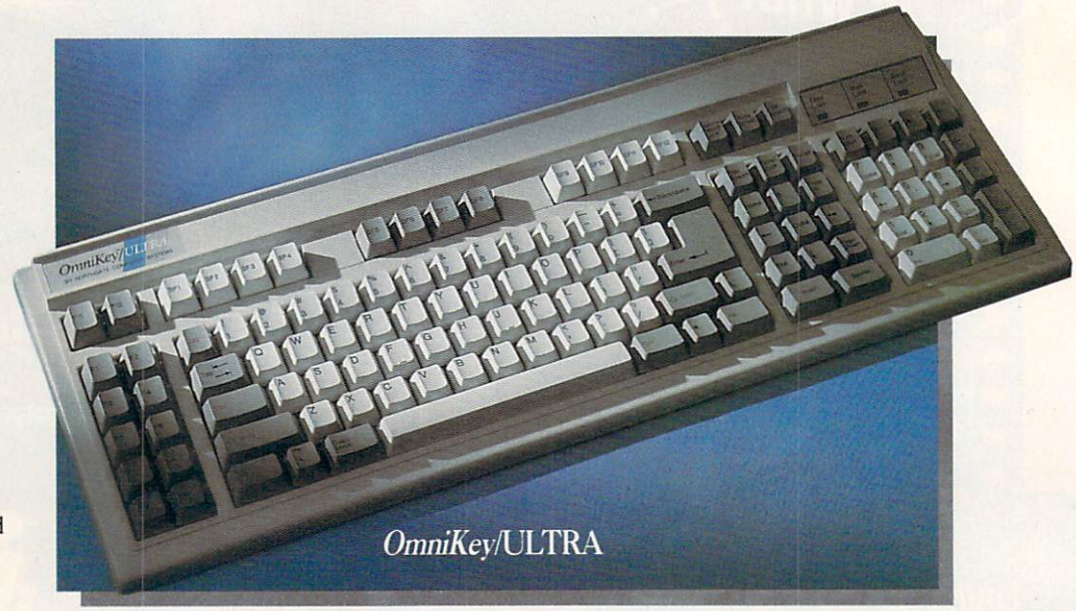

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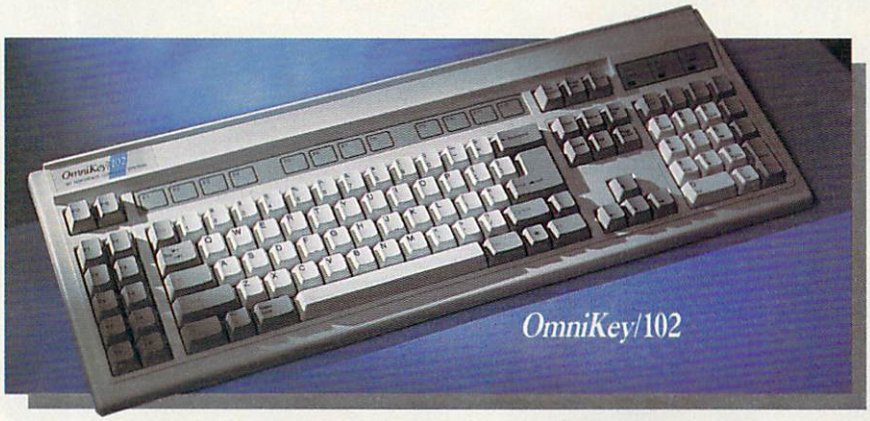

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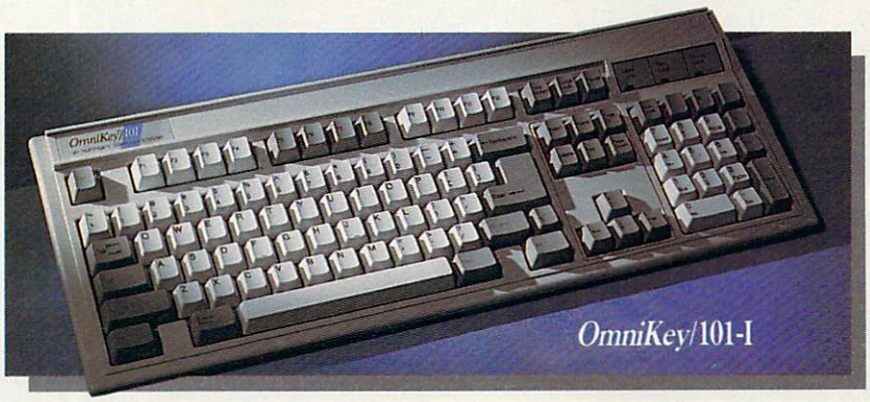

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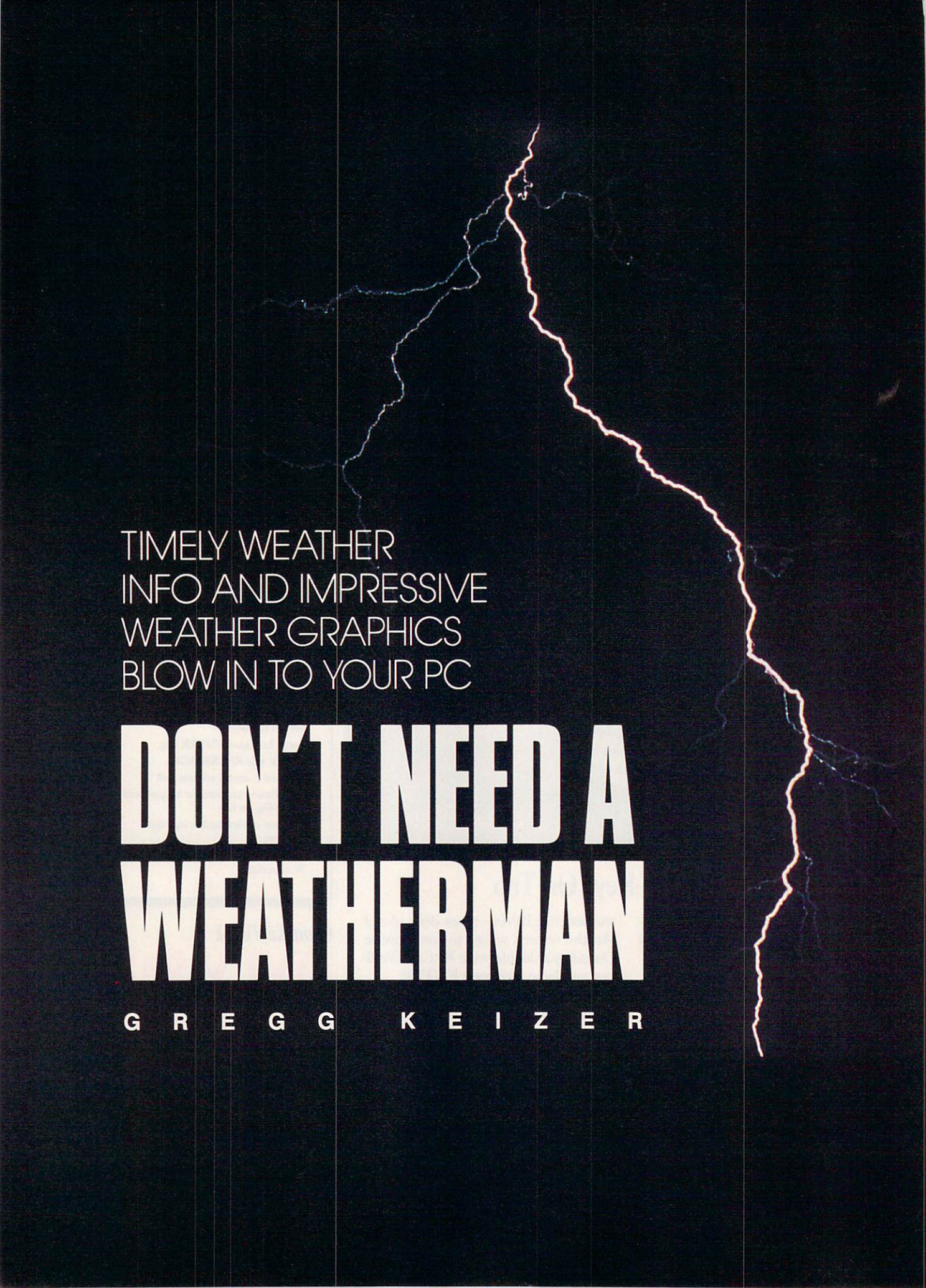
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WEATHER GRAPHICS
BLOW IN TO YOUR PC
DON'T NEED A
WEATHERMAN
GREGG KEIZER

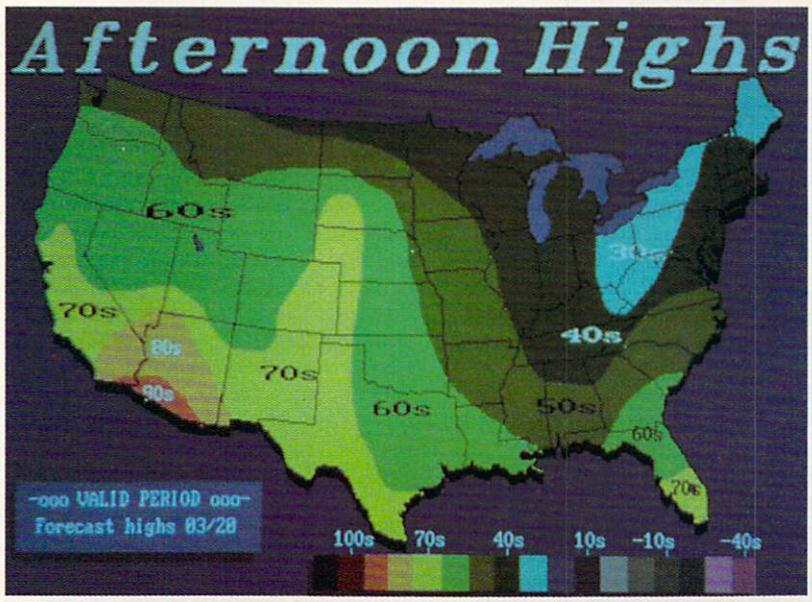
Hot in the summer, cold in the winter. Windy today, windier tomorrow. Snow from October to April? You bet. That's the weather where I grew up. Brutal storms that swept across the prairie, rain that was rarely where it needed to be when it needed to be there—it was a farmer's nightmare and not much better for a city dweller.

I follow the weather. We all do. Weather's right up there next to sports as part of the fabric of American conversation. It's no surprise, then, that there are so many ways to find out what the weather's going to be like: TV, radio, colorful maps in newspapers, or just watching the sky for clouds and smelling the air for rain.

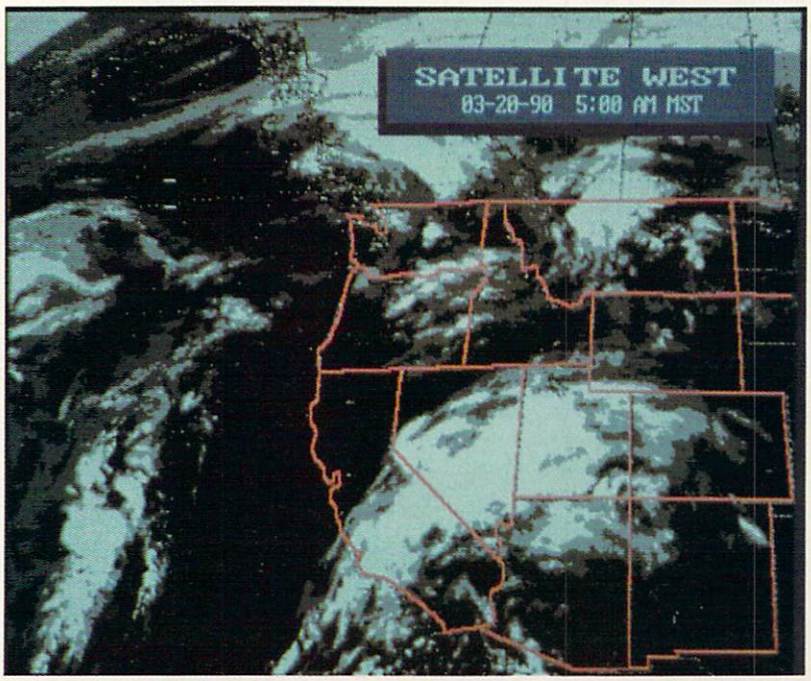
You can do better than that. Put that PC of yours to work as a personal meteorologist, crunching numbers and drawing graphics. All you lack is the raw data—the weather observations and recordings. No, you don't have to check a rain gauge every hour or stare at a thermometer all day long. The National Weather Service (NWS) already does an excellent job of gathering weather data. You just need to get your hands on it.

That's where two programs—*Accu-Weather Forecaster* and *WeatherBrief*—come in. These packages put you in touch with two of the largest commercial weather information databases in the country, Accu-Weather and WeatherBank, both of which get their basic information from the NWS. Connected to one of these databases via modem and telephone line, your computer can channel an enormous amount of weather info into its hard disk and onto its screen.

It's one of the most innovative uses of a home computer.



***WeatherBrief*'s colorful maps make the weather interesting and understandable.**



***WeatherBrief*'s satellite photos offer you a remarkable perspective on the weather.**

Weather on the Way

Accu-Weather Forecaster and *WeatherBrief* are remarkably similar in their operation. Both programs let you select the weather information you want *before* you call the database—that cuts down on connect time and thus cuts costs (the Accu-Weather and WeatherBank databases charge connect time by the minute). Once you've selected the information, each program automatically dials its database, pulls down the information you requested, then breaks the connection. Once you're off the phone, the programs build maps and compile lists of up-to-the-minute information. Just as impressive, both packages let you download TV-style weather graphics and specialty maps that look amazingly like what you see on local newscasts.

WeatherBrief is the less expensive of the two packages and in many ways is the easier to use. Even though it's crammed with options, this is the better program for beginning weather enthusiasts.

Before dialing the WeatherBank database, you use *WeatherBrief*'s simple menu system to select from the dozens of available information choices. *WeatherBrief* lets you cluster those requests in up to eight different groups and save them for later use. I created several of these groups—one for local area weather information, another for national weather forecasts,

MARK WAGONER 1990

and a third for world weather.

These information choices make WeatherBank a weather buff's candy store. Here are just some of the things you can ask *WeatherBrief* to retrieve for you: current conditions for any major NWS reporting station, 6- and 10-day forecasts by state or city, radar maps of any of six regions, cloud-cover maps, precipitation forecast maps, lightning-strike maps, satellite pictures of the United States, even custom-created TV-like graphics that show national 30-day temperature and precipitation forecasts.

When you're satisfied with your selections, *WeatherBrief* dials and logs on to WeatherBank; then it pulls down data while you wait. The time online depends on the number of items and the complexity of any graphics you've selected. Simple data requests are the fastest, taking less than two minutes. Satellite pictures and custom graphics can make your online time jump dramatically; in one test session, *WeatherBrief* was on the line for over 17 minutes. It's easy to spend five or six dollars in a single session if you're downloading a lot of graphics or pictures.

But the wait (and maybe even the money) are worth it. Although the simpler items—current conditions, perhaps—are in text form, *WeatherBrief*'s maps are dazzling on an EGA or a VGA monitor. Satellite pictures and custom graphics like the drought index I downloaded are even more impressive; you won't mistake them for what you see on TV, but they're close.

I thought the text information was the most valuable, though I was tempted by all the color maps and fancy graphics. It was fascinating to see complete weather reports, including current temperatures, humidity levels, and tomorrow's forecast highs and lows—all from cities across the country. I especially liked tracking a hurricane's progress up the Atlantic seaboard. There's a certain satisfaction in knowing that your PC can access weather forecasts, warnings, and observations only moments after they've been posted by the NWS. Not even the Weather Channel is faster.

System Box Blizzard

Accu-Weather Forecaster does much more than simply download information and present it to you. It gathers raw data from the Accu-Weather database and then creates a variety of maps, charts, pictures, and lists to visually describe the weather.

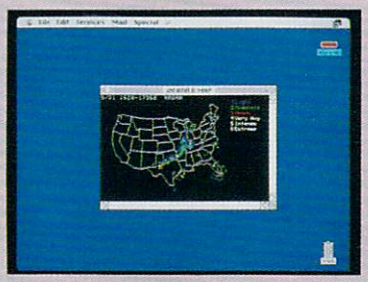
With the exception of its excellent TV graphics library, *Accu-Weather Forecaster* doesn't ask for specific information requests. Instead, you identify two NWS stations—the one nearest to you and another you'd like information from—and decide how many major stations around the country will be polled by *Forecaster*. The program does all the rest.

Logging on to the Accu-Weather database and culling its data are handled automatically once you've given the program a telephone number, account name, and password. One nice touch is that *Accu-Weather Forecaster* estimates your online time before you call.

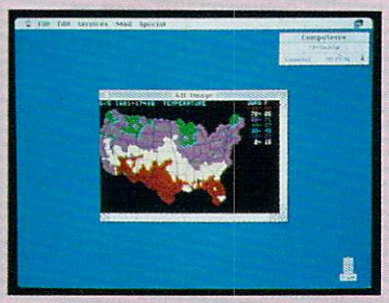
As long as you stick to requesting data, not graphics, *Forecaster* quickly grabs the last 24 hours' worth of observations from your two primary stations, the last hour from all stations within a specified area, and the last hour from 100 major stations around the country. You'll be on the line an average of four to five minutes. Offline, you can view that data any number of ways.

Create a chart showing the rise and fall of temperature, precipitation, wind speed, and barometric pressure

Prodigy's weather map gives you a quick look at the national forecast.



More than 100 radar sites across the country supply information for CompuServe's map of precipitation intensities.



CompuServe gathers information for its temperature map every 15 minutes.

WIRED FOR WEATHER

If your weather information needs are limited, *WeatherBrief* and *Accu-Weather Forecaster* may be too much of a good thing. Fortunately, your computer can tap other electronic resources to tell you what it's going to be like outside.

CompuServe, the telecommunications giant, offers extensive weather information and news among its hundreds of services. Nine types of National Weather Service–style reports appear in text format, ready for you to read while online (or capture as a text file for later reading). Although reports are limited and sometimes several hours old, they duplicate some of those you can retrieve with *WeatherBrief*.

CompuServe also has three maps you can view or download; even in color, though, they're crude when compared to those on WeatherBank or Accu-Weather.

Prodigy, another major player in telecommunications, also has a weather section, which was recently improved. It now has three national weather maps, one showing weather for the current day, another showing fronts and isobars for the current day, and the third showing weather for the next day. Seven regional weather maps have also been added. City weather reports have been expanded to include temperature in Fahrenheit and Centigrade, winds, air quality, a three-day forecast, and the times of sunrise and sunset. The number of cities has been expanded to 235 domestic and 100 frequent international travel destinations. In the major metropolitan areas, there are reports for the cities in the region. And the outdoor reports have been expanded to include reports on beach/boating, skiing, and foliage reports.

Neither CompuServe nor Prodigy offers up the weather info that *WeatherBrief* or *Accu-Weather Forecaster* makes available. But keep in mind that getting weather info via CompuServe or Prodigy is less expensive than it is with WeatherBank or Accu-Weather.

over the past 24 hours. Or view 11 different national maps that show temperature, wind velocity, visibility, and more in either symbol or colored-bar contour fashion. Choose Picture and *Forecaster* draws a graphical display of the selected station's report, complete with cloud cover, thermometer, and barometer. Or simply list the data on the screen for quick comparisons between locales. A separate function lets you check out local reporting stations' forecasts, as well as the national weather summary.

Accu-Weather Forecaster doesn't cheat you out of great graphics, either. Its newest version makes it easy to select and download any of 145 different television-quality weather maps, graphics, and pictures. By and large, they're much more impressive than the ones you'd see with *WeatherBrief*. Check out the maps that show such things as wind chill and the heat index or the satellite pictures that look almost as good as those you see on the local news. The enhanced radar maps are especially striking.

The versatility of *Accu-Weather Forecaster* justifies its higher price. Where *WeatherBrief* simply downloads data and, with some exceptions, displays it for you, *Accu-Weather Forecaster* transforms raw weather information into interesting graphic interpretations. It makes the weather easy to follow and even easier to understand.

Who'll Stop the Rain?

Both programs give your computer a perfect excuse to dial the phone. Each offers a slick entrance to a complex database, then lets you extract just the information you want. But they're different enough that if you're a well-heeled weather enthusiast, you'll want both.

I thought *Accu-Weather Forecaster* the better all-around value (even at its higher price), but just barely. It excels at displaying current weather conditions, and its television graphics are second to none. But it's weak in providing forecasts and the more esoteric weather information.

WeatherBrief lets you dig through such weather information as long-range forecasts, alerts and warnings, hurricanes, and interstate highway travel reports. It's slightly easier to use, yet it can still overwhelm you with facts and figures about the weather.

If you want to stop talking about the weather and really know something about it, you should have one of these electronic Willard Scotts inside your PC. ⊡

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PATHWAYS

STEVEN ANZOVIN

POWER IN THE PALM OF YOUR HAND

Sixty-five million years ago, the earth was utterly dominated by huge, powerful, and specialized reptiles. Underfoot scurried small furry beasts, not awesome but agile and adaptable. A short time later (geologically speaking), the dinosaurs were gone, and we mammals had the place to ourselves. A similar evolutionary trend may be taking place right now in the digital world as palmtop computers—those small, portable machines also known as handhelds or personal organizers—challenge laptops by evolving capabilities only desktop PCs had a year or two ago.

Palmtops differ from laptops in that they're smaller, less powerful, and can run only a limited number of applications. While most laptops aim to give you as much of the functionality of a desktop machine as possible, with portability as a bonus, palmtops are definitely minimalist. The typical palmtop looks like a glorified calculator and weighs less than a pound. It has a tiny LCD screen that shows no more than eight lines of 40 characters, offers a QWERTY or an ABC keyboard with keys so cramped that only a lemur could touch-type, and comes standard with 64K of RAM. You can't run standard PC applications on most palmtops; you're limited to applications specially created for them.

But what the current crop of palmtops do, they do well. Most often, these handy machines keep schedules and address books for execs on the go. Enter your daily or weekly schedule into one of the calendar programs that come standard with nearly all palmtops, and the machine will beep you shortly before each appointment. You can then check the screen for time, place, and notes as you get on your way—a priceless aid for all of us who are chronically late, lost, and unprepared. The integral address book keeps thousands of names and numbers more accessibly than in a paper Filofax or Day-Timer. Palmtops include calculator and world-clock functions as well.

All this might not be enough to tempt you to shell out as much as $400 for a palmtop and accessories, but they can do even more. Most palmtops offer additional software on slide-in IC cards. You can get language translators, dictionaries and thesauruses for law and medicine, spreadsheet and expense-account programs, travel planners, wine advisors, and even *Tetris*.

Two top-of-the-line models currently duking it out in the savagely Darwinian palmtop market are the Sharp Wizard OZ-7200 (Sharp Electronics, Sharp Plaza, Mahwah, New Jersey 07430; 201-529-8200; $300) and the Casio B.O.S.S. SF-9000 (Casio, 570 Mt. Pleasant Avenue, Dover, New Jersey 07801; 201-361-5400; $260).

Though useful, each has design flaws. The Wizard has a smaller 8-line × 16-character display, a hard-to-use ABC keyboard, and a maximum 32K of additional RAM (with an optional IC card). The B.O.S.S. (Business Organizer Scheduling System) accepts up to 64K of additional RAM and has a bigger 6-line × 32-character display and a QWERTY keyboard, but the keys are flat, not raised. Both models offer a range of software, but the IC cards are expensive, ranging from $50 to $180.

Under intense selection pressure, each company is developing new, improved palmtops. The latest models are the Sharp Wizard OZ-8000 and the Casio B.O.S.S. SF-9500. Both should be available by the time you read this. Since the new Wizard will sport a larger display and QWERTY keyboard like the B.O.S.S.'s, and since the new B.O.S.S. has raised keys for easier typing, it may be difficult to choose between the machines themselves—an interesting example of convergent evolution. Instead, you'll want to make sure that you can get the external applications you need for your work. Miniaturized versions of some popular PC applications should be appearing by the end of this year.

When it comes to palmtops and desktops, the dinosaurs-vs.-mammals analogy at the beginning of this column isn't quite right. The big dinos were never really threatened by their furry cousins; it was the other way around—protorats and premonkeys made good eating for the smaller sorts of saurians. But desktops and palmtops have a symbiotic, rather than predator-prey, relationship. The palmtop manufacturers, realizing that most buyers also use a desktop computer, try to make it easy to move data back and forth between machines. Both the Wizard and the B.O.S.S. can interface with PCs and Macs and transfer data to and from programs like *Lotus* and *HyperCard*. (The simplest way to print out information from a palmtop is to move it to your PC first.)

Given their limited abilities, palmtops are no threat to the dominance of desktop PCs—yet. But laptops are a different story. Why lug around a 6-plus-pound laptop to do what a half-pound palmtop can do for you, at a sixth of the price? Within a year or two you'll see palmtops with voice annotation (voice-recorded messages) and text-to-speech capability, crisper displays, touchscreens that recognize your handwriting, and some type of integrated circuit-based mass storage. So as palmtops get more powerful, they may mean extinction for some species of laptops—it's a simple matter of survival of the smallest. ⊡

PC VIEW

CLIFTON KARNES

Finally, *Windows* 3.0 is here, and it's made a big splash. Everyone agrees that its sculpted buttons and full-color icons are beautiful, but some argue that Microsoft has pushed the product too hard, hyped it too much, and oversold it in general.

Windows 3.0 certainly has its detractors, but its release is quickly emerging as the most important event since the introduction of MS-DOS itself. Interestingly, *Windows* finds itself in nearly the same situation DOS was in after *its* introduction.

When the first version of DOS hit the streets, a lot of people scoffed at it. After all, there was already a mature, well-supported operating system widely available: CP/M. Who needed another entry to confuse the marketplace?

There was no software for MS-DOS, everyone claimed, and the system didn't support a hard disk (many CP/M systems had hard disks at the time). And the floppy disks didn't hold enough data—a measly 160K compared with CP/M's 360K or more. Although MS-DOS was touted as a 16-bit wonder, the PC's standard configuration used just 64K—no more RAM than the 8-bit 8080- and Z80-based CP/M computers.

As more software appeared for the PC, industry pundits began to say that perhaps MS-DOS would coexist with CP/M. And it did just that—for a while.

But as we all know, DOS completely replaced CP/M. Why? It's simple: Although the first MS-DOS machines were really no better than their CP/M counterparts, MS-DOS and its PC engine had more *potential.* True, IBM's early DOS computers came with just 64K, but they could address much more. When RAM prices came down, 640K soon became the standard. Fast, large hard disks also became plentiful. These two factors—increased RAM and fast, large hard disks—ensured the eventual success of MS-DOS.

The situation between *Windows* and DOS parallels that ten-year-old duel between DOS and CP/M. *Windows* is the new kid on the block, and it faces many of the criticisms that met DOS at its introduction. But *Windows* has greater *potential*—especially when matched with the right hardware.

When you run *Windows* in real mode on an 8088- or 8086-based PC, DOS leaves it at the gate. *Windows* is clunky and impossibly slow.

But things start to change with a 286 computer. In standard mode, AT-class machines sporting a megabyte or more of RAM can multitask *Windows* applications and single-task most DOS programs. *Windows* is still a little sluggish, but with it, you can really *use* your extended memory to run applications. The first time you get a message that says something like *2,714K free,* you'll catch a glimpse of the new life *Windows* can breathe into your computer.

On 286 machines, *Windows* and DOS run neck-and-neck, but deciding between the two is easy. If you run a lot of *Windows* applications, *Windows* clearly gets the nod. If you spend most of your time tooling around in DOS, *Windows* won't offer you much.

On a 386, it's a different story. In its 386 incarnation, *Windows* 3.0 can multitask *Windows* applications *and* DOS applications. It can even multitask DOS applications in windows. And it uses not only extended memory, but also virtual memory (hard disk space configured as memory). When you run *Windows* 3.0 and get a message that says *14,412K free,* you'll feel some of 3.0's power on a 386. With 386 hardware, *Windows* 3.0 is recommended even if you don't use a single *Windows* application.

So, what about the future of DOS and *Windows?* Or perhaps it would be better to ask about DOS *versus Windows.* Like the CP/M-DOS battle, it all depends on hardware. As the PC's hardware improved and became less expensive, the power of DOS led people away from CP/M. The same thing is going to happen with *Windows.* As 386 hardware becomes more common, so will *Windows.* With *Windows,* just like with DOS ten years ago, it's not really a matter of *if;* it's a matter of *when.* ⊡

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MATHUP	ED 204	Match equations with answers in this "concentration" style game.
VOCAB	ED 205	Vocabulary game for 1-4 players, fun way to improve your vocabulary!
PLAY 'N LEARN	ED 211	Introduce youngsters to the basics of computers and numbers..
KINDERMATH	ED 213	Basic Math for the Kids! Three levels of difficulty. (CGA req'd)
SPELLBOUND	ED 214	Excellent spelling Tutor. Animated graphics. (Color req'd)
STARVIEW	ED 215	Simulates the nighttime sky for any time or date. View the solar system, stars, and planets.
PC-PRIMER	ED 216	An excellent tutorial for beginning computer users.
MATHMAZE	ED 218	Educational strategy/adventure game.
THE ANIMATED ALPHABET	ED 219	(4 disks) Animated alphabet tutor for preschoolers! (EGA req'd)
CE BOOK	ED 222	Delight the little ones in your family! Generate personalized coloring books. Produce a story with the child as the character.
THE NIGHT SKY	ED 224	(4 disks) A planetarium on your PC! Set the date for accurate plotting of Heavenly Bodies. 24,000 stars! (CGA, HD req'd)
MEMORY MASTER	ED 225	Improve your memory with proven memory training techniques.

GENERAL APPLICATIONS
Astronomy, Finance, Travel...

MAIL MASTER	GE 101	Good and dedicated mailing list manager for form letters and labels etc.
GENEALOGY ON DISPLAY	GE 105	(2 disks) A complete package, ideal for beginners
PERSONAL FINANCE MANAGER	GE 107	Household budgeting, savings, investments, checking etc.
REAL ESTATE MANAGEMENT	GE 109	If you own it, you need it!
ASTROLOGY	GE 110	Plan you life by the stars and planets - good luck!
DR DATA LABEL	GE 112	Powerful mailing list program. Includes sort and duplicate removal .
ACE ASTRONOMY	GE 115	(2 disks) Performs calculations, provides physical and orbital data, !
RECIPES	GE 116	(2 disks) Great database of interesting dishes.
CROSSWORD CREATOR	GE 121	Create your own puzzles - very absorbing, and useful for educators also
STRESS & SHRINK	GE 122	Stress test and personality analysis
WEIGHT CONTROL	GE 124	Programs for losing weight
BIORHYTHM	GE 131	Calculate and print your own monthly chart
LITTLE BLACK BOOK	GE 134	Creates pocket-sized address book and prints mini-alphabetized pages
LANDLORD	GE 137	Rental management shareware - keep it simple but effective!
PC-BILL MASTER	GE 140	Checkbook manager with sophisticated functions. Multiple accounts etc.
BROTHER'S KEEPER	GE 142	(2 disks) Excellent genealogy package: charts, reports, 15,000 names!
CHECKBOOK ASSISTANT	GE 147	Very popular and user-acclaimed checkbook management software.
PC-LOTTO	GE 152	Popular and all-embracing package for use with worldwide lotto games
PC-QUIZZER	GE 182	Create lessons and administer complete tests on a computer!
EZ LABEL	GE 222	Make, maintain and print mailing lists and labels in all standard formats.
CHARGE ACCOUNT MANAGEMENT	GE 245	Gain charge account control!
PC BIORHYTHM	GE 250	Plot Physical Energy, Emotional Mood, and Intellectual Ability cycles.
HEADACHE FREE	GE 270	(2 disks)Identify seven different types of headaches and fourteen cures.
SPELLRITE	GE 271	A memory resident spell checker!
JUDY	GE 303	Personal scheduler! Features on-screen clock, reminders, "nag" file.
LOTTO MAGIC ODDS CALCULATOR	GE 308	Figure odds on games of 4-9 numbers with a field of up to 9999!
PRO FOOTBALL PICKS	GE 310	Football handicapping program designed to pick the winners.
MOVIE GUIDE	GE 311	Film history, stars, and movie catalog in one relational database.
DOSTUTOR	GE 317	If you know the basics, this is a logical next step.
HANDWRITING ANALYST SAMPLER	GE 320	An excellent way to learn the art/science of handwriting analysis.

WORD PROCESSING
Style, Speller, Macros, Thesaurus...

PC-WRITE	WO 101	(3 disks) The benchmark package with mail-merge and spell checking!
GALAXY	WO 106	Easy to use WP with menus and quick keyboard commands. Fu
BRADFORD	WO 107	Letter quality output from dot-matrix in over 35 fonts - recommended
WORDPERFECT MACROS	WO 108	Over 80 macros for WordPerfect v 5.0
PRO-SCRIBE	WO 115	Improve the impact and clarity of your writing with this new program
WRITER'S HEAVEN	WO 116	Accessories for PC-Write versions 3.0 and up.
PC-WRITE MACROS	WO 117	100 macros for this popular word processor - automates tasks with a single keypress. Requires PC-Write 3.0 or later (see WO 101)
PHOENIX WP	WO 121	Good, robust and simple word processor with power as required !
WORD PROCESSING FOR KIDS	WO 122	A wordprocessing program with all the basics designed just for kids!
TRILOGY	WO 126	Integrated word processor/client database/mailing system.
CLICHE FINDER	WO 129	Search any ASCII file for trite or hackneyed words or phrases!
INTEXT EUROPEAN	WO 134	Word processing in English and a second language. European version includes French, German, Danish, Italian, Dutch, and Portuguese!
SAGEWORDS	WO 146	Word processor with superior memory management, multitasking, pull-down menus, block operations, multi-window cut and paste and more!
PC-WRITE LITE	WO 147	(2 disks) A simpler version of PC-Write, easier to use, faster, and easier on available memory. Ideal for laptop computers!
WILL/POWER OF ATTORNEY MAKER	WO 149	Instructions and Templates to help you write your own legal documents !
WEED	WO 151	Text file expurgator. Removes lines of specified text.
GALAXY LITE	WO 152	The power & sophistication of Galaxy (WO 106), but easier to use and takes up less memory! Ideal for laptop computers!

GRAPHICS
Design, Draw, Animate, Clip...

PC-KEY DRAW	GR 101	(4 disks) Now version 3.53 with 'hyperdraw' of this magical drawing/art program with tutorial, library and many demo files - recommended
FINGERPAINT	GR 103	Flexible Herc or CGA painting program - includes animation feature!
DANCAD3D	GR 106	(2 disks) The best there is for 3-D wireframe with all conceivable options
PRINTSHOP GRAPHICS	GR 108	3 additional libraries, over 200 additional pictures-requires PrintShop.
PRINTMASTER GRAPHICS	GR 109	3 additional libraries for PrintMaster
IMAGE - 3D	GR 116	For serious wire-frame 3D - this menu-driven CAD is a must!
WP/PM/PCC CLIP ART	GR 119	(11 disks) Art for Pagemaker and WordPerfect 5.0 in PCC format, 300 dpi
FIRST PUBLISHER GRAPHICS	GR 121	(3 disks) Full of pictures and symbols for First Publisher in .PCX format
VGA PAINT	GR 122	At last! A superb graphics and painting program just for VGA owners
EZGRAPH	GR 130	Create presentation quality line graphs from your scientific data!
KID PAINT	GR 131	Children can color stored pictures with "box" of thirty colors,! (EGA req'd)
NAGEL ART	GR 136	Fascinating collection of .GIF art files in EGA or VGA format.
PAINTER'S APPRENTICE	GR 161	Drawing application similar to MacPaint and PC Paintbrush.(EGA req'd)
EGA COLORING BOOK	GR 162	A "computer coloring book" with over 500 different crayons! (EGA req'd)
PC-DRAFT	GR 164	(2 disks) Powerful draw program. Creates pictures in GEM and WPG formats - ideal for WordPerfect 5, Pagemaker, and Ventura. (CGA req'd)
PCX CLIP ART I	GR 165	(10 disks) A great collection of clip art in PCX. Import to WordPerfect, PageMaker, Ventura, 1st Publisher, etc.
FIRST PUBLISHER DIGITALIZED ART	GR 175	Chock full of images to First Publisher.
RUBICAN PUBLISHER	GR 180	(3 disks) At last! Full-featured desktop publishing in shareware! Utilizes existing WP to produce documents. Text only. (HD Req'd)
COMPLETE COOPER GRAPHICS	GR 181	Clip art in Okt &, New PrintShop, Printmaster and First Publisher formats. 300 images on each disk! Most complete set on the shareware market!
BABY DRAW	GR 183	Simple drawing application for ages 2 to 102! It's fun! (CGA req'd)

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GL, Forms, Flow Charts, Investments...

PC-GENERAL LEDGER	BU 101	Comprehensive, easy to implement accounting system
MR BILL	BU 102	(2 disks) Ideal for general billing, invoices. Reports, audit trail etc.
FORM LETTERS	BU 103	Standard business letters suit most common situations
PC-PAYROLL	BU 106	(3 disks) The 1990 Edition! Menu-driven with reporting package.
CPA LEDGER	BU 108	(3 disks) Serious GL system with exhaustive documentation.
LOAN AMORTIZATION & PROSPECT	BU 109	Ideal for businesses or individuals.
FLOWCHARTER	BU 112	Excellent for producing flowcharts of project steps and workflow.
ACS IN-CONTROL 12 PACK	BU 118	(2 disks) The ULTIMATE in prospect/client/customer tracking.
PDS QUOUTE	BU 121	Prepare and submit cost estimates and bid proposals.
FORMGEN	BU 126	Another nice form generator - sophisticated but easy to use.
SOLVEIT!	BU 127	Comprehensive financial calculator. 29 menu-driven calculations.
PFROI/READ & RUN	BU 128	Techserve's superb portfolio manager.
PCBILLING	BU 148	An easy to use billing program for small business applications.
EXPRESS CHECK	BU 154	(2 disks) Excellent checkbook management from Expressware
PAYROLL USA	BU 156	(2 disks) Another great payroll program from Anthistle Systems.
SBAS GENERAL LEDGER	BU 157	V 1.5 A double-entry general ledger package for the small business!
GENERAL LEDGER LITE	BU 158	V 1.3e Menu-driven, mouse-compatible double-entry system with multiple years, 1999 accounts demo files and complete documentation.
FRIDAY	BU 163	Tracks important meetings, phone numbers, contacts, etc. (HD req'd)
SURVWARE	BU 165	Input questionnaire data, analyze results, and format reports!
FAST STMT WRITER	BU 168	Complete & easy customer statements!
FAST INVOICE WRITER	BU 169	Fast & Easy customer invoices!
BILLPOWER PLUS	BU 176	(2 disks) Expanded version of BU 142. (HD req'd)
MULTITRACK	BU 178	(2 disks) A full-featured tickler with a pop-up alarm! (HD req'd)
SOFTSIZE	BU 184	(2 disks) A "multi-sizing" POS system for the small retailer.
POLICY MAKER	BU 185	(2 disks) Inventory management utility!
CONTACT PLUS	BU 186	Keep track of clients!
LEGAL FORMS	BU 190	Over 100 different blank legal forms.
THE FRONT OFFICE	BU 191	(2 disks) For prospecting, sales mgt, job costing, customer reporting etc.
THE SLIC WORKS	BU 192	Integrated application. Word processing (with mail merge), information management and spread sheet (with charts) in one simple package.
BUSINESS CHECK LEDGER +	BU 196	(2 disks) Handle eight different bank accounts. (HD req'd)
FINANCE PLUS	BU 211	Calculates values for a wide range of financial problems.
MARKETPLUS	BU 212	(2 disks) Complete investment tracking system with graphics
TIMECARD	BU 213	Process time cards and improve record-keeping accuracy!
PRINCETON REALQUICK	BU 214	Complete real estate management application!
MICRO REGISTER	BU 215	Inventory and AR program for retail or service businesses.
THE INVOICER	BU 218	Complete invoicing and statement generating program.
BUSINESSKIT	BU 220	Two applications in one! *Simple Bookkeeper* and *Billing Statement* !
PORTFOLIO MANAGER	BU 223	Maintain information on your investment portfolio. (HD req'd)
SIMPLY LABELS III	BU 226	(2 disks) Design your own label formats and maintain label files.
ACCOUNT + PLUS	BU 229	Small business accounting 100% compatible with dBase III Plus.
INVOICE-IT	BU 231	Invoicing, inventory, and customer database program. (HD req'd)
PC QUOTE	BU 232	Easy to use, on-line menu-driven quotation/invoice system.
9 O'CLOCK	BU 233	Complete Time tracking system! Track up to 9 simultaneous activities, even with your computer turned off!
REGIT	BU 235	(2 disks) Turn your PC into a powerful point-of-sale cash register.
WALL STREET - THE BOTTOM LINE	BU 236	Stock & security record keeping and reporting system.
PROPMAN	BU 238	(3 disks) Single entry accounting for property managers! Does tenant tracking and expense processing. (HD req'd)
STOCKMASTER	BU 241	Package of five stock market analysis programs. (Color req'd)
TELEMARK	BU 244	Telemarketing and prospecting database.
EZ-AC	BU 249	Single-entry bookkeeping. Set up and run in less than 5 minutes!
MLB	BU 250	Menu and prompt driven bookkeeping application. Up to 26 ledgers!
SKEDUL-EZ	BU 253	Easy to use, all-purpose schedule system.
PHONE	BU 256	Client name, address, phone database prints labels and reports.
MOSSINTECH CASH ACCOUNT	BU 258	Incredible accounting package from Great Britain! 50 income categories, 50 purchase categories, 20 bank accounts, etc!

DATABASE MANAGEMENT
dBase, Files, Routines...

PC-FILE 5.0	DA 101	(3 disks) New version 5.0 of the dBase killer! Full-featured and state-of-the-art DBMS. Many new features — highly recommended.
WAMPUM	DA 105	Latest version of this legendary dBase III/IV compatible clone.
FILE EXPRESS	DA 106	(2 disks) Powerful package for data storage and manipulation.
GRAPHTIME II	DA 108	(2 disks) dBase, Wampum, Lotus and Multiplan compatible graphing
WYNDFIELDS	DA 110	3 disks squeezed onto one - mouse supported and easy window menus!
JAGER MANAGER	DA 111	A convenient information manager with database, dialling and calendar
FILEBASE	DA 113	An uncomplicated, semi-sophisticated, user-friendly database package!
PC-FILE:dB	DA 114	(3 disks) Direct access to dBase III Plus files.
1 ON 1 + 3!!	DA 115	(2 disks) A great database mgt system! Ideal for novice or a pro.
PC DATA CONTROLLER	DA 117	Simple yet powerful database. Great if your just getting started.
DATA+PLUS	DA 120	(2 disks) dBase III-IV compatible, but 80% faster! Over 1 billion records.
DBTOOLS	DA 132	Enhancement package for dBASE III+ (or any DBASE interpreter). Popup menus, windows, sound control, etc. 23 functions in all!
COMPUTRON	DA 133	Combined name and date database, phonebook/autodialer, notebook!
EDIT DB	DA 134	Easy to use database with built-in movie databases. (HD req'd)!
BIOBASE	DA 135	Telephone, name, address, notes database. Menu-driven, easy to use.
ZEPHYR	DA 138	Another Ward Moody triumph! A fully relational, Fox Pro-compatible database system for non-programmers. It's fast!

SPREADSHEET & UTILITIES
Templates, Macros, Utilities...

PC-CALC+	SP 101	(3 disks) Superb 123 clone - interacts with PC-FILE+.
EZ-SPREADSHEET V.S21	SP 102	Simple to use but powerful system - ideal for beginners - one of the best
AS EASY AS... 3.01	SP 103	Loaded with features, and compatible with 1-2-3 files. this one has all the bells and whistles!
LOTUS MACROS	SP 104	Save tedious work with these short-cuts for use with 1-2-3.
LOTUS TEMPLATES	SP 106	If you use Lotus, you'll love these ready-made applications!
QUBECALC	SP 109	This powerful 3-dimensional spreadsheet lets you view data in a new light.
123 POWER WORKSHEETS	SP 110	(2 disks) Powerful worksheets - worth having if you use Lotus!
MIPSCALC PLUS	SP 111	(3 disks) Spreadsheet - reads, writes Lotus files - needs GEM
WHITLING WORKSHEETS	SP 112	(2 disks) Excellent budgeting tools for Lotus 1-2-3.
LOTUS LEARNING SYSTEM	SP 115	(2 disks) Good, basic tutorial to learn Lotus 1-2-3 (1-2-3 req'd)
BEGINNING 1-2-3 TUTORIAL	SP 116	Worksheets and tutorial for the novice 1-2-3'er (1-2-3 req'd)
ADVANCED 1-2-3 TUTORIAL	SP 117	Designed for someone who has worked through the basics (1-2-3 req'd)
INCOME WK7	SP 118	Lotus WK file calculates income statements.
REAL ESTATE TEMPLATES	SP 119	Purchase analysis, yield, buyer qualification, etc. for use with 123, Symphony, and As Easy As.

UTILITIES
Disk & Program Management...

DESK COMMANDO	UT 101	Superior to SideKick. Menuing, tree support, calculators, appointments.!
LINCOMATIC BANNER	UT 105	Design and print large banners - hundreds of uses at home and work!
POWERMENU	UT 115	Superb hard disk menu organizer with windowing
ALT	UT 119	Power of SideKick, Superkey and Norton Utilities all in one package.
EZ-COPY-LITE	UT 120	GREAT floppy duplicator - PROFESSIONAL utility for mass copying!
KARC/PKXARC	UT 126	Latest version of this great file compression/extraction tool.
MENU-MATIC	UT 129	The LATEST version of this menuing package from BC Enterprises
ARCHIVER	UT 142	Makes archiving and unarchiving a breeze with pull-down menus.
MENUX	UT 145	HD menu with multiple windows - use batch files to run your programs.
ANADISK	UT 149	The ultimate utility! Analyzes, inspects, edits, repairs& copies diskettes.
HD-TEST	UT 154	The most thorough hard disk tester available in shareware.
HARD DISK BACKUP	UT 155	One of the most comprehensive utilities for backing up your hard disk!
MASTER MENU	UT 156	Full-featured hard disk menu application.
TURBO COPY	UT 157	Format/copy/verify diskettes fast!
SERIAL FILE COPY	UT 172	Transfer files between computers using the RS232 serial ports.
BILLSCAL	UT 175	Simple calendar generator.
SAM'S MENU	UT 183	Screen blanker, password protection, user-customized colors and menu title prompts, 216 applications from the Main Menu! (HD, CGA req'd)
TIMERUN	UT 205	A marvelous utility that allows you to automatically execute a program or DOS command at a pre-selected future date and time.
ARCAID	UT 208	A "Shell" for file archiving utilities. View the contents of an archive or directory and delete, extract, and run programs.
LHARC	UT 217	The best all-around compression/decompression utility in shareware.

GAMES
Chess, Planes, Adventures...

JET FLIGHT SIMULATOR	GA 101	Stimulating and fast-paced fun!
3-D CHESS	GA 103	Fantastic 2D and 3D play with many levels and game save facility
PINBALL COMBO	GA 104	Comprises 3 super pinball games, varying in complexity
DUNGEONS & DRAGONS	GA 105	A classic for you adventurers!
POKER & ULTIMA 21	GA 116	Best poker we've seen, plus casino blackjack.
GAMBLER'S DISK	GA 121	All the casino thrills - blackjack, slots, baccarat, solitaire, tutor included
MONOPOLY WITH GRAPHICS	GA 127	An old favorite cleverly programmed for absorbing family fun!
DIAMOND MASTER BASEBALL	GA 132	A very in-depth and statistical approach to baseball for experts
PC-PRO GOLF	GA 139	(2 disks) A must for the golfing fraternity - good graphics
EGA TREK	GA 140	Superb Star Trek game for EGA - fight the Klingons and Romulans.
EVETS - THE ADVENTURE	GA 141	100 monsters, 150 items, DND style game in great shape!
MAZE	GA 142	Stiller's incredible mind boggler - get it for a LENGTHY mental challenge!
BEYOND THE TITANIC	GA 143	First class adventure from Apogee Software - riveting!
KINGDOM OF KROZ/TREK TRIVIA	GA 144	Excellent Apogee offerings for Star Trek and adventure fanatics
PC-JIGSAW 1.10	GA 146	Jigsaw puzzle simulation - hours of intriguing and exasperating fun!
UNO	GA 149	Fascinating solitaire card game, with bonus games menu program!
EGA SORRY!	GA 150	Immensely popular version 2.0 of this classic game, for EGA card only
CAPTAIN COMIC	GA 158	The best! In stunning color. Mario Bros' style game. (EGA Req'd)
CYRUS EGA CHESS	GA 161	A challenging opponent for chess if you have EGA to show fine detail
MORAFF'S EGA/VGA PINBALL	GA 172	Here's a high class pinball for high resolution!
MILLE BORNES	GA 178	Now you can play this great card game against the computer.
YACHT RACING SIMULATOR	GA 180	Challenging and fun for the serious sailor, or a landlubber! (CGA req'd)
DULLES TOWER	GA 181	Ever wonder what it's like to be an Air Traffic Controller?
RISK	GA 183	The classic game of world domination. (CGA req'd)
BASS TOUR	GA 186	The latest version of a great fishing simulator! (EGA req'd)
SCRABBLE	GA 188	THE program for Scrabble buffs! (EGA req'd)
RETURN TO KROZ	GA 194	20 levels, 35 new creatures, traps, spells and hazards!
BLACKJACK!	GA 199	Blackjack game/tutor. Rules of play and strategies. (EGA req'd)
MINIATURE GOLF	GA 202	18 holes for one or more players. Try for a a hole in one! (CGA req'd)
CONDO	GA 203	Monopoly for the '90s! Build apartments, hotels and condos. (CGA)
TETRIS	GA 211	The Russian arcade game that's sweeping the country!
SON OF STAGEFRIGHT	GA 219	Find your way out of an old abandoned theatre. A good challenge.
WORDFIND	GA 220	(2 disks) Not a game,helps you find words for crossword puzzles!
THE LOST ADVENTURES OF KROZ	GA 232	Another great Kroz adventure, with 75 unique play fields and up to 1000 creatures per level. Runs on all systems!
DARNIT	GA 233	One of the best computer solitaire games on the market! (EGA req'd)
BATTLESHIP	GA 236	"Search and destroy" ! Play computer, or play by modem! (EGA req'd)
MORAFF'S BLAST	GA 244	Bricks balls and paddles! 21 screens, and up to 14 balls in play. Supports SUPER-VGA and Hercules, CGA, EGA, and VGA! !
LEONG	GA 246	Solitaire board game. Move across a grid and avoid pitfalls. ! (EGA)
VIDEO BLAKJAK	GA 253	Play blackjack and learn basic strategy. Works with any monitor!
RAILROAD	GA 254	Build tracks, join cars, reverse directions and change speeds. (CGA)
GAMMON IV	GA 255	Three different playing styles to test your skills!
UNO	GA 256	The popular card game for any monitor. Plays just like the real thing!
CLASSWORD/WORDHIDE	GA 257	The easiest crossword/wordsearch generator we've ever used!
POPCORN	GA 258	"Star Wars" breakout! Blast bricks, catch balls, etc. CGA req'd)
LAS VEGAS EGA CASINO	GA 260	Blackjack, Poker, and Slots! Authentic casino simulation! (EGA req'd)
VGA JIGSAW	GA 264	The artwork for the puzzles will amaze you! (VGA req'd)
CRAPS COMPLETE	GA 273	The best craps game on shareware! Stunning! (EGA & Mouse req'd)
DELUXE ROULETTE	GA 274	Remarkable roulette game. Multiple play capabilites! (EGA & Mouse)
BACCARAT	GA 277	Play the game popular among the rich and famous (EGA req)
MORE WITH BATTUNE	GA 275	Four more great adventures with that lovable creature, Battune.
PHARAOH'S TOMB	GA 278	The next generation computer game! "Fluid Animation Software Technology" eliminates flicker - even on old PCs. Addictive game with the superior graphics we expect from Apogee. (CGA req)
CAVES OF THOR	GA 279	The latest addition to Apogee's library of quality software. Imagine the ground-breaking land of KROZ with advanced graphics, improved game play, flowing rivers, and fantastic sounds! (CGA req'd)

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NEWS & NOTES

Colorful Entry

Epson is entering the image-processing market in a colorful way, introducing the ES-300C color desktop scanner. The new scanner utilizes 8-bit monochrome processing to produce 256 shades of gray and 24-bit color processing with a resolution of 300 dots per inch (dpi).

Advanced scanning technology, combined with a unique direct-print function and comprehensive bundled software, allows users to capture, edit, paint, and print in both the PC and Macintosh platforms.

The scanning mechanism includes a one-pass color technology known as TruePass. Alternating red, blue, and green light bars scan each line of the image, separating the colors simultaneously. This results in faster processing and greater accuracy than that of conventional desktop scanners, which blend a series of separate scans using a single light bar and colored filters.

The TruePass system also allows color corrections to be performed during the scanning process, and the ES-300C can be used with Optical Character Recognition software that converts text into images users can then store, edit, and retrieve in the PC environment.

The ES-300C is available from Epson-authorized resellers. The manufacturer's suggested retail price is $1,995. Interface kits are $495 for the PC version.

Epson America, 2780 Lomita Blvd., Torrance, CA 90505

Qume Does It Again

Qume, a leader in low-cost high-performance laser printers for the personal computer market, has done it again. Its new CrystalPrint Express is a 12-page-per-minute (ppm) PostScript-compatible laser printer that produces output with 600 × 300 dpi resolution. This means the new CrystalPrint Express is capable of print resolution twice that of most widely used laser printers today, at a speed 50 percent higher. The new printer's suggested retail price of $5,595 is comparable to the price currently asked for other 8-ppm laser printers with lower resolution.

Qume, 500 Yosemite Dr., Milpitas, CA 95035

Those Pesky ELFs

Computer monitors, like most electronic devices, generate a wide range of electromagnetic fields. Research into potential health hazards from exposure to magnetic fields started over a decade ago, with studies focusing on electric power lines. Recently, there has been concern raised about the possible harmful effects of long-term exposure to very-low-frequency (VLF) and extra-low-frequency (ELF) emissions generated by computer monitors. Fortunately, there are already some alternatives to the standard computer monitors normally available in the U.S., monitors that conform to more stringent standards for VLF emissions.

Sigma Designs, for example, now sells IBM-compatible and Macintosh monitors that meet the low VLF emission standards set by the Swedish government. Sigma is developing monitor technology that will meet new standards for ELF emissions that are expected to be set by Sweden next year.

Sweden has received international attention as the most progressive country in regulating magnetic field emissions. Sigma says it will deliver monochrome and gray-scale monitors with both low VLF and low ELF technology in the first quarter of 1991.

Cornerstone Technology is another monitor manufacturer that's already offering low-radiation displays.

In both cases, the low-radiation option adds $150–$200 to the regular suggested retail price of the offered displays.

Sigma Designs, 46501 Landing Pkwy., Fremont, CA 94538; Cornerstone Technology, 1990 Concourse Dr., San Jose, CA 95131

Parting the Clouds

Astronauts aboard NASA space shuttles are getting a clearer picture of photo opportunities with satellite images printed on Seikosha's high-resolution video printer.

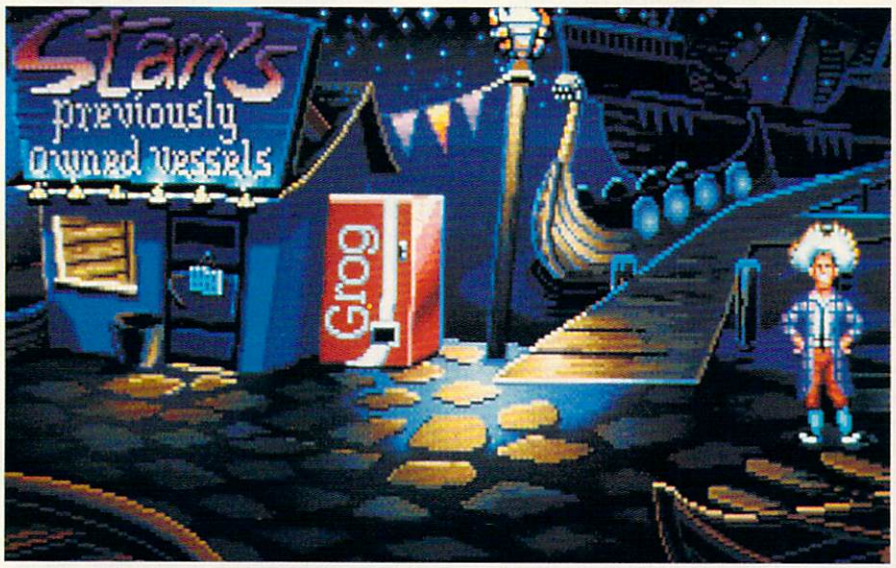
With it, NASA Houston produces detailed, up-to-the-minute weather maps with data from geostationary satellites. Houston transmits satellite pictures to the shuttle astronauts as they prepare to photograph environmentally sensitive areas. Each photo session has only a narrow window of opportunity, and the satellite-generated weather maps let astronauts preview the photographic conditions they will encounter *before* they encounter them.

The Seikosha printer was selected because it can produce weather maps using a 64-tone gray scale. NASA feeds the printer output into a special fax machine for transmission to the shuttle. The VP-3500 video printer is a 300-dpi thermal printer that can reproduce a video image of up to 1280 × 1240 pixel resolution. It retails for $6,700.

Seikosha America, 10 Industrial Ave., Mahwah, NJ 07430 ⊡

News & Notes by Alan R. Bechtold, editor of *Info-Mat Magazine*, an electronic news weekly published by BBS Press Service.

THESE PIRATES HAVE TONGUES AS SHARP AS THEIR SWORDS.



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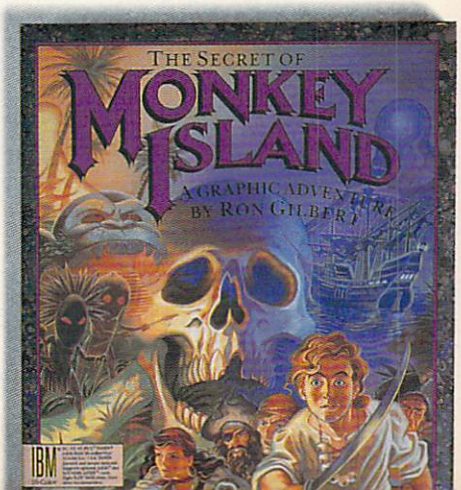

The Secret of Monkey Island is available for IBM and 100% compatibles in 16-color EGA and 256-color VGA versions. Visit your retailer or order directly with Visa/MC by calling 1-800-STARWARS (in Canada 1-800-828-7927). ™ and © 1990, LucasArts Entertainment Company. All rights reserved. IBM is a trademark of International Business Machines, Inc. 3M is a trademark of 3M Corp. AdLib is a trademark of AdLib, Inc. Cruise prize arranged with the "Fun Ships" of Carnival Cruise Lines, The Most Popular Cruise Line In The World; ship's registry: Bahamas and Liberia.

Circle Reader Service Number 189

FEEDBACK

QUESTIONS FROM OUR READERS

About two years ago I purchased an IBM Model 30. Recently, I bought a 5¼-inch drive to go with it. Many programs that come on 5¼-inch disks demand to be placed in drive A, which is my 3½-inch drive. What can I do about this situation?

MADHU POCHA
MANCHESTER, MO

The simple solution is to issue the DOS command ASSIGN A B. This command will make your computer think that drive B is drive A. That way, you can install your program or run it in your 5¼-inch drive. When you've finished, either reset the computer or issue the DOS command ASSIGN, which returns things to normal.

The complicated, permanent solution only works if you're using an internal 5¼-inch drive. Reverse the position of the drives with respect to the flat data cable that serves the drives. Although this is a simple operation, if you're slightly nervous about going into the innards of the computer, you'd be wiser to let a qualified service technician make the switch for you.

Most people would be satisfied just making the software switch with the ASSIGN command. You could even place the ASSIGN command in your AUTOEXEC.BAT file to make the change automatic. If you do this, include the complementary command ASSIGN B A, which will allow you to use your 3½-inch drive as drive B.

One word of caution on using this command: Some commercial programs, especially games, are encrypted with heavy copy protection. Therefore the ASSIGN command may not work with some commercial packages.

Keeping It Clean

I am concerned about the care and maintenance of my hardware, particularly the heads on my disk drives. Could you give me some general rule of thumb for cleaning the disk drive heads and maintaining other components of the hardware?

HENRY ZIMOCH
CHICAGO, IL

How often or how rigorously you should clean your hardware is directly related to the dirtiness of the immediate environment. If you smoke, live in a dusty home or an area of heavy pollution, or own an ultrasonic humidifier, you should clean your computer often with a vacuum cleaner or compressed air and keep your keyboard covered with a thin plastic cover.

If you're in a truly nasty situation, such as on a factory floor or in a trailer at a construction site, you should consider purchasing a hardened *or* ruggedized *computer. These computers are designed to withstand shocks. Some use refrigeration or special filtering for cooling or eliminating dust- or chemical-laden outside air.*

If your computer is in an average office or home environment, you should clean it about once a month or quarter. Failure to do so may result in a build-up of dust on the cooling vents and internal components. All electronic devices generate heat, and some are very intolerant of high temperatures.

Begin by backing up and optimizing your hard disk. Then unplug the computer, open the computer case, discharge any static in your body by touching the power supply housing, and blow out all the dust with compressed air. Remember that dust is also harmful to you, so wear goggles and a mask to protect your eyes and lungs. When all the dust has been blown out, close the case and replace any screws that you removed.

If your floppy drive has been giving you problems, run a disk-head cleaner to clean the dust and debris that may have accumulated on the disk drive heads.

No matter what the manufacturers claim, all head cleaners are at least a little bit abrasive, so experts recommend only using a head cleaner when your drives are acting up.

Use an antistatic wipe to clean the monitor screen (some experts recommend dryer sheets or a weak solution of fabric softener and water—about three parts water to one part fabric softener). Don't use a commercial window cleaner on your screen. Some monitors have an outside coating to protect the glass and prevent glare. A glass cleaner can remove or damage this protective coating.

One computer writer has been known to clean his keyboard by carrying it into the shower with him, but for obvious reasons we can't recommend that. Instead, purchase a portable vacuum cleaner like the Mini-Vac (from The GiftHorse, Department C-P, 4975 Hunters Run, Colorado Springs, Colorado 80911) and vacuum the keys periodically, or blow the spaces between the keys with compressed air.

*Cotton swabs and isopropyl (*not *rubbing) alcohol are good for cleaning tight corners. Here's a hint worthy of Heloise: Post-It notes can be used to remove things that fall in crevices. Dust and hair stick to the adhesive.*

Most of the exterior of your computer can be cleaned with a mild solution of soap and water (or fabric softener and water in the proportions listed earlier).

Readers whose letters appear in "Feedback" will receive a free COMPUTE's PC LCD clock radio while supplies last. Do you have a question about hardware or software? Or have you discovered something that could help other PC users? If so, we want to hear from you. Write to COMPUTE's PC Feedback, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We regret that we cannot provide personal replies to technical questions. ⊡

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MARK WAGONER 1990

BECOMING A PC ENVIRONMENTALIST

In the natural environment, important things lie unseen, hidden in the bushes. Your computer is no different. Lurking in a little corner of your PC's memory is information that most users never see: the DOS environment. The environment is a special area in memory that contains information on your computer's basic setup. Once you understand the basics of the DOS environment, you'll be able to use it to speed up your batch files, get more out of many commercial and shareware programs, alter your system's prompt, and even move the main DOS file, COMMAND.COM, out of your root directory and into a new location. First, though, you need to understand how the environment works.

Get SET

The basic command for viewing and manipulating the DOS environment is SET. To see what is currently contained in the environment, type the command

```
SET
```

at any DOS prompt and then press Enter. SET is an internal command, so it operates no matter what disk or directory you're using.

TO SQUEEZE EVERY OUNCE OF POWER FROM YOUR PC, YOU'LL HAVE TO MASTER ITS ENVIRONMENT

When you give this command by itself, you'll see something like this:

```
COMSPEC=C:\COMMAND.COM
PATH=C:\;C:\DOS;C:\UTILITY
PROMPT=$P$G
DATA=C:\DATA\
```

Your screen will probably look different, depending on how your system is set up, but those four lines represent every type of information that can be stored in the environment. Here's a look at each line.

COMSPEC—Your Way Home

The COMSPEC line tells DOS where to find a copy of COMMAND.COM, the program that interprets everything you type at the DOS prompt. When you boot up, whether from a floppy disk or from your hard disk, DOS automatically includes this line in the environment. It's very important for the system to know where to find COMMAND.COM because programs can use the memory space normally taken up by COMMAND.COM. When you exit a program, the PC reloads COMMAND.COM from the location named in this line. ▷

GEORGE CAMPBELL

Floppy disk users are familiar with this DOS error message:

```
Insert disk with COMMAND.COM in drive A
and strike any key when ready
```

(The exact wording may vary depending on your DOS version.) The message means that DOS tried to load COMMAND.COM but couldn't find it in the location specified in the COMSPEC. The same principle applies on hard disks, but since COMMAND.COM is usually where COMSPEC thinks it is, you rarely see the message.

It's possible to tell DOS to find COMMAND.COM somewhere other than its usual place. Suppose you want DOS to find COMMAND.COM on drive B. You might want to do this if the program you're running from drive A is too big to allow you to keep COMMAND. COM there, too. You could copy COMMAND.COM to another floppy, insert it in drive B, and then give this command before running your program:

```
SET COMSPEC=B:\COMMAND.COM
```

Now, when you exit the program, DOS will look for COMMAND.COM on drive B instead of drive A. Hard disk users can do the same thing, placing COMMAND.COM in a directory other than the root directory of drive C.

PATH Through the Woods

The second line in the example above displays the DOS PATH. Most hard disk users are familiar with the PATH command. It allows DOS to find and run COM, EXE, and BAT files from any directory, as long as the program is located in one of the directories named in the PATH statement.

You would ordinarily include a PATH statement in your AUTOEXEC. BAT file. While hard disk users make good use of this statement, floppy users can also benefit from adding a path statement to their AUTOEXEC.BAT file. You don't need the SET command to create or change your PATH. The line below will allow floppy disk users to run programs on either drive A or B, regardless of what the prompt says.

```
PATH=A:\;B:\
```

For more information on the PATH command and its syntax, consult your DOS manual.

PROMPT Input

Next in line is the PROMPT command. It's amazing how many users skip this valuable command. In the example above, the PROMPT line looks like this:

```
PROMPT=$P$G
```

That line displays a DOS prompt that shows the current directory. It's a big help in finding your way around your PC. If you always see a prompt that only shows the currently logged drive and a greater-than sign (like C>), it's time to fix up your prompt.

Just give the command PROMPT=PG at any DOS prompt. This command will cause your prompt to display the complete path of the current directory, which can be very useful in a complex directory structure. Hard disk users will benefit most from this command. You can include the command in your AUTOEXEC.BAT file to automate the process.

There's even more to the PROMPT command. You can add other features and even your own text. Each feature is preceded by a dollar sign. Try these:

$D	Current Date
$T	Current Time
$G	The greater-than symbol (>)
$V	Your DOS version
$_ (underscore)	Moves to the next line

You can even include your own text just by typing in the words you want. For example, type this command on one line at the DOS prompt:

```
PROMPT=Hello! It's $T on $D$_You're using
DOS $V$_in the $P directory. Give a command:
```

Using ANSI.SYS, you can even add colors and more to your prompt. For more information on these extra features, see the PROMPT and ANSI.SYS entries in your DOS manual or read the article "FYI: ANSI.SYS" in the May 1990 issue of *COMPUTE!'s PC Magazine.*

Customizing with SET

The fourth line in the sample environment above, which reads DATA=C:\DATA, won't appear the first time you run the SET command. It's an example of information you place into the environment for your own use.

You already know how the PATH command works: It lets DOS find programs and batch files on disks and directories other than the one to which you are currently logged. If only your programs could use PATH to find their data files! DOS versions 3.3 and later include the helpful APPEND command, but many programs offer their own tools for locating data files or for other information.

By including a variable in the environment area, you can often tell a program where to look for its data or for information telling it how you want it to run.

WordPerfect is a good example of this. It uses a number of special startup options. For example, if you start *WordPerfect* 5.1 with the command

```
WP /d-C:\TEMP /m-DOITNOW
```

the program will send all its temporary files to the C:\TEMP directory

Where *Is* the Environment?

Finding the exact location of your DOS environment can be difficult. That's because it keeps moving. Each time a program is executed, it gets a *copy* of the master environment. But since DOS and other programs need to be able to find this elusive area of memory, each program contains a pointer to its own private environment, and this pointer is always located at the same spot in memory—offset 2C hexadecimal in the current segment.

This offset is in an area called the PSP, or Program Segment Prefix. The PSP contains a lot of useful information, but we're only concerned with the environment here.

To see your DOS environment in memory, you'll need to use the DOS external command, DEBUG. Simply type

```
DEBUG
```

at the DOS prompt.

Now, at the - prompt, enter D 2C. This tells DEBUG to display the memory at address 2C (the hexadecimal numbering system is assumed). You'll see something like this:

```
23A4:0020  A3 1F 4E 01
```

The first two values, A3 and 1F on this PC, form the address of the current environment, but, for technical reasons, DOS stores address bytes in reverse order, so the real address is 1FA3. Since this is the address of a segment, to see its contents you'd type

```
D 1FA3:0
```

at the DOS prompt (be sure to substitute your computer's values for the ones above). You'll see the text of your environment, beginning with your COMSPEC statement. To quit DEBUG, type Q at the - prompt.

To verify that your PC's environment moves around, type COMMAND at the DOS prompt. This will invoke another command interpreter and another environment. Now load DEBUG and type D 2C again. This time you'll get different addresses. To verify that these point to the environment, reverse them and enter the D command. You'll see the same environment headed again by your COMSPEC command. To remove the extra COMMAND.COM, type EXIT at the DOS prompt.

— Clifton Karnes

Photos Courtesy of Imperial War Museum, London, England

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and immediately run the macro named DOITNOW. That's handy, but it's a lot of work to type.

There's a shortcut, though. *WordPerfect* checks the DOS environment each time it runs. By including an environment variable containing the information it needs, you can tell *WordPerfect* what to do without all that typing. The SET command is the key. Here's what you'd use to duplicate the command above:

```
SET WP=/d-C:\TEMP /m-DOITNOW
```

Now, just by giving the command WP, you can provide the same information you laboriously typed out before. If you include this SET command in your AUTOEXEC.BAT file, *WordPerfect* will always start just the way you want.

Many other programs have similar capabilities. To check on the software you use, try looking in the index of the manual for the words *environment* and *SET*. Each program uses environment variables in a different way. Some, like *WordPerfect,* use them to help users cut down on complex command line switches, while others use the environment to find data files. In either case, a little study can save keystrokes, cut down on all the things you have to remember, and increase your productivity.

The SET command can create an environment variable, but it can also remove one. To clear a variable, give the command this way:

```
SET VARIABLE=
```

By naming the variable, but not adding a value to it, you tell DOS to delete the variable from the environment. Don't place any spaces around the equal sign.

Batch File Environmentalism

There's one more way to make the DOS environment work for you. Many users find that batch files are an indispensable part of their daily computing. What most people don't know is that you can supercharge your batch files by letting them get information from your DOS environment.

As we've seen, environment variables have two parts. First comes the variable name, then an equal sign, followed by the data in the variable. Batch files can access the data by using the variable name. For example, if you use a modem to download files from bulletin boards, you've discovered that they're usually stored as archives containing several files. It's often convenient, especially with shareware programs, to examine the documentation before extracting all of the files. README, READ.ME, README.DOC, and MANUAL .DOC are common names for documentation.

Here's a way to extract all the documentation files from a whole list of ZIP files, sending them all to a special directory on your hard disk, ready to read. The batch file uses PKUNZIP to do the extracting.

Before running this batch file, however, you must use the SET command to establish an environment variable. Let's call our variable UNZIP. Here's the command:

```
SET UNZIP=READ*.* *.DOC *.TXT
```

Now you can use the variable UNZIP in a batch file to represent all those wildcard characters. You won't ever have to type them again. Before showing you the batch file, though, you need to know some other information. For this example, let's assume that the program PKUNZIP.EXE is in the current directory or in the PATH. All the ZIP files are stored in the directory C:\ZIPS, and we'll send the documents to the directory C:\TEMP. You can substitute your own information. Here's the batch file, called UNZIPIT.BAT:

```
PKUNZIP C:\ZIPS\*.ZIP %UNZIP%
  C:\TEMP
```

It's just one line, but it has enormous power. Just give the command UNZIPIT and the batch file will cause PKUNZIP to extract every documentation file from a whole list of ZIPPED files and send them to your temporary directory for reading.

The key here is the use of percent signs (%) on both sides of the environment variable name. When DOS sees that, it checks the environment for the variable UNZIP and then automatically inserts everything on the other side of the equal sign as the contents of that variable.

Now, suppose that you wanted to switch to extracting all the EXE files from your list of ZIP files. You could write another batch file, but there's a better way. Just give this command:

```
SET UNZIP=*.EXE
```

Now, instead of extracting documentation, your UNZIPIT.BAT file will extract only the EXE files, still sending them to the C:\TEMP directory. If you want all files extracted, use the SET UNZP=*.* command.

This is a simple example, but it's easy to see how you can use environment variables to enhance the power of many of your batch files. Remember, you can establish the variable automatically at boot time by including the SET command line in your AUTOEXEC.BAT file.

Sizing Up the Environment

If all this sounds interesting and you're ready to start typing PROMPT, PATH, and SET commands right and left, hold on a second. DOS allows only limited room for the environment. In DOS versions 2.0–3.2, only 128 bytes are allowed. Later versions of DOS let you use 160 bytes. That's the equivalent of about two lines of text on your screen.

Keep adding to your environment with long PATH and PROMPT statements, or use too many environment variables, and DOS will complain with this message:

```
Out of environment space
```

This space limitation is pretty severe, but there's a way around it. The

SET and PROMPT at a Glance

SET

The SET command sets an environment variable name. This command has several forms.

SET	By itself displays the current environment.
SET *name*=	Deletes the variable *name*.
SET *name*=*value*	Places *value* in the variable *name*.

PROMPT

The PROMPT command sets the DOS prompt. The most common setting is PG, which displays the current path followed by a greater-than (>) sign. Here's a complete list of PROMPT options:

$B	Vertical bar (|)	$P	Current path
$D	Current date	$Q	Equal sign (=)
$E	Esc character	$T	Current time
$G	Greater-than sign	$V	DOS version
$H	Backspace	$_	Enter
$L	Less-than sign	$$	Dollar sign
$N	Default drive		

The command PROMPT by itself sets the prompt to its default, NG.

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technique varies with the DOS version, and there are two completely different methods.

For DOS versions 2.1–3.0, the only way to increase the size of the environment is to load a second copy of COMMAND.COM, telling the second copy that you want a larger environment space. Here's the command, which you should give from the directory containing COMMAND.COM:

```
COMMAND /E:size /P
```

Replace *size* with your desired environment size, in bytes. You can use as many as 32,768 bytes, but 512 or 1024 is usually enough. If you're using DOS 2.1, you may see an error message about a search path not being found, but you can ignore it.

This method works, but it has a disadvantage: Since it loads a second copy of COMMAND.COM, you'll lose about 20K of memory when you use it. You can avoid this memory loss if you use DOS version 3.1 or later.

With these later versions, you can use the SHELL statement in your CONFIG.SYS file to increase your environment space when you boot up, without losing memory. To do this, include the following line as the first line in your CONFIG.SYS file:

```
SHELL=C:\COMMAND.COM C:\
  /P /E:size
```

Substitute another drive and path, if your copy of COMMAND.COM is in another location. The second C:\ tells DOS where to set the COMSPEC variable.

The /P entry is essential. If you leave it out, the system will lock up and you'll have to reboot from a floppy disk.

Finally, specify the size for your environment. With DOS 3.2 or higher, give the size in bytes, up to 32,767 bytes. DOS 3.1 is different, requiring the size to be in multiples of 16, and is limited to 992 bytes. For version 3.1 you must specify the size between 11 (176 bytes) and 62 (992 bytes). That's usually enough, but if you need more than 992 bytes, use the method described above for earlier versions.

BASIC and the Environment

If you program in any variety of BASIC, from the lowly BASICA/GW-BASIC interpreter to the *QuickBASIC* 4.5 compiler, you can read or change any part of the DOS environment from within your own programs. Two simple BASIC commands handle all of the work.

First, you may want to set a new environment variable from within a program. One good reason to do this is to tell your program where its data files are located. To do this, you use the ENVIRON statement. Here's an example. Suppose you want to let your program know that all its files are in the directory C:\BASIC\. To add this to the environment, use a line like this in your program:

```
ENVIRON "DATA=C:\BASIC\"
```

It's just like using the SET command from the DOS prompt, as described earlier in this article. Don't use any spaces around the equal sign.

Similarly, you can set the PATH, COMSPEC, PROMPT, or any other valid environment string with the ENVIRON statement. To set a new PATH, for example, the BASIC line would look something like this:

```
ENVIRON "PATH=C:\;C:\DOS;
  C:\BATCH"
```

Getting access to information stored in the environment is just as easy. To do this, you use the ENVIRON$ function. For example, to find out what directory is stored in the DATA environment string, you'd use a line like this:

```
DATA$ = ENVIRON$("DATA")
```

The quotation marks inside the parentheses are required. Now, you can use that information in your program. If you use the line

```
PRINT DATA$
```

BASIC will display everything after the equal sign (=) from the environment. Using the example above, you'd see this on your screen:

```
C:\BASIC\
```

Now, let's use this environment information to open a sequential data file called CONFIG.DAT. By using the environment, you can open this file, even if you've changed directories within your program. Here's a BASIC fragment:

```
FILENAME$ = DATA$ + "CONFIG.DAT"
OPEN FILENAME$ FOR INPUT AS #1
```

BASIC will open the file C:\BASIC\CONFIG.DAT and allow you to read information from that file.

Here's a final example. You can combine the ENVIRON statement and ENVIRON$ function to alter your PATH statement. Suppose you want to add a new directory to your path. The following line will add the directory C:\UTILITY to the end of any existing path. If no path exists, then the line will create one.

```
ENVIRON "PATH=" +
  ENVIRON$("PATH") + ";C:\UTILITY"
```

Try using these commands in your own programs and see how much you can do with them. Remember that you'll need line numbers if you're using BASICA or GW-BASIC.

Making the most of your PC's environment is an important step in becoming a true power user. As you become more familiar with these environment tools, you'll add to your productivity and use your PC more effectively. For more information on any of these topics, check your DOS or BASIC language manual. ⊡

Using *EnvEd* to Alter Your DOS Environment

While the SET command, described above, is one way to alter the data in the DOS environment area, it's inconvenient at times. Adding a directory to your PATH statement, for example, means typing the entire path from start to finish.

On this issue's disk, you'll find *EnvEd* (for Environment Editor), a program written by Jeff Bowles. It lets you edit your DOS environment, using the familiar keystrokes you use with your word processor. You can use *EnvEd* to insert, delete, or alter any of the data in the environment. It's especially useful for changing your PATH statement without retyping the whole thing.

EnvEd uses the same commands as *WordStar*, but you don't have to be a *WordStar* guru to use it. The cursor, Ins, Del, and Backspace keys are all you need. To start the program, give the command ENVED while in the directory containing the ENVED.EXE file.

The program begins in Insert mode, which means that anything you type on an existing line will push other characters to the right. Press the Ins key to toggle between this mode and overtype mode. Overtype mode causes you to overwrite existing text as you type. To delete characters, just use the Del or Backspace key.

Once you've finished making your changes, save your work by pressing Ctrl-K, X (hold down the Ctrl key while you press K and X). If you decide not to make any changes, just press Esc to exit the program without saving. It's that easy.

You'll be able to use all of the environment functions listed in the main article while using *EnvEd*. Just type them in, but don't type SET—it's not needed. *EnvEd* keeps track of the amount of memory available for the environment, and it won't let you exceed that limit.

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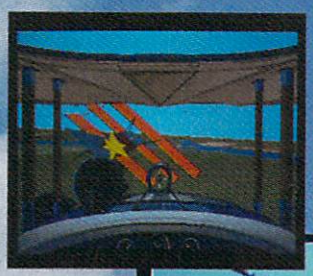

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INTRODOS

TONY ROBERTS

What are the differences among DOS versions? Are you cheating yourself by not having the latest and the greatest? Should you stay with what you have?

The answers to these questions depend mainly on what hardware you have and how you use it. The changes in DOS over the years have mirrored the evolution of computing hardware. As new hardware has been invented and put into use—high-density 3½-inch drives for example—DOS has been upgraded so the systems could use the new hardware.

You'll see DOS referred to as either PC-DOS or MS-DOS. Both versions are produced by Microsoft. PC-DOS is the version distributed with IBM-brand equipment, while MS-DOS is distributed with most clones. Although there are some subtle differences between the two families, this discussion treats them as equals.

You won't find DOS 1.*x* in use anywhere these days, but DOS 2.*x*, 3.*x*, and 4.*x* are all widely used. To see which version you have, type VER at DOS prompt.

DOS 1.0 came out in 1981 to support the original IBM PC, by today's standards an unsophisticated machine with little memory and a single-sided disk drive. After a few months, DOS 1.0 was upgraded to provide support for double-sided disk drives.

In early 1983, the IBM PC XT was announced, and along with it came DOS 2.0. This version provided support for the 10MB hard disk that came with the XT and introduced the subdirectory structure we still use.

The IBM PC AT, introduced in 1984, provided another set of hardware enhancements. It was bundled with DOS 3.0, which supported the AT's 1.2MB high-density floppy disk and provided ramdisk software to access the AT's extended memory. DOS 3.0 was subsequently tweaked a few times: DOS 3.1 added network support; DOS 3.2 allowed 3½-inch 720K disk drives and added the XCOPY command; and DOS 3.3 added support for 1.44MB 3½-inch disk drives, allowed multiple hard disk partitions, and improved batch-file processing and hard disk backup.

The DOS 3.3 enhancements coincided with the introduction of the IBM PS/2 in 1987. The PS/2 included a high-density 3½-inch floppy disk drive and a large hard disk. Prior to this version, DOS could only access hard disks smaller than 32MB. DOS 3.3 allowed larger hard disks to be partitioned into smaller units that could be accessed as separate logical drives.

SHOULD YOU CHANGE YOUR DOS?

In 1988, DOS 4.0 was announced. This version eliminated the 32MB barrier, provided support for expanded memory, and offered a shell as an alternative to the DOS command line. These changes gave computer owners with gigantic hard disks and megabytes of memory better control over those features. The shell provides menus and mouse support, making it easier to operate with fewer typed commands.

The original release of each of the DOS versions—1.0, 2.0, 3.0, and 4.0—was quickly followed by an update that exterminated some of the bugs. If you're using any of these original releases, don't hesitate to upgrade.

While each version added features, each added weight as well. The system files of DOS 2.*x* occupy 40K while the system files for DOS 3.*x* and 4.*x* consume 59K and 108K, respectively.

In choosing which DOS version to use, you must weigh the features against the costs of disk space and RAM usage. If you have a floppy drive system with no hard disk and limited memory, DOS 2.10 or 2.11 is probably just fine unless you want to run software that requires a higher DOS version.

If your system has a hard disk or you plan to add one, you'll benefit by using DOS 3.*x*. If that hard disk is larger than 32MB, you'll need DOS 3.3. Likewise, if you're adding 3½-inch drives, you'll want DOS 3.3.

DOS 4.*x* is attractive because of its shell, but if you don't have at least 640K of RAM and a hard disk, the overhead will outweigh the enhancements. If you have a hard disk that's larger than 32MB, DOS 4.01 allows you to format the entire disk as one unit. DOS 3.30 requires you to break these disks into partitions that can be no larger than 32MB each.

Another caveat with DOS 4.01 is that it looks at the disk a bit differently than previous versions. You'll need to reformat your hard disk under DOS 4.01 to use it, and you'll find that some of your software—disk optimizers, undelete programs, and so on—may not work unless you upgrade them to versions compatible with the more advanced DOS.

If you decide to upgrade your DOS, make sure you don't change DOS families. If your system came with PC-DOS, upgrade with a later version of PC-DOS. Similarly, if the machine came with MS-DOS, stick with it.

Also, some clones are shipped with versions of DOS that have been adjusted specifically for that hardware. If your machine uses such a nonstandard DOS version, contact the dealer or manufacturer for advice about the upgrade path. ⊡

CLIFTON KARNES

THREE SUPER STOCKING STUFFERS

With Christmas just around the corner, it's time to think about gifts. Whether you're playing Santa for that significant other power user in your life or just rewarding yourself for a year well done, here are three ideas for super stocking stuffers.

Everyone needs a text editor, and although you can get by with DOS's EDLIN (barely get by, that is) or with a shareware product, a power user needs a power tool. For editing, the hands-down winner is *BRIEF* (Solution Systems, 541 Main Street, Suite 410, South Weymouth, Massachusetts 02190; 800-821-2492); $199. An acronym for Basic Reconfigurable Interactive Editing Facility, *BRIEF* has everything you could want in an editor and about 300 features more.

From the moment you crank it up, *BRIEF* feels like a fine sports car—fast and powerful, with a cursor that corners as if it were on rails. In fact, although the program's setup offers several cursor speeds, only arcade players will be able to take the Gs of Fast.

BRIEF is reconfigurable. If you don't like the keystroke associated with a command, you can change it. And if you want to write your own commands, you can use either of *BRIEF*'s macro languages. That's right; *BRIEF* offers two macro languages: one that's LISP-like and one that's C-like. Both are amazingly powerful.

Power and speed are great, but the feature that really made *BRIEF* famous is its Undo, which allows you to undo as many as 300 keystrokes. This feature has probably saved programmers more hours of work than Jolt Cola.

One last point about *BRIEF:* Many of the best programmers in the country have written macros for it. That translates into outstanding support for almost anything you want to do with *BRIEF.*

To put the icing on the cake, you could top off your *BRIEF* gift with Greg and Carolyn Belfor's *CBRIEF Macro Help* (Greg Belfor, 1270 Estes Street, Lakewood, Colorado 80215; $15).

Written in *BRIEF*'s macro language, this shareware product is a superb online help system for *BRIEF*'s macro language. Impressively, *CBRIEF Macro Help* not only provides help on the official, known *BRIEF* commands, but it also includes details on many otherwise undocumented features.

Most power users telecommunicate, and so most will already have some sort of communications software. But chances are they don't have *Telix,* an elegant shareware program that can put some of the pizazz back in everyday computer phoning.

To start with, *Telix*'s list of protocols reads like a telecommunications Who's Who: ASCII, CompuServe Quick B, Kermit, MODEM7, SEAlink, Telink, XMODEM, 1K-XMODEM, G-1K-XMODEM, YMODEM batch, YMODEM-G, and ZMODEM. In short, everything.

Noteworthy features include a scroll-back buffer that displays the last seven screens of text and *Telix*'s ability to invoke your own editor (*BRIEF,* if you're lucky) at the touch of a key so that you can edit messages and other text online.

You'd expect to find macros, a large dialing directory, and online help in a full-featured telecommunications program, and you wouldn't be disappointed. They're all here. But unless you were very imaginative, you wouldn't have expected to find *Telix*'s script language, SALT. SALT is a very versatile C-like scripting language. You simply can't go wrong with *Telix.*

No matter what a power user's special interests are, if he or she has a PC, it's a sure bet that there's a keyboard attached. Although every PC is shipped with a keyboard, it's usually one of average-to-poor quality. Most people don't even think of replacing their keyboards with better ones, but if you surprise your loved one with a ZEOS/RS keyboard (ZEOS International, 530 5th Avenue NW, St. Paul, Minnesota 55112; 800-423-5891; $89.95), you'll have a friend for life.

The ZEOS is notable for two things: It's significantly smaller than the usual 101-key keyboards, and it has the best feel of any keyboard on the planet.

Because of the ZEOS's small size, it takes up only 75 percent of the desk space used by a normal keyboard. That's great in general, but if you have a mouse or a trackball, that means that you can get these devices much closer to your keys and save precious hand movement when you go from one to the other.

The ZEOS may be small, but it doesn't downsize its keys or scrunch them to gain that size. All keys are full sized and arranged in a standard 101-key layout with separate dedicated cursor keys (in an inverted *T*) and 12 function keys along the top of the keyboard. The Backspace key is oversized on most keyboards but is normal sized on the ZEOS.

If you're looking for action, this keyboard has it. The ZEOS keys offer an audible click and excellent tactile feedback. The keyboard also has raised dashes on the F and J keys to guide your hands to the home row. Lights for NumLock, CapsLock, and ScrollLock keys (in seasonal green) provide the finishing touches. ⊡

BASIC TRAINING

TOM CAMPBELL

SUPER BASIC STRINGS MADE EASY

One of *QuickBASIC*'s strong points is the way it handles strings—that is, anything you might see between quotation marks. BASIC's string handling is so easy to learn that BASIC experts moving to C, assembler, or ISO standard Pascal tend to experience severe culture shock.

In this column we'll discuss the CHR$, LEFT$, and MID$ functions; then we'll present an ambitious program that performs a word-wrap on any message you care to feed it, wrapping up the result in a tidy box.

There are some strings you can't type. CHR$ returns a one-character string matching an ASCII value you pass it. CHR$ is a function, meaning you can use it anywhere you'd use a variable. For example, uppercase *A* is ASCII 65. Here are two equivalent ways to display the letter *A:*

```
'Print the letter A
PRINT CHR$(65);
PRINT "A"
```

This example prints two *A*'s one after another. The semicolon (;) tells BASIC not to issue a carriage return and linefeed after the PRINT.

CHR$ would seem to be less than a revelation when taken at face value, but it suddenly becomes interesting when we realize it can be used to represent characters that the BASIC interpreter itself uses. For example, the Esc key is ASCII 27, but it's also used to cancel an operation in most editors. So if you want to send an ASCII 27 to a printer, instead of typing LPRINT followed by double quotation marks and pressing Esc (which might pop you out of the editor), you'd type LPRINT CHR$(27).

Another good use of CHR$ is when your printer won't print the PC-specific box characters in the upper 127 extended ASCII characters.

As you can see in this and last month's program listings, the DBox$ variable is declared using CHR$ for just that reason.

Finally, it's put to work in several parts of this month's program. For example:

```
' Building a string
Blank$ = CHR$(13) + " " + CHR$(9)
```

This creates a string called Blank$ consisting of the carriage return (ASCII 13), the space character, and the tab character (ASCII 9).

You can pluck out parts of a string readily with LEFT$, RIGHT$, and MID$. LEFT$ returns any number of characters starting at the beginning of the string. The following example prints the single word *Paula.*

```
' Printing a substring
PRINT LEFT$("Paula Abdul slept here", 5)
```

The AddWord routine needs to handle the case where a single word is longer than is legal for a line; it chooses to clip the word like this:

```
NextWord$ = LEFT$(NextWord$,
  WrapWidth - 1)
```

I won't insult you by explaining RIGHT$, except to say that it works from the end of the string.

It might seem logical to use array notation to check each character of a string:

```
' This example won't work!
' Assign a string to TEST$
TEST$ = "hello, world."
' Print each character,
FOR I = 1 TO LEN(TEST$)
   ' using array notation. Wrong!
   PRINT TEST$(I);
NEXT
```

This won't work because TEST$(I) is accessing the Ith member of an *array* of strings, not each member of I. And in BASIC, don't forget, a string isn't an array. The correct method is this:

```
' This example works!
' Assign a string to TEST$
TEST$ = "hello, world."
FOR I = 1 TO LEN(TEST$)
   ' Print a substring of TEST$
   PRINT MID$(TEST$, I, 1);
NEXT
```

MID$ prints the middle *n* characters specified, where *n* is the third parameter. They start at the position named in the second parameter, shown above as I. DrawBox uses it like so:

```
'MID$ example
LOCATE Row, TCol
PRINT MID$(Box$, 4, 1);
```

In the example above, the vertical bar character is printed. It's the fourth character in the string named Box$.

Now to this month's program. It's a reusable subroutine that displays a box and then word-wraps text inside it. Here are highlights of the program.

- The WrapBox subroutine, which lets you position a box anywhere on-screen, using any colors for the foreground and background, and displays any message inside it with word wrap. This is at the heart of an online help system I'm writing, and you can use it, too.
- The Wrap$ function, which returns a string completely formatted with

BASIC TRAINING

word-wrap, given a raw input string.

- The DrawBox routine (stolen from last month's program and stripped of comments to save space in the program listing), which draws a box on-screen using specified coordinates and colors.
- No global variables in any routine, which means that you can use your own globals without problems—there won't be any unpleasant side effects.

This is some of the most compact code I've ever written, but some of the credit goes to BASIC itself. A word-wrap routine I wrote in C that does slightly less than Wrap$ was much longer and more difficult to follow because a lot of the things we take for granted in BASIC, such as string concatenation using +, initializing strings to " ", and intelligent but transparent allocation of memory for strings.

On the minus side, BASIC doesn't allow array notation to let you step through the successive characters of a string as does C.

The AddWord routine is internal

```
DEFINT A-Z
DECLARE SUB AddWord (LineLen, NextWordLen, NextWord$, WrapWidth, Final$, Lines
DECLARE SUB DrawBox (TRow, TCol, Wide, High, TextColor, BackColor, Box$)
DECLARE FUNCTION Wrap$ (Raw$, WrapWidth, MaxLines)
DECLARE SUB WrapBox (LeftRow, LeftCol, Wide, High, TColor, BColor, DBox$, Msg$

CLS
DBox$ = CHR$(205) + CHR$(201) + CHR$(187) + CHR$(186) + CHR$(200) + CHR$(188)
LINE INPUT "Please type in a test string: "; Msg$
CALL WrapBox(6, 30, 13, 9, 7, 0, DBox$, Msg$)

SUB AddWord (LineLen%, NextWordLen, NextWord$, WrapWidth, Final$, Lines)
  IF (LineLen + NextWordLen) >= WrapWidth THEN       ' Line'd be too long.
     IF NextWordLen > WrapWidth THEN                 ' This word alone is
       NextWord$ = LEFT$(NextWord$, WrapWidth - 1)   ' longer than the line.
       NextWord$ = NextWord$ + ">"                   ' Truncate with flag
     END IF                                          ' char.
     Final$ = Final$ + CHR$(13)                      ' Force end of line.
     Lines = Lines + 1                               ' # of output lines.
     LineLen = 0                                     ' Starting a new line.
  ELSE IF LineLen > 0 THEN Final$ = Final$ + " ": LineLen = LineLen + 1
  END IF                          ' Now add token to output string.
  Final$ = Final$ + NextWord$: LineLen = LineLen + NextWordLen
  NextWord$ = "":    NextWordLen = 0                 ' Reinit vars.
END SUB ' AddWord

SUB DrawBox (TRow, TCol, Wide, High, TextColor, BackColor, Box$)
  COLOR TextColor, BackColor          ' Set text fore- & background colors.
  BottomRow = TRow + High             ' Calculate outside of loop.
  FarRight = TCol + Wide
  FOR Row = TRow + 1 TO TRow + High - 1                ' Draw interior.
    LOCATE Row, TCol + 1: PRINT STRING$(Wide - 1, " ");
  NEXT Row
  FOR Col = TCol TO FarRight                           ' Draw top row.
    LOCATE TRow, Col: PRINT LEFT$(Box$, 1);
  NEXT Col
  LOCATE TRow, TCol: PRINT MID$(Box$, 2, 1);
  LOCATE TRow, FarRight: PRINT MID$(Box$, 3, 1);
  FOR Row = TRow + 1 TO TRow + High - 1                ' Draw sides.
    LOCATE Row, TCol: PRINT MID$(Box$, 4, 1);
    LOCATE Row, TCol + Wide: PRINT MID$(Box$, 4, 1);
  NEXT Row
  FOR Col = TCol TO FarRight  ' Draw the bottom row.
    LOCATE BottomRow, Col: PRINT LEFT$(Box$, 1);
  NEXT Col
```


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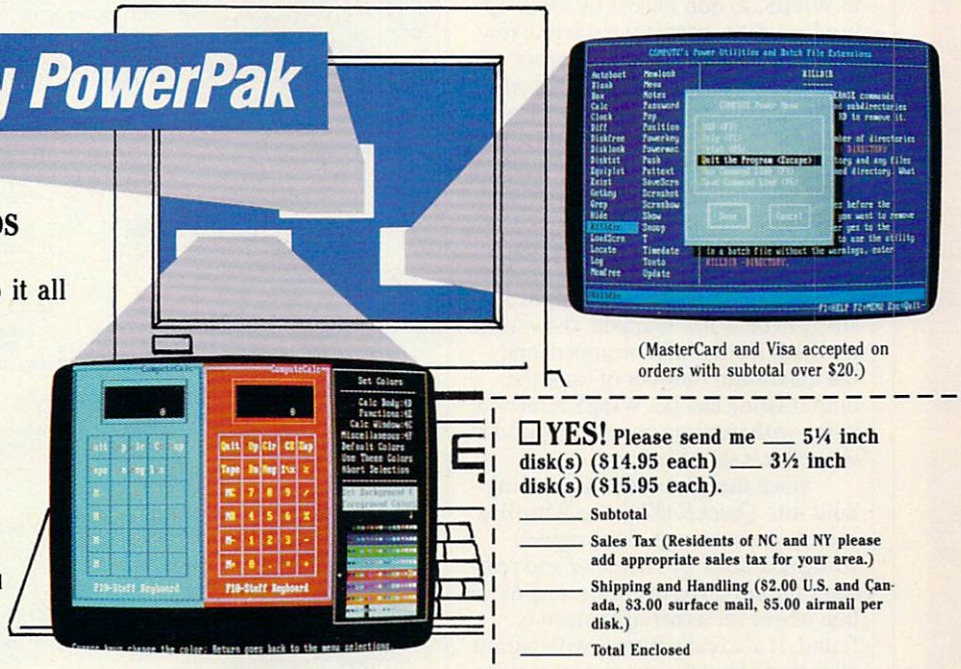

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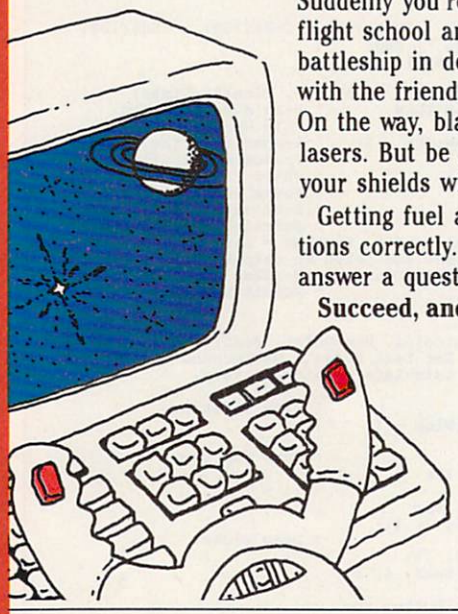

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BASIC TRAINING *continued from page 19*

to Wrap$, so don't use it by itself. To use DrawBox, pass it the starting row and column (the upper left corner of the screen is at location 1,1), the width of the box, its height, a number from 1 to 16 for the text color, a number from 1 to 8 for the background color, and a string containing characters to draw the box.

A box using the characters in Box$ will be displayed onscreen. The Wrap$ function takes as its input a string to be word-wrapped, the width to which it should be wrapped, and the maximum number of lines the output string can be. Wrap$ returns a string with carriage returns embedded where lines should wrap.

Since there's no text windowing built into *QuickBASIC*, the WrapBox routine goes through the wrapped string character by character and relocates the cursor at the beginning of the line whenever a carriage return is found. It also calls Wrap$ with parameters that allow the characters making up the box itself, and a space of padding on either side, to be taken into account.

There's a lot of computing going on here, and this routine is quite a bit slower in the integrated environment than it is in the final EXE. ⊡

```
  LOCATE BottomRow, TCol: PRINT MID$(Box$, 5, 1);
  LOCATE BottomRow, FarRight: PRINT MID$(Box$, 6, 1);
END SUB ' DrawBox

FUNCTION Wrap$ (Raw$, WrapWidth, MaxLines)
  Blank$ = CHR$(13) + " " + CHR$(9)    ' Word separators.
  EndWord$ = ".,!"                     ' Sentence separators.
  LineLen = 0                          ' Current line length.
  Final$ = ""                          ' Output string.
  NextWord$ = ""                       ' Next word from input.
  NextWordLen = 0                      ' Tracks length of NextWord$
  Lines = 0                            ' # of lines in the output string.
  RawLen = LEN(Raw$)                   ' Length of input string.

  IF RawLen <= WrapWidth THEN          ' If the input string is short enough,
    Wrap$ = Raw$                       ' short-circuit the function, returning
    EXIT FUNCTION                      ' the input string unchanged.
  END IF

  FOR Index = 1 TO RawLen
    NextChar$ = MID$(Raw$, Index, 1)   ' Next character from the string.
    IF INSTR(Blank$, NextChar$) THEN   ' The next word has been built.
      CALL AddWord(LineLen, NextWordLen, NextWord$, WrapWidth, Final$, Lines)
    ELSE
      NextWord$ = NextWord$ + NextChar$      ' Not a blank.
      NextWordLen = NextWordLen + 1          ' Track its length.
      IF INSTR(EndWord$, NextChar$) THEN     ' If punctuation mark, end word.
        CALL AddWord(LineLen, NextWordLen, NextWord$, WrapWidth, Final$, Lines
      END IF
    END IF
  NEXT
  IF NextWord$ <> "" THEN
    CALL AddWord(LineLen, NextWordLen, NextWord$, WrapWidth, Final$, Lines)
  END IF
  Wrap$ = Final$
END FUNCTION ' Wrap$

SUB WrapBox (LeftRow, LeftCol, Wide, High, TColor, BColor, DBox$, Msg$)
  CALL DrawBox(LeftRow, LeftCol, Wide, High, TColor, BColor, DBox$)
  Msg$ = Wrap$(Msg$, Wide - 5, High)   ' Word-wrap input with inside padding.
  MsgLen = LEN(Msg$)                   ' Calculate this outside of loop.
  NextRow = LeftRow + 1                ' Start under the top row of the box.
  LOCATE NextRow, LeftCol + 2          ' Start one past the left row.
  FOR Index = 1 TO MsgLen              ' Loop through word-wrapped input,
    NextChar$ = MID$(Msg$, Index, 1)   ' jumping over to the left side when
    IF NextChar$ = CHR$(13) THEN       ' a carriage return is hit and printing
      NextRow = NextRow + 1            ' all other characters as is.  The0
      LOCATE NextRow, LeftCol + 2      ' right boundary has already been
    ELSE PRINT NextChar$;              ' taken care of with the call to
    END IF                             ' Wrap$.
    IF NextRow >= LeftRow + High THEN EXIT SUB ' Truncate at bottom.
  NEXT Index
END SUB ' WrapBox
```

HOT TIPS

HINTS AND TIPS FROM OUR READERS

Have you ever wondered why the single and double dots (. and . .) appear as the first two files in all your subdirectory listings?

These two directory entries refer to the parent directory of the current directory and the current directory itself. They are automatically included when a subdirectory is created with the MKDIR command.

You can use these entries to navigate through the DOS directory structure on your disks using the CD command. You can enter CD . . at the DOS prompt to move to the parent directory of the current directory without specifying a long path. Try moving up two levels by entering CD . . \ . . at the DOS prompt. You can move freely through the entire directory structure this way.

Kim Rokosa
Bristol, CT

Label Miser

How many labels do you waste when setting printer tabs and linefeeds? Try printing on the back side of the labels until the settings are correct. You don't even need to hold the labels up to the light to determine what adjustments are required. When you're satisfied with the results, simply feed the labels into the printer with the label side up. You'll get rows and rows of perfect labels with no waste. This tip is especially handy for printing three-wide labels.

David Nagel
Jenison, MI

WordMaster Mail Merge

I was disappointed that *WordMaster* (May 1990 *COMPUTE!'s PC Magazine*) lacked a mail-merge option. Then I discovered that *WordMaster*'s macro language is sufficient for creating a basic mail-merge option.

The easiest way to create a macro is to use Edit mode under Macros (located in the Misc menu). Press F1, highlight Macros in the Misc menu, and then press Enter. Go to Edit macros, highlight the first entry that says *No Name*, and then press Enter. Enter your macro name (for instance, SETUP). An empty box will appear on the screen. Press the appropriate keys (see macros below). To include the Enter key or cursor keys, press ScrollLock, press the key, and press ScrollLock again. Press Enter to exit Edit mode.

After you've entered the macros below, highlight *Store macros* and enter a filename such as WM at the prompt.

The following macros implement a framework for mail merge that provides the basics and can be modified or extended easily. It consists of two steps: a setup function and a merge-next-address function.

Mail-Merge Setup:

```
Ctrl-F8 ADDRESS.LIST Enter Alt-
  F8 Alt-F10 D:$$temp$$ Enter
```

This macro opens a new window, loads in the address list, switches back to the document, and saves a temporary working copy.

Merge Next Address:

```
Ctrl-PgUp Alt F2 %address% Enter
  Enter Ctrl-Y Alt-F8 Ctrl-B Ctrl-S
  Dn Dn Dn Dn Dn Ctrl-B Ctrl-E
  Alt-F8 Ctrl-B Ctrl-C Alt-F10
  D:$$temp$$ Enter Y Shift-F7 Dn
  Enter D:$$temp$$ Enter Up Enter
  Ctrl-Y Ctrl-Y Ctrl-Y Ctrl-Y
  %address%
```

This macro goes to the beginning of the document, looks for the string %address%, and deletes it. Then it switches to the address window, starts a block, moves down five lines, and ends the block. Next it switches to the document, does a block copy, saves the working copy, prints the document, deletes the address, and puts the search string %address% back in the document.

Each address in the address list must consist of five lines for these macros to work on your system. You can change the setup macro to write to your hard drive or a floppy disk as well. Simply change the D: in the macros to the correct drive identifier, such as C: for your hard disk.

You can merge each entry one at a time by pressing the Alt key assigned to the merge macro, or you can automate the entire process by creating a third macro that invokes the setup and merge macros as many times as needed to process the entire list.

Robert Rankin
New Paltz, NY

Date

If your system uses an AUTOEXEC.BAT file in its boot-up sequence, the date and time prompts don't appear when the system boots. If you'd like to see the current date and time at boot-up to make sure your system clock is accurate but you don't want to enter a new date, add the following lines to your AUTOEXEC.BAT file.

```
ECHO OFF
DATE < RETURN.DAT | FIND "C"
  > DATE.TMP
TYPE DATE.TMP
```

Make sure the C in the second line is uppercase (FIND is one of a very few DOS commands that are case-sensitive). Then create a file called RETURN.DAT by entering COPY CON RETURN.DAT at the DOS prompt. Next press the Enter key, F6, and Enter again. This creates a file with a single carriage return to send to the DATE command. The FIND.EXE file that comes on your DOS disk should also be available to the system (the directory where it's located should be listed in the PATH statement in your AUTOEXEC.BAT file).

Marvin Heikkila
Duluth, MN

If you have an interesting tip that you think would help other PC users, send it along with your name, address, and Social Security number to COMPUTE's PC Hot Tips, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We'll pay you $25–$50 and send you a COMPUTE's PC LCD clock radio for each tip we publish. ⊡

ON DISK

GEORGE CAMPBELL

For this issue's disk, we've rounded up an assortment of shareware and public domain programs you won't want to miss. Ranging from a floppy disk organizer to an educational math game, they're all winners.

If you bought your copy of *COMPUTE* on the newsstand, you'll want to order your own copy of this disk so you can try out the programs. Subscribers automatically get these disks, so if you haven't subscribed to *COMPUTE's PC Disk* yet, now's the time. For more information, see the order blank on the next page.

If you have the disk, to find out how to use it, insert it in your drive and run *CMOS, COMPUTE's Menu Operating System,* by typing MENU at the DOS prompt. Next, choose Information and Extras from the disk's initial menu. On the subsequent menu, select How to Use the Disk, and you're on your way.

DISKTRAK

If you're like most PC users, you've accumulated an impressive stack of floppy disks, and finding the file you need can be tough. Stuffing each disk in a floppy drive and listing a directory is one way, but it can take hours.

DISKTRAK, written by California programmer Birk Binnard, is the answer. It's a database program for your disk collection. It automatically reads your disks' directories, adding the filenames to its data file. All you do is feed your disks into a floppy drive—*DISKTRAK* does the rest. To find a file later, just type in the whole or partial name of the file; *DISKTRAK* will locate it almost instantly.

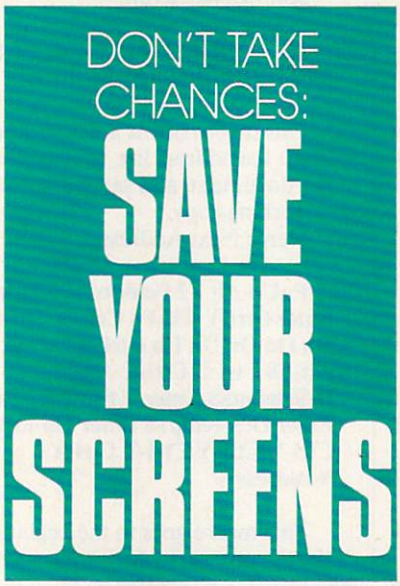
That's not all. *DISKTRAK* lets you add a note for each file, making it that much easier to identify your programs and data. It can read the names of files inside a compressed ZIP file, print detailed reports for future reference, and help you delete unwanted files. The moving-bar menus make it easy to learn and use.

To run *DISKTRAK,* you'll need an IBM, Tandy, or compatible PC with at least 256K of RAM, DOS 2.1 or higher, and a minimum of two floppy disk drives. *DISKTRAK* is a shareware program, with a low registration fee of only $10.

Star Blaster

Education really *can* be fun, and *Star Blaster* is surefire proof. Written by North Carolina's Richard C. Leinecker, it offers fast arcade-style action, with learning as a plus.

Your mission: To reach a destination in space while destroying or avoiding UFOs. To do this, you must



solve math problems that use decimal fractions. Correct solutions can increase fuel, ammunition, and defensive shield strength. You control the difficulty of the problems.

You'll need to keep your wits about you, though, because *Star Blaster* is a fast-moving game requiring all your concentration. The program uses the keyboard during play, but you can select menu functions with a mouse.

You'll need an IBM, Tandy, or compatible PC with at least 256K of RAM and a CGA display or better (EGA, MCGA, or VGA) to run *Star Blaster.* Registration for this shareware program is only $15, and registered users receive three more educational games from the author.

EnvEd

The little-known DOS environment is a powerful tool for users, storing your PC's PATH, variables, and other important data. Unfortunately, editing the individual elements in the environment can be a tough job. Most people make changes to their AUTOEXEC.BAT file and reboot.

EnvEd is a tiny program designed to solve this problem. It lets you edit any item in the DOS environment, with a word processor–like screen that uses a subset of the *WordStar* command set. Written by Jeff Bowles, it simplifies a difficult job. You'll need an IBM, Tandy, or compatible PC, DOS 2.1 or higher, but only 128K of memory to use the program.

To help you understand the DOS environment, see the feature article "Becoming a PC Environmentalist" in this issue of COMPUTE's PC. You'll find information there about the environment in general and about this valuable program in particular.

Screen Saver

There are scores of programs on the shareware market that blank your computer's screen after a period of inactivity. Most are limited to specific video modes, and many can't handle graphics-based programs.

Tom Donnelly, a California programmer, wrote *Screen Saver* to give users one program that handles every possible situation. It will clear any monitor at an interval you set. Pressing any key or moving your mouse restores your screen instantly.

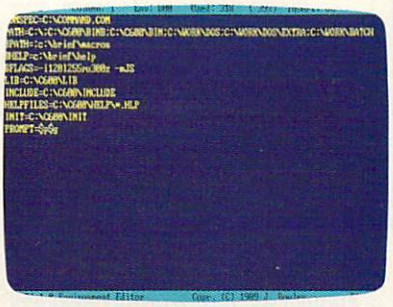
That's not all *Screen Saver* can do. It can also blank your screen anytime you like. Just press a hot key of your choice. Finally, you can designate a password, which allows you to blank the screen and leave your computer without worrying about unauthorized access.

Screen Saver uses a separate in-

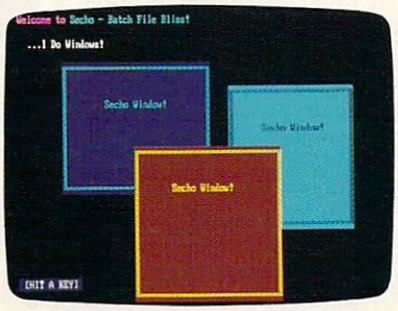
ON DISK

DISKTRAK

Star Blaster



EnvEd



Secho

stallation program to handle configuration chores. Once configured, a memory-resident program takes over. You can change configurations or turn off the program at any time.

To use *Screen Saver,* you'll need an IBM-compatible PC with at least 40K of free memory, any video adapter, and DOS 2.0 or higher. The author requests a registration fee of $20.

REPL

At one time or another, most of us need to replace text in a group of files. While most word processors can do this on a single file, it's not so easy when you have many files to change.

John Bridges, from California, came up with *REPL* to handle this job. To use it, you create an ASCII file with any text editor. This file contains the original text, followed by the new text, and can contain multiple search-and-replace pairs. Once you've created the file, a simple command sends *REPL* into action. Before you know it, the job is done.

Some common uses for *REPL* include altering a drive name in a list of batch files or changing passwords in a group of log-on scripts for communications software. *REPL* can run on any PC with at least 128K of RAM and DOS 2.1 or higher. The program requires no registration fee.

Secho

Almost every PC owner uses batch files to speed up and automate DOS commands. There's just one problem: Regular batch files are *boring.* There's no color or sound, just a series of humdrum DOS commands.

Secho, from Michigan author Chris Lucksted, puts an end to all that tedium. It's designed to replace the DOS ECHO command, which you normally use to write text to the screen in batch files.

Using *Secho,* you can add customized sound effects, change screen colors, display the date or time, clear the screen by fading it out, or pause for a specific time. You can also use *Secho* to place text anywhere on the screen, display available memory, draw boxes and windows, and more.

You can use *Secho* on any PC, but its color commands, naturally, require a color monitor. The author asks for a contribution of $10 if you like the program. ⊡

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ONLINE

GEORGE CAMPBELL

Everyone needs to take a break from time to time, and PC games are an ideal way to escape the monotony of everyday chores. There's no shortage of exciting and entertaining games, ranging from simple, text-based adventures to the latest arcade-style thrillers.

Most of these games, however, lack one thing: competition. There's something about playing against a human opponent that makes a game more satisfying. While some games allow two or more people to play, switching players can take some of the excitement out of the process.

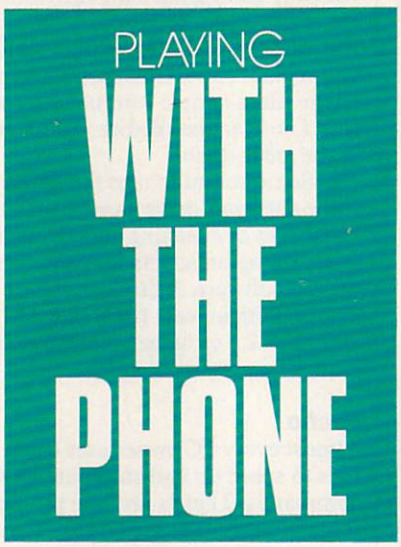
The answer is as close as your telephone. You can use your modem as a gateway into the world of online competition. You have several options: commercial online game software, online games on services like CompuServe and GEnie, games you can play on your local BBS, and online games written by shareware authors.

A number of software publishers have produced games capable of communicating with other modem users. *Flight Simulator 3* (Microsoft), *Modem Wars* (Electronic Arts), *Falcon* (Spectrum Holobyte), and *BattleChess* (Sierra On-Line) are just a few of the programs in this category. All offer excellent graphics and exciting scenarios.

Commercial online services offer a wide assortment of games you can play while you're connected. These range from simple blackjack games to multiplayer text-adventure classics. On CompuServe, enter GO GAMES (on GEnie, type GAMES) to go to the service's gaming area. Access, complete instructions, and help for each game are just a menu entry away. Remember that normal online charges apply here. If you get carried away, your pocketbook could suffer permanent damage!

Many local BBSs also offer online games. In most cases, these are single-player games, such as the classic *Adventure,* or multiplayer games in which only one player at a time is active, like *TradeWars.* These games offer an important advantage over games on commercial services: They're free.

Shareware games combine the best of all worlds. You play them over the phone lines with another person, like commercial online games, but you can try them out without emptying your wallet. Unlike the games you play on a BBS or commercial online service, they offer more than simple text on the players' screens.



All of the games listed in this column are available on CompuServe (GO IBMNEW). The filenames shown are those used on CompuServe. Most are also available on GEnie and other online services, as well as on many local BBSs, though their filenames may be different. You can use those services' search tools to find them. Just use *game* and *online* as search text.

ModemPoker (MPOKER.ZIP) allows two people to play the classic game of five-card-draw poker over the phone lines. It offers excellent color screens and can handle modem speeds up to 9600 baud. Registration costs just $7, and a future version will offer a choice of several poker games, plus blackjack.

PC-Othello (PCOTHL.ZIP) is an excellent online game for two people. It's the centuries-old strategy game, Othello, updated for the twentieth century. Aside from its attractive game board, this game allows both players to type comments at any time.

Trek 2.8 (TREK28.ARC), another classic, uses graphics to create an arcade-style atmosphere in which you and a competitor play a wide-ranging space wars game. It's not as easy to learn as some simpler games, but its complexity ensures that you'll never get tired of playing. There's even a single-player mode for practice.

Space Shades (SHADES.ZIP) is just as complex and just as entertaining as *Trek.* Battle it out alone or against an online opponent. The shareware version of this game runs in text mode and can be played on any PC. For a registration fee of $17, you can get a graphics version that offers outstanding screen images.

If you prefer card games, give *Gin Rummy Challenge* (RUMMYX.ZIP) a try. You can play against the computer or dial up a friend for a game. The program runs on monochrome or color systems and can use either the mouse or keyboard. Help screens make the game easy to learn and use. If you like the game, its author asks you to send a donation to a charity.

Just in case one game isn't enough for you, *Worthy Opponent* (WORTHY.ZIP) lets you select from a menu of four games, including Checkers, Snake Pit, Cornerstone, and Cannonball. All offer excellent text-based screens, sound effects, and easy-to-learn commands. *Worthy Opponent* includes talk windows and a phone book to list all your favorite opponents' phone numbers. Each game is complete with its own help screens. A $15 registration fee brings you five additional games for the program.

There are other modem games available, but these are some of the best shareware games. If you enjoy gaming, you owe it to yourself to download one or more of these and give them a try. ▣

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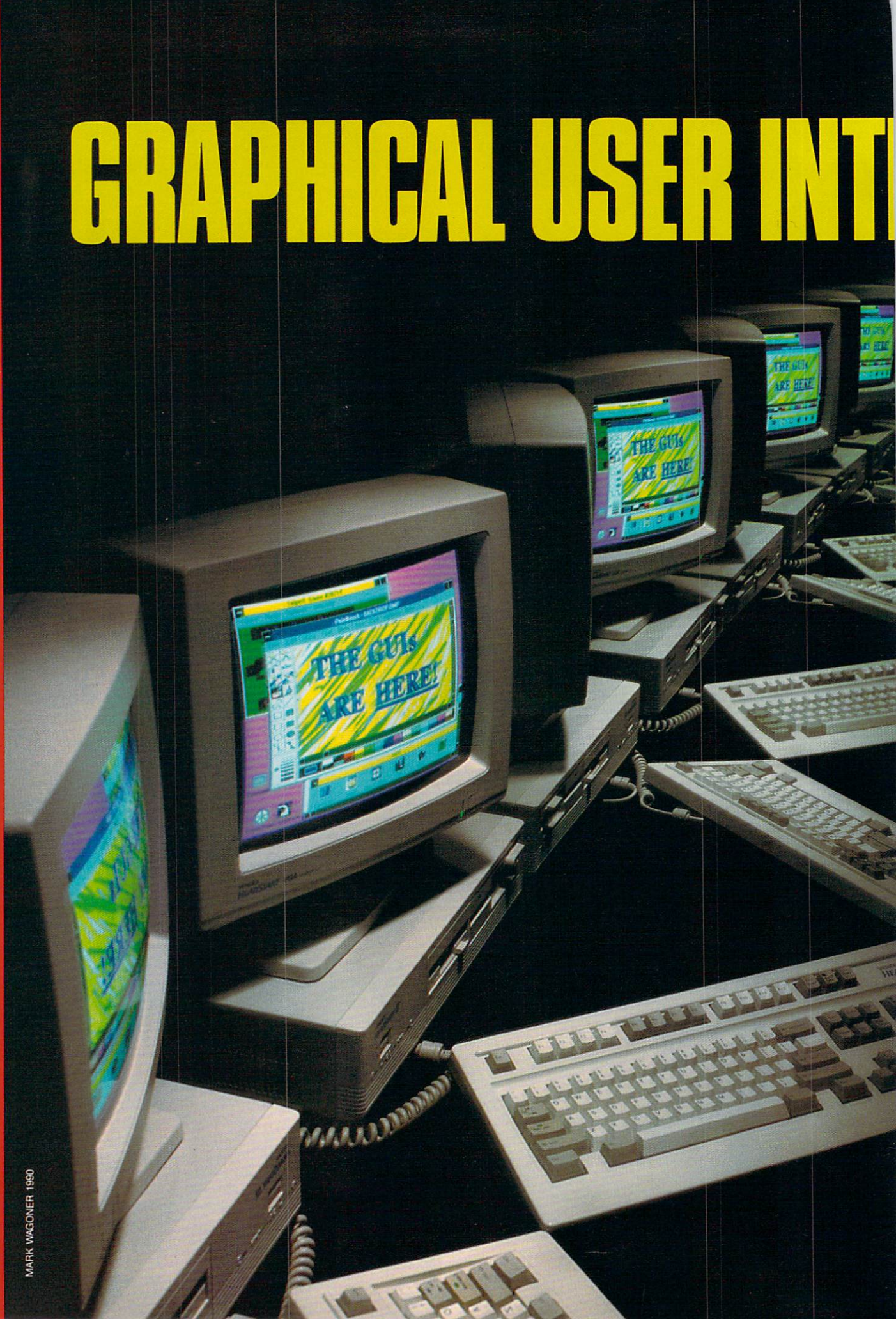


MARK WAGONER 1990

ERFACES AND BEYOND

Once, every PC owner did battle with the command line. Today, we can choose from a staggering array of interfaces, including every shading from pure graphical (complete with icons and folders) to textlike graphical interfaces, such as DOS 4.0's DOSSHELL, to text-based interfaces like *The Norton Commander,* to, finally, command line interfaces that offer alternatives to DOS.

But what distinguishes a graphical interface like *Windows* from an interface like DOSSHELL? And what features cause people to gravitate toward graphical interfaces?

The answer is simple: Graphical user interfaces provide a platform for programs to run under and emulate. At a glance, a user can tell the difference between a *Windows* application and a *DeskMate* application—and for good reasons, as you'll see. By contrast, DOSSHELL launches programs indiscriminately, imposing no design requirements and providing no special resources for them (this approach has its benefits, too).▷

FIND THE INTERFACE THAT'S RIGHT FOR YOU

ROBERT BIXBY

Up from the Command Line

For the past year or so, the buzzword in computer circles has been *GUI* (pronounced GOO-ey). The computer and software pros aren't talking about gummi bears. GUI stands for graphical user interface, the hottest ten-year-old news story around.

About ten years ago, the first graphical interface was displayed by its proud developers at the Xerox Palo Alto Research Center, changing the way Steve Jobs—and, later, the rest of us—thought of computer/human interaction.

A graphical user interface involves more than being able to work with pictures, called *icons,* on a graphic (rather than text) screen. It also refers to the *look and feel* of the programs that run under the graphical user interface.

You may recognize *look and feel* as another recent buzzword. This phrase was used in Apple's 1989 lawsuits alleging that Microsoft's *Windows* and Hewlett-Packard's *NewWave* were too much like the Macintosh interface.

Industry wags had a field day with the lascivious overtones of the phrase, and many were quick to point out that Apple was far from the first to apply graphical interfaces to a computer.

The merits of these cases will have to be weighed in the courts. The only thing certain is this: Whoever created the graphical interfaces was right on the money. Users like graphical interfaces, find them easy to work with, and can even develop an affection for them—three statements that could never be made about the command line interface.

A few dissenting voices have spoken out, however, complaining that graphical interfaces are too slow, too RAM-hungry, and too idiosyncratic. But despite these complainers, the momentum is clearly in the direction of graphical user interfaces.

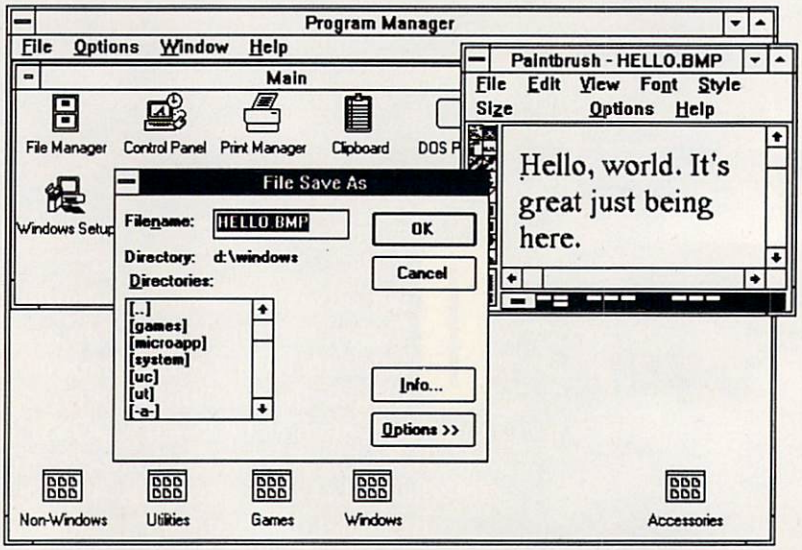
Getting Graphic

If you're new to graphical interfaces, you should know that they can be confusing at first. As a group, they aren't as intuitive as their creators might have you believe.

The advantage of a graphical interface is that it can be learned quickly and with only a little work, in contrast to DOS. Programs that run under a graphical user interface will follow certain conventions: Menus, file handling, and navigation will all be basically the same from one application to another.

This uniformity is ensured by the fact that the program running under a graphical interface uses the same routines as the interface to provide these tools. Knowing what a dialog box will look like before opening it will take some of the shock out of using the system.

Command line interfaces like DOS and UNIX stand in stark contrast to this uniformity. Known for their unusual program and command names (UNIX is by far the worse of these two, featuring commands like grep and nohup) and given to arcane switches and arguments, command line interfaces send even seasoned veterans running back to the manuals and software documentation.



Microsoft Windows

GUIs are friendly and intuitive and most likely lie between you and the future. Decisions about which interface dominates the market are not made by industry insiders or computer gurus, but rather by people like you and me, who take our hard-earned dollars to the computer store, weigh the alternatives, and take home the interface that most closely meets our needs. So it's important that some time and space be devoted to looking over the features (and futures) of the interface options available.

Windows

Microsoft's offering for the MS-DOS GUI world is probably the best known of all entries. In June, Microsoft released the much-storied *Windows* 3.0. This new *Windows* is much more attractive, graphical, and complex than previous versions. It uses RAM beyond the 640K boundary and can multitask (if you have an 80386 and enough RAM). Furthermore, programs written to the new *Windows* 3.0 standard may one day be compatible with *Presentation Manager,* the OS/2 graphical interface, providing a bridge OS/2 has lacked: a ready supply of commercial software that can use the resources OS/2 offers. Whether or not this linkage occurs, *Windows* programs today are identical to their *Presentation Manager* counterparts, from the user's point of view. IBM and Microsoft have been looking for a gentle way to convince its millions of customers to walk up the ramp to OS/2. *Windows* 3.0 may be just the ticket.

Although *Windows* ships with a usable complement of software, only in the past couple of years has there been third-party interest in *Windows* software development. For years, the only word processing option with *Windows* was *Windows Write.* Recently, Samna's *Ami* and *Ami Professional* and NBI's *Legacy* have arrived to fill the gap.

Even Microsoft has jumped on the bandwagon with its own *Microsoft Word for Windows.* After years of eager rumors and subsequent disappointments, *Word* has shown itself to be a powerful *Windows* alternative. New users will discover that it resembles Macintosh *Microsoft Word* more than it resembles *Microsoft Word 5.x* for DOS.

It's interesting that, although Microsoft didn't recommend *Windows 286* for the 8088 world, you can run *Windows* 3.0 in so-called *real mode* on a machine with an 8088 or 8086 and 640K of RAM. Besides real mode, *Windows* 3.0 has standard mode, intended for use with 80286-based computers, and 386-enhanced mode, which allows for multitasking of both *Windows* and DOS applica-

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But Wonderland isn't just a bewitching story. It's playing environment breaks new ground for computer adventures. Here's what the editor of Computer Gaming World has to say about it!

"The game is neither strictly a text adventure nor can it be described as a graphic adventure. It is its own genre... The game uses multi-tasking to offer an incredible array of features..."

Besides superb graphics and sound support, Wonderland's unique windowing environment offers pull-down verb and noun menus, graphics you can size up or down and move around the screen, automated mapping, point-and-click object manipulation, a compass for directional movement, and extensive on-screen help.

"Innovative," "ambitious" (The Chicago Tribune), "exquisite and impressive" (CGW), "brilliant and insane" (The Electronic Gamer), are more words used to describe Wonderland. Questbusters calls its windowed universe "the ultimate interface." Stunning graphics, impressive sound board support and a captivating story, all in a sophisticated new windowing system, combine to make Wonderland the richest adventure ever: a game to play, to tell, and to inhabit.

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Fast Features: User Interfaces

Product	Company	Price	System Requirements	Type	Display Options	Program Handling	Support Programs
Concurrent DOS	Digital Research 70 Garden Ct. Monterey, CA 93942	$495.00	80386-based PC, 2MB of RAM, hard disk	Command line	N/A	Multitasking and multiuser	None
DeskMate	Tandy 1800 One Tandy Center Fort Worth, TX 76102	$99.95	IBM, Tandy, or compatible PC; 512K of RAM; DOS 3.2 or higher	Graphical	Tree or file list	Task switching (among *DeskMate* applications)	Spelling checker, calculator, phone list, to-do list, corkboard, alarm, calendar, word processor, spreadsheet
DESQview	Quarterdeck Office Systems 150 Pico Blvd. Santa Monica, CA 90405	$129.95	IBM, Tandy, or compatible PC	Text	Menu, windows	Multitasking, task switching	None
DOSSHELL	IBM 1133 Westchester Ave. White Plains, NY 10604	Available with DOS 4.*x*	PC, Tandy, and compatible computers	Text	Tree, file list, menu	Single tasking	Comes with DOS 4.0 or higher
DR DOS	Digital Research 70 Garden Ct. Monterey, CA 93942	$199.00	IBM, Tandy, or compatible PC; 256K of RAM	Command line	N/A	Single tasking	Text editor
4DOS	JP Software Box 1470 East Arlington, MA 02174	$50.00 registration fee (shareware) (plus $4.00 shipping in the U.S.)	IBM, Tandy, or compatible PC; DOS 3.0 or higher	Command line	N/A	Single tasking	None
GEM	Digital Research 70 Garden Ct. Monterey, CA 93942	$49.95	IBM, Tandy, or compatible PC; 512K of RAM; DOS 2.1 or higher, DR DOS, Concurrent DOS XM 6.0, or Concurrent DOS 386 2.0; mouse	Graphical	Icons, windows, file list	Single tasking	None
NewWave	Hewlett-Packard 19310 Pruneridge Ave. Cupertino, CA 95014	$195.00	80386 system with 4MB of RAM, *Windows*	Graphical	Icons; file list	Multitasking, with the ability to make programs interact within a single document	*NewWave Write*
The Norton Commander	Peter Norton Computing 2210 Wilshire Blvd. Santa Monica, CA 90403	$149.00	PC, Tandy, or compatible computer	Text	Tree, file list, menu, windows	Single tasking	Viewers for *dBase, Lotus 1-2-3, Excel, Quattro, WordPerfect, Microsoft Word, XyWrite, WordStar,* and PCX graphics files
PC Tools Deluxe	Central Point Software 15220 NW Greenbriar Pkwy., #200 Beaverton, OR 97006	$149.00	PC, Tandy, or compatible computer; 512K of RAM; DOS 3.0 or higher	Text	Tree, file list, menu, windows	Single tasking	Text editor, shell, telecommunications, cache, mirror, back up and restore, hard disk optimizer, clipboard, database
***Presentation Manager* (OS/2)**	Microsoft 16011 NE 36th Way Redmond, WA 98073	$340.00	80386 computer, 4MB of RAM, hard disk	Graphical	Icons	Multitasking	Information not available
SoftBreeze	Softshell Systems 1163 Triton Dr. Foster City, CA 94044	$99.00	IBM, Tandy, or compatible PC; 512K of RAM; DOS 3.0 or higher; hard disk	Text	Tree, file list, menus	Task switching	File- and disk-management utilities
Software Carousel	SoftLogic Solutions 1 Perimeter Rd. Manchester, NH 03103	$89.95	PC, Tandy, or compatible computer; 192K of RAM; DOS 2.0 or higher; hard disk recommended	Text	Full-screen menu	Task switching	A companion program is provided that will swap information among applications, TSR manager
Switch-It	Better Software Technology 55 New York Ave. Framingham, MA 01701	$99.95	PC, Tandy, or compatible computer; 256K of RAM; DOS 2.1 or higher; hard disk and EMS memory recommended	Text	Menu	Task switching	Includes cut and paste between applications and command retriever
Take Charge!	Departmental Technologies Box 645 Andover, NJ 07821	$99.00	IBM, Tandy, or compatible PC; 320K of RAM; DOS 2.0 or higher; hard disk	Text	Tree, file list, menus	Task switching	Telecommunications, directory and file utilities, alarm, calculator, calendar, text editor, card-file database, automatic dialing through a modem
***Windows* 3.0**	Microsoft 16011 NE 36th Way Redmond, WA 98073	$149.00	80286, hard drive, mouse, 640K of RAM (EMS recommended), DOS 3.1	Graphical	File list, windows	Multitasking	*Windows Write, Windows Paint,* calculator, notepad, card file, clock, reversi

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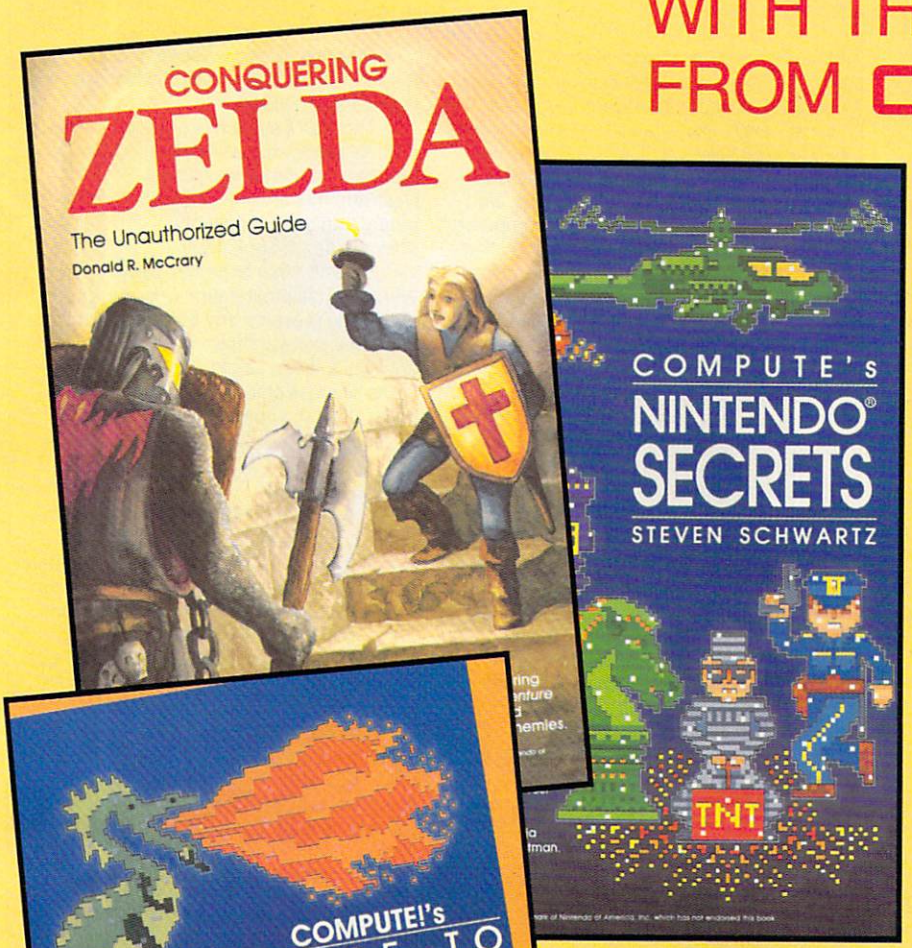

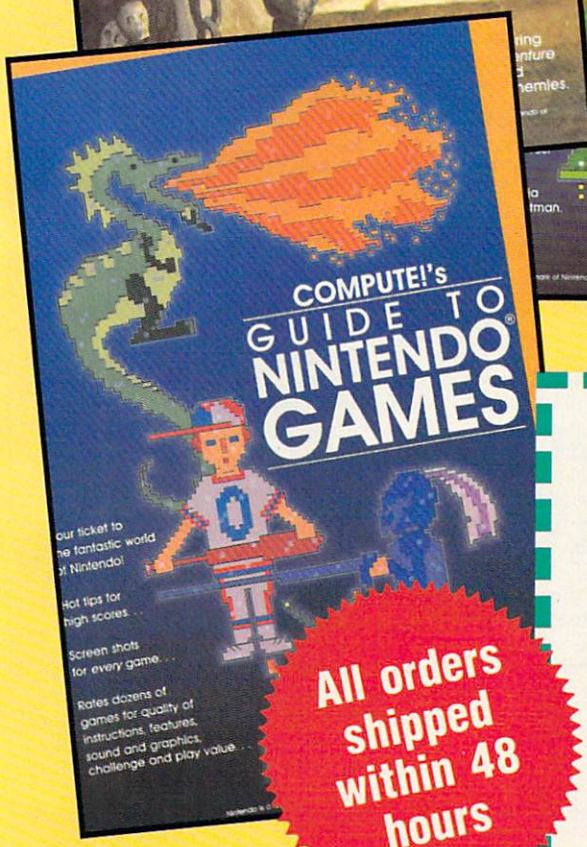

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tions, as long as you're operating an 80386-based machine with at least 2MB of RAM.

Windows' current incarnation is a beautiful thing to see. In contrast to earlier versions, it will run many DOS programs without problems. Unfortunately, it won't run some programs written specifically for earlier versions of *Windows,* resulting in many new product announcements simultaneous with the announcement of *Windows* 3.0. This will reap some small change for the *Windows* developers. *Microsoft Word for Windows* and Computer Support's *Arts & Letters* are two products that can be run under either version of *Windows.* Microsoft claims that if developers programmed according to the rules, their products should be upwardly compatible. *Excel,* Microsoft's own *Windows* spreadsheet, didn't play by the rules and had to be updated for the new version. From the standpoint of the user looking for a graphical interface, *Windows* in its earlier incarnation wasn't especially *graphical.* The new version cures that problem with full-color icons (on machines with color graphics adapters).

So where does *Windows* fit in? Microsoft founder Bill Gates has said that he sees the operating-system market segmented by CPUs: DOS is primarily for 8088 machines, *Windows* is for the 80286 machines, and *Presentation Manager* is for the 80386 machines, though he has eqivocated on this stand.

As you might expect, there is some overlap: DOS works on all three platforms. *Windows* runs on machines powered by the 8088 through 80486 CPUs, while OS/2 and *Presentation Manager* will run on 80286, 80386, and 80486 machines.

Presentation Manager and OS/2, an operating system and interface combination, look, act, and feel just like *Windows.* Unfortunately, OS/2 has failed to generate the excitement its developers had hoped for, though it is slowly gaining in popularity. Whether OS/2 was ahead of its time or whether it was just a bad idea is up in the air at the moment.

The shortcomings of *Windows* and *Presentation Manager* have inspired enhancements from third-party manufacturers. Hewlett-Packard's *NewWave* gives *Windows* a more Mac-like look. It also adds improvements like macros (through an entity known as the *Agent*) and dynamic links among programs (known as *hot links*).

One of *NewWave's* advantages is that it makes *Windows* more compatible with non-*Windows* applications. *NewWave* costs $195 and requires either a 386 system with 4MB of RAM or a 286 system with 3MB of EMS 4.0 memory. It also requires at least a 40MB hard drive, DOS 3.2 or higher, and *Windows* version 2.11 or higher, EGA or VGA graphics, a mouse, and a 1.2MB floppy drive. This is *serious* software.

Now that *Windows* also allows for hot links and broader compatibility, the onus is on Hewlett-Packard to come up with more features to justify *NewWave's* existence. At PC Expo, held in New York City this past June, I had the opportunity to talk to a Hewlett-Packard representative. He made a strong case for *NewWave.* True, *Windows* allows for dynamic links among software packages, allowing (for example) figures in a spreadsheet to be updated instantaneously as values are changed where they appear in databases, graphics, and documents; but the only thing you need to

NeXT and Mac

When Steve Jobs was forced out of Apple by noted fizz-water salesman John Sculley, people throughout the industry wondered "What next?" Steve must have heard them, because he seemed to think some further action on his part was called for, and he named his new company NeXT. Ever the champion of the black-and-white computer, he created a monochrome Maserati called the NeXT. He did it with a pile of money invested by notables like H. Ross Perot, IBM, and Sony. IBM probably yearned for the new interface so that it could crush once and for all that troublesome upstart, the Macintosh. Perhaps Sony was keen to place its incredibly capacious optical drives in the American marketplace.

NeXT was delayed quite awhile in its introduction. Now that it's out, people—especially intelligent, well-educated, creative people at universities across the land—have been trying to find something to use it for. Music seems to be a possibility, because in terms of sound, the $10,000 NeXT is right up there with the $600 Amiga and the similarly priced Atari ST. In advertising and company press releases, NeXT has been pushing the machine for desktop publishing, though there's only one piece of NeXT software in this area at this time: *FrameMaker* from Frame Technology.

Despite the identity crisis (which is fairly normal in anyone's adolescence, and no less so if that person happens to be a computer), no one will argue that NextStep, the user-interface-cum-development-system, is remarkable. Beyond the fact that it's monochrome and is thinly hiding something as mundane as UNIX, people can't take their eyes off of it. No one who sees a NeXT in operation can fail to be impressed with the fine clarity of the images, the readability of the text, and the more complete realization of the standard features thought to be done to perfection on earlier machines. Looking at it, it's obvious where Microsoft found some of its ideas for *Windows* 3.0 (and Commodore-Amiga for the new Amiga Workbench 2.0).

The onscreen buttons and controls are finely sculpted. The menus are logical. The windows can all scroll and be updated at once, even though some of them are behind other windows, because NextStep and UNIX are truly multitasking. Supposedly, IBM will be introducing NextStep for use with its line of computers at some point, though no one knows when that will occur (and IBM isn't talking). NextStep is called a *development environment* by its creators. It includes under its umbrella the Workspace Manager, the Window Server (including Display PostScript), the Application Kit, and the Interface Builder.

The NeXT system is only one of several UNIX windowing alternatives. Owing to the savvy media style of its developer, NextStep has received more press than the others, but there are plenty of competitors. They are Open Look, Motif (an X Window variant), and other schemes based on X Window. This proliferation of opposing standards prevents any publisher of microcomputer software from issuing the kind of applications that would bring UNIX into the home or small office, thus promising to make UNIX the best-kept secret in small systems for some time to come.

The Macintosh

When it comes to the Macintosh, the computer that arguably started the current spate of graphical user interfaces, the interface and the operating system are so intertwined that they are barely distinguishable. That's because the Mac's interface was part of the original design of the machine, not an add-on as is the case with most PC interfaces.

The Macintosh has come a long way since the original version made its debut six years ago. The original Mac was a 128K, single-floppy-drive computer with a nearly useless keyboard and a monochrome screen.

In its latest incarnations, the Mac doesn't look very different from an AT clone. Even its keyboard looks like the standard 101-key enhanced PC keyboard. The Macintosh is available with a fire-breathing 68030 processor, 24-bit color, and virtually all of the features of the highest-tech PC. The graphical interface, however, has remained consistent across the years, taking the advent of hard drives, color, and the rest completely in stride.

As futuristic as the Macintosh looked in 1984, its interface looks like a toy beside the NeXT interface. Rather than attempting to maintain its place at the head of the line through litigation, many people wish Apple would expend more effort on innovation.

Over the years, Apple has effectively quashed all efforts to clone the Macintosh (though recently Apple has entered into an agreement with Outbound, manufacturer of a portable Mac clone), but now it might appear that software developers have executed an end run around the Apple defense. The appearance of *Windows* 3.0 will induce a lot of PC users to stick with DOS rather than switch to the Mac.

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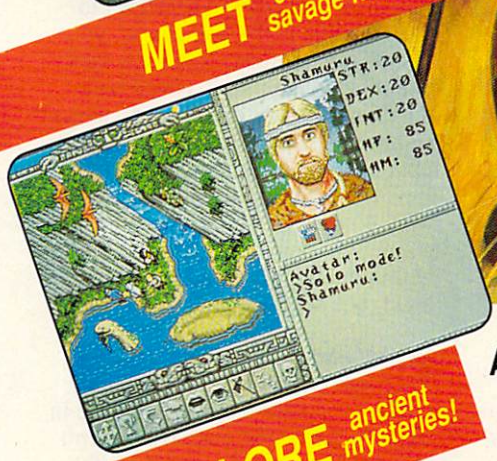

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do to break the dynamic link in *Windows* is change a linked document's name. *NewWave* maintains the link, regardless of the changes made in the document or in its name.

The links *NewWave* provides are more powerful as well. Placing a linked graphic file in *Microsoft Word for Windows,* a *Windows* product requires that it be in a format the program can handle, such as TIF or *Windows* Metafile. If a new format emerged tomorrow, a new version of the *Word* product would have to be developed to accommodate it. In the *Ami Professional* version developed for use with *NewWave,* the word processor has nothing to do with the graphic. When a linked graphic is imported, it remains part of the program that created it. I saw a demonstration in which an animated graphic was imported to an *Ami Professional* document. The word processor didn't have to be able to provide animation for the graphic. All it did was allow the section of the page where the animation appeared to be a part of the external animation program.

The *NewWave* environment features *Agent,* a macro recorder similar to *Recorder,* provided with *Windows* 3.0. But instead of simply recording keypresses and mouse movements as does *Recorder, Agent* deals with files by name and its macros take the form of programs that can be edited with a word processor. If you use *Windows* 3.0's macro recorder capability, it will record that you moved the mouse to a given position and double-clicked to invoke *Excel.* However, if you move *Excel* to a different location on the screen and replace it with an *Ami Professional* document, invoking the macro will start *Ami Professional* instead of *Excel.* By contrast, *NewWave's Agent* will contain instructions to start *Excel,* regardless of its position on the screen. This will make your macros more reliable and therefore more useful.

GEM

Gary Kildall's Digital Research is one of the great might-have-beens of the computer industry. It was once king of the hill with its ubiquitous CP/M operating system, but because of misunderstandings with representatives from big blue IBM, Microsoft—rather than Digital Research—got the nod to create DOS. Shortly after the appearance of the IBM PC, Digital saw its market share dwindle to a very few true believers.

Ever since, with product after product, Digital Research has tried to find its niche in a world it never made—the world of DOS. One of these products is DR DOS, an MS-DOS alternative. Another is *GEM.*

Perhaps inspired by the Macintosh, Digital Research's programmers set to work on an early windowing interface for the PC called *GEM,* which is now seen mainly on Atari STs and as the operating environment for a handful of PC desktop publishing packages such as *Ventura Publisher* and *GEM Desktop Publisher.*

Although it isn't multitasking, *GEM* is still a powerful shell. It provides many of the same advantages as *Windows,* including the simple routines necessary to place text and dialog boxes onscreen.

A few users are crazy about *GEM,* though one witty detractor called it "CP/M with windows." In its current release, it's a little more informative than *Windows* (for example, the size of the thumb mark in the scroll bar tells you how much of the file is currently visible onscreen), and it costs half to a quarter as much. And *GEM* should operate on all machines that run DOS.

People who run *GEM* after running *Windows* may be surprised to discover that *GEM* comes with very few desktop utilities. You get a basic operating system shell, which lacks the paint program and word processor shipped with *Windows,* and which is missing interesting tidbits (such as the Reversi and Solitaire games supplied with *Windows*). Word processors and graphics packages exist that will work within the *GEM* operating environment, but they are sold separately.

DeskMate

Venerable *DeskMate* (now in its 3.0 release) would be a strong presence in the software world, even if it weren't friendly and powerful, because of the fact that it's the operating system shell available for one of the best-selling personal computers: the Tandy 1000 line. Tandy has been aggressively pur-

Which Interface Is Right for You?

How can you decide which interface is for you?

If you're managing a large number of programs and would like to be able to switch among them, consider a task switcher like *Switch-It, Take Charge!,* or *SoftBreeze* rather than a graphical interface. Context switchers are generally much more efficient in their use of RAM, and they usually require little from the programs they switch.

If you're interested in running *Windows* applications, such as *Word for Windows* and *Ami,* you'll probably want *Windows.* In addition, it comes with two powerful programs: *Microsoft Windows Write* and *Microsoft Windows Paint.*

As a file switcher, *Microsoft Windows* may cause you some problems. A small group of DOS applications steadfastly refuse to run under *Windows.* Yet it's the leader of the pack of graphical interfaces because the programs that will run under it, using its resources and emulating it, include some of the major success stories of software. *CorelDraw, Arts & Letters,* and *Micrografx Designer,* the big-three PC drawing programs, are all *Windows* applications. Microsoft's *Excel* spreadsheet is only available as a *Windows* application, and *Windows*-based word processors are also beginning to appear in numbers. The first databases have begun to appear, too.

GEM draws very little attention these days, but it's a good file switcher and far more graphical at its heart than *Windows 2.x* was. One of *GEM*'s biggest claims to fame is that it provides the operating environment for *Ventura Publisher,* one of the two top PC desktop publishing packages.

It's been said that a musical instrument exists to perform the music written for it. Few people study basset horn anymore, though this instrument was common in the last century. Without new music written for it, the basset faded until it became a musicological footnote.

GEM is a capable programming achievement but has very little important software written to take advantage of its abilities. Without software, *GEM* may become another basset horn.

DeskMate will probably live as a standard as long as Tandy sells PC compatibles, which means that it will probably never die.

The programs supported by *Windows* and *DeskMate* vary in their focus. Although there is some high-level software available to operate under the *DeskMate* interface, the Lotus *DeskMate* spreadsheet cannot compare with *Excel.* By its pricing and its mall locations, Tandy is obviously aiming at the home and small-office user rather than the upper-end corporate customer, who is in Microsoft's sights.

Although *Windows* 3.0 is very exciting, *DeskMate* is probably a better choice as a graphical interface for the home user than *Windows* or *GEM.* In addition to the fact that the interface is friendly, logical, inexpensive, and packed with features, *DeskMate* is a better switcher.

Among the other products mentioned, *Take Charge!* is very powerful and takes up virtually no memory, so it would be a good option to use, if you're only looking for a task switcher and you have very limited memory. *DESQview* becomes more valuable with a more capable machine and more RAM. If you're operating an 80386 with two or three megabytes of RAM, you should look into *DESQview.*

If you're tired of the DOS command line but don't need the features of a GUI or a task switcher, consider *The Norton Commander* or *PC Tools Deluxe* shell. Both programs make DOS easier to use and more powerful.

Command line enthusiasts should take a serious look at *4DOS.* It's shareware, so you can try it before you pay. In many ways, it's the interpreter COMMAND.COM should have been.

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suing non-Tandy users with a *DeskMate* version that will run on any compatible, and it has been making converts.

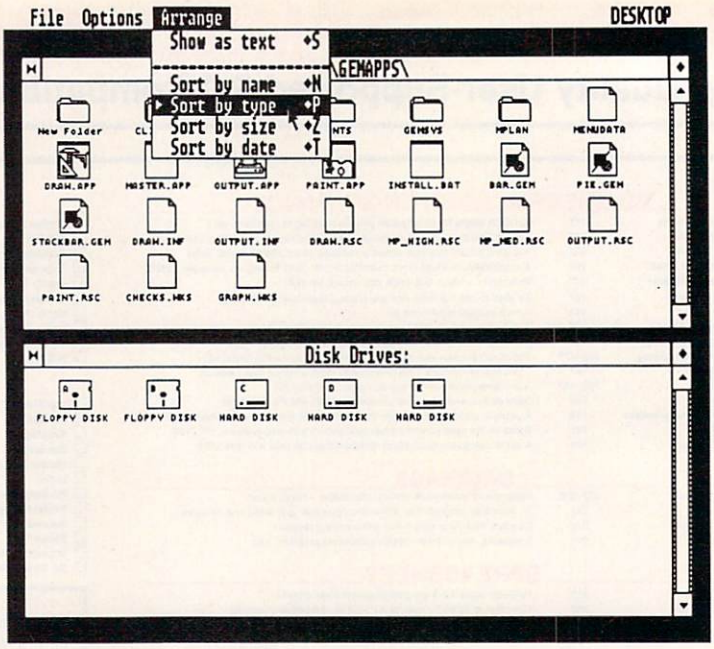
It will come as no surprise to the thousands of Tandy users that *DeskMate* is a viable alternative to *Windows*. It loads rapidly, can run at full speed on virtually any DOS computer, and has a graphical desktop appearance (though it looks as garish as fingerpaint next to the designer graphics of *Windows'* screens).

DeskMate provides an onscreen clock and calendar, plus an address book, an appointment calendar, and a telecommunications module. In addition, it sports an object-oriented drawing program, a simple word processor, a small spreadsheet, and several other personal-productivity programs.

And these aren't the only programs available to run under the *DeskMate* interface. Several manufacturers have gotten behind Tandy in creating important software that has the *DeskMate* look and feel.

Some familiar names appear among the software available in this special format, including *PFS:First Publisher, Quicken, Q & A Write,* and a Lotus product called *Lotus Spreadsheet for DeskMate.* These software packages are virtually assured success, as they're being aggressively marketed through the nationwide network of Radio Shack stores.

Tandy is obviously serious about making *DeskMate* a contender in the GUI wars.



***GEM*'s icon-oriented desktop.**

Nongraphical User Interfaces

Not everyone is happy with graphical user interfaces. They tend to be slow and demand a lot of system resources. There are ways, however, to work with the faster, more responsive text screen without having to depend on the command line.

The interfaces described below take less time to learn than the command line and provide assistance like help screens, point-and-click selections, user customization, and menus. For a new computer user, or a user who spends as little time as possible on the command line, one of these text-based interfaces may be the answer.

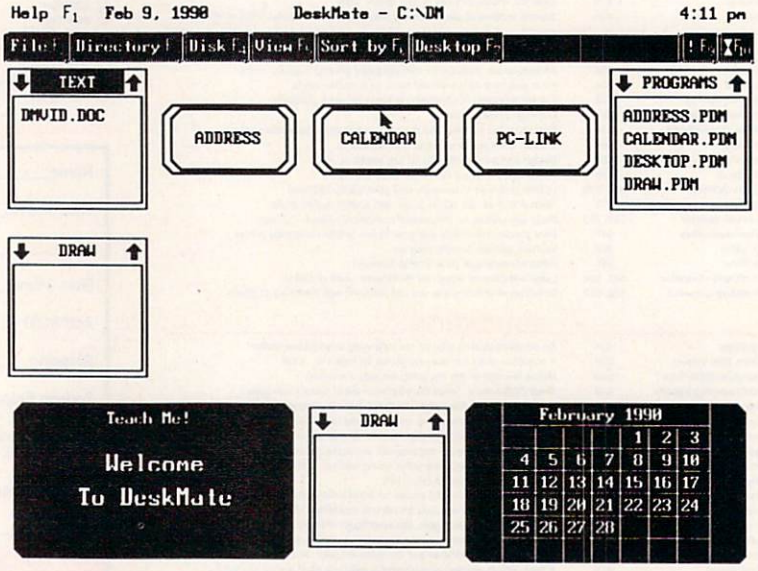
DESQview

Although *DESQview* uses 150K or less, it typically takes control of all available memory. On some machines (specifically 286s), it can take advantage of a little-known glitch in the way the CPU manages memory and move a portion of itself into the RAM between 640K and 1MB, which frees more memory below the 640K barrier for running programs.

While *DESQview* isn't a graphical interface itself, it provides an alternative to programs like *Windows* or *DeskMate.* Essentially, *DESQview* hides in the background until you call it with a keypress. When you press the hot key, it provides a menu. From this menu, you can open a window, close a window, or switch windows.

DESQview is multitasking, *if* you have EEMS or EMS 4.0 expanded memory. Without expanded memory, you can still multitask, but you must multitask with programs that fit in the 640K of conventional memory. This severely restricts the number of programs that will multitask on an unexpanded system, particularly when you take *DESQview*'s 150K overhead into account. You can, however, use *DESQview* for context switching (moving from one program to another without having both run simultaneously).

There's one definite advantage to *DESQview:* It will work on any existing system, from the original IBM PC to the 80486 machines. Although it's far from a graphical user interface, *DESQview*'s windows and menus will please those who need multitasking or context switching but who want the speed of a text-based interface.▷



File selectors dominate *DeskMate*'s interface.

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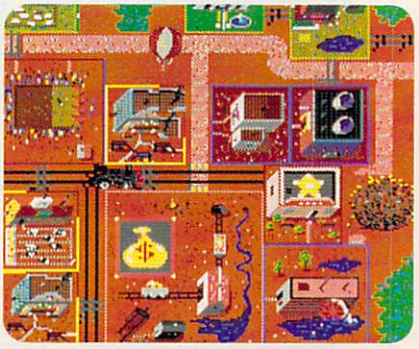

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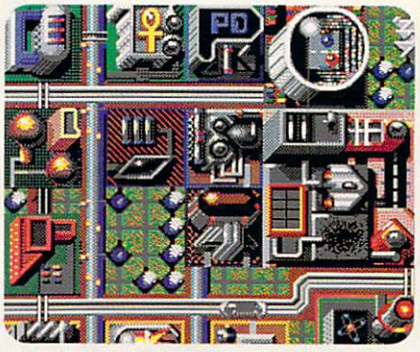

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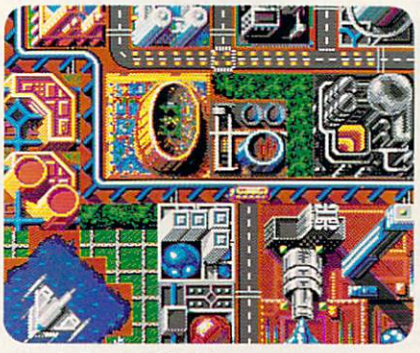

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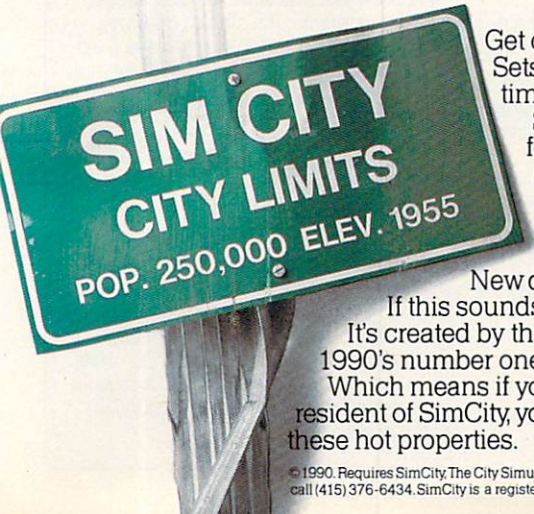

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Which means if you're already a permanent resident of SimCity, you'll now have to move to these hot properties.

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Circle Reader Service Number 153

Take Command

The Norton Commander and DOSSHELL (the shell shipped with DOS 4.0) represent additional options in the shell game. DOSSHELL is extremely capable and would be a contender in a friendliness competition with *Windows* or *DeskMate.*

Interestingly, while DOSSHELL appears to be a text-based interface, it's actually graphical in nature (at least on EGA or better systems). Perhaps later versions will exploit the shell's graphic potential. If not, this squandering of CPU and memory resources (drawing letters on the graphics screen takes much longer than displaying characters on a text screen) seems a little strange.

The Norton Commander contains all of the standard DOS-shell features, adding a utility that can directly read *Lotus 1-2-3, dBase,* and most word processor files. Although not designed with the beginner in mind, it provides a depth of features that will richly reward the time invested in studying the manual.

Commander also features a command line on the same screen as the menu options, providing many of the benefits of a graphical interface right along with the command line.

No discussion of shells would be complete without mentioning *PC Tools Deluxe.* If you're among the half-dozen or so PC users who haven't yet purchased *PC Tools Deluxe,* it's waiting for you in its sixth version. It

GUI Glossary

The world of the graphical user interface has its own vocabulary. Here's a short list of words you'll hear when GUIs are under discussion.

Button. Buttons are rectangles or circles, usually found in a dialog box, that affect an operation if they're selected by the mouse. Generally the default button is marked in some way to indicate that it can be selected simply by pressing Enter. Usually, the Esc key activates the Cancel button. To change the button that's highlighted, use the Tab or cursor keys. And you can always click on any of the buttons with the mouse pointer. There are many different kinds of buttons, including check boxes and radio buttons, but their action is fairly uniform.

Clicking. When you click, you move the mouse pointer to a specific position, such as over an item in a menu, and press the mouse button once, releasing it as soon as the click is felt. This action is usually employed to make a selection from a list or to select a button.

Close box. You can usually make a window disappear by clicking on the close box. The close symbol is usually located in the upper left corner of the window. *Windows* uses a slightly different scheme, providing a menu when you click where the close box should be, which offers a choice among minimizing, maximizing, closing, and other operations. If you double-click on this box in *Windows,* it acts like a close box.

Dialog box. Dialog boxes are rectangles of information superimposed on the screen. They're usually designed to appear when you're about to lose data, or they may be displayed to advise you of a change of circumstances or to give you a list of options.

Double-clicking. When you double-click, you move the mouse pointer to a position on the screen and then press the mouse button twice in rapid succession. This action is usually employed to start an application or to make a selection from a file list and command the application running to load it.

Dragging. When you drag, you move the mouse pointer to a position on the screen, press the mouse button, and then move the mouse with the button depressed. Usually this causes something on the screen to move along with the mouse pointer. This action is usually employed for moving and sizing windows or for moving icons around the screen.

Friendly. An interface is friendly if you can learn it thoroughly in a few days.

Icons. Icons are little pictures of things, to quote an ad copywriter. There are many uses for icons. In *GEM,* dragging an icon from one window to another can be used to copy the file represented by the icon from one directory to another. Most graphical user interfaces offer you the choice of icons or filenames in the listing.

Maximize. *Windows'* windows can be made to fill the entire screen with the maximize button, which is an upward-pointing arrow in the upper right corner of the window. When the window is maximized, clicking on the same button will make the screen an intermediate size between maximized and minimized.

Menu. Menus provide lists of options and commands. While a dialog box will generally provide information and options in table format, menus are nearly always in the form of a single list.

Minimize. *Windows'* windows can be turned into tiny icons at the bottom of the screen by clicking on the minimize box, a small downward-pointing arrow at the upper right corner of the window. This isn't the same as closing a window. The program may still be operating when it's minimized.

Mouse pointer. Usually the mouse pointer is either a tiny arrowhead or a rectangle. It moves in response to your mouse movements.

Move bar. If your graphical user interface allows you to move its windows, you can drag the move bar to reposition its windows. Usually the move bar is the bar that runs along the top of the window.

Scrolling. Graphical interfaces allow you to move up and down or sideways in a document with the aid of slide bars or scroll bars. These bars are typically made up of arrows, a thumb mark or slide box, and a gray bar along which the thumb mark moves. Generally, clicking on the arrows moves the screen a short distance in the direction indicated. Clicking on the gray area between the thumb mark and the arrows moves the screen a larger distance in the direction of the arrow. Dragging the thumb mark moves you proportionally through the document. Dragging the thumb mark halfway along the slide bar will take you to a position roughly halfway through the document. Scroll bars typically appear at the right side of a window or selection list or along the bottom of a window.

Selection list. Selection lists are used to view the contents of a disk or directory. They're usually scrollable. If you see a file you want to load, most graphical user interfaces allow you to double-click on the file's name in order to load it.

Window. An area of the screen where your application is running. Some user interfaces allow you to have multiple onscreen windows.

Zoom box. If you resize a window, you may want to make it fill the entire screen at least during part of its operation. If so, you could click on the window's zoom box (usually in the upper right corner) to make the window fill the screen again. *Windows* uses minimize and maximize buttons instead of a zoom box.

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has virtually everything, including a DOS shell.

Since *PC Tools Deluxe* will inevitably be mentioned in every review of virtually every kind of software, from disk utilities to word processors, we don't need to dwell on its virtues here, other than to say that it has plenty of them.

Other GUI alternatives include menu programs, such as *Direct Access*. Menu software acts primarily as a buffer between the user and DOS: It provides powerful menu-making options but lacks utilities.

There are many additional shells available, both commercially and through shareware and freeware. Check your software outlet, bulletin boards, online services, and shareware distributors for these packages.

Prompt Innovations

Some users are wedded to the command line. If you've mastered it, the command line can be amazingly fast and flexible. Part of the command line's power comes from the fact that it's really a mini programming language that lets you use features like pipes, filters, and redirection. It also lets you automate frequently repeated commands with batch files.

However, most people who have been using DOS for a few years have accumulated a bag of DOS utilities, many of which may have come from *COMPUTE!'s PC Disk*. These utilities fill the gaps in the operating system, making it more usable and friendly. Common utilities allow you to recall previous commands entered at the command line or to display directories in two-column, sorted form.

Developers of MS-DOS alternatives have capitalized on DOS shortcomings by providing the programs power users have accumulated over time as part of the operating system. Two prominent DOS alternatives are *4DOS* and DR DOS.

4DOS

This program is not actually a replacement for DOS but an alternative command line interpreter. It takes the place of the COMMAND.COM file on your boot disk and provides a collection of useful commands that Microsoft and IBM left out of MS- and PC-DOS.

4DOS has two advantages over COMMAND.COM. First, it provides much more power. And second, it's more intuitive. For example, where in DOS you have to issue multiple commands to copy selected files from one disk to another, *4DOS* allows you to list several files after the COPY command, and it will copy each in turn.

One of *4DOS*'s nicest features is a file selector that can be called at the command line. From it, you can select the files on which your command will operate. The file selector features a MOVE command and an EXCEPT command, which allows you, for example, to move the entire contents of a directory, with the exception of files you specify.

4DOS also provides a batch-file programming language that's much more capable than DOS's. While supporting standard batch files, it introduces a new, timesaving alternative in BTM (Batch To Memory) files. One of the things that slows down conventional batch files is the fact that as each line is read from disk, interpreted, and acted on, the disk file containing the batch commands is opened and closed. BTM files are read and executed from RAM, reducing the disk access and increasing operating speed by two to five times.

In addition, *4DOS* allows batch files operating under it to use IF–THEN–ELSE statements, box-drawing commands, and commands that allow the batch file to make use of such knowledge as the amount of RAM and disk space available, the display type, and even your PC's CPU.

DR DOS

By the time you read this, you'll be able to buy DR DOS (Digital Research's Disk Operating System) from your computer store. For some time, PC compatibles manufacturers have been able to buy it as an alternative to MS-DOS. Digital Research's DOS has all the features of MS-DOS 3.3 (a very popular version) plus some of DOS 4.0's enhancements.

Two of DR DOS's most important features are its support for hard disk partitions larger than 32MB and LIM EMS 4.0 memory (the current expanded-memory specification). Most significant to the companies that purchase DR DOS for installation is the fact that it is *ROMable*. In other words, it can be placed in a ROM chip, allowing for virtually instantaneous booting. No more waits while the DOS wheels grind themselves to dust inside the machine. Award Software, maker of the Award BIOS, now sells DR DOS on a ROM card. This is good news for network managers who want to run diskless DOS workstations and for impatient DOS users who want DOS to be on instantly.

DR DOS sports a witty reply to the deadheaded EDLIN. Rather than clone the worst text editor in computerdom, Digital Research has provided a full-screen editor that uses well-known *WordStar* commands.

Another important DR DOS feature is command line recall, which allows you to retrieve the last several command line entries.

Power users will appreciate the password protection for files and directories built into DR DOS. Novices will be grateful for the online help provided for every DR DOS command.

Concurrent DOS

It's obvious from Concurrent DOS's $495 price that it's one for power users. Digital Research has a provided a response to OS/2 in Concurrent DOS that puts OS/2 out of the picture.

Systems running Concurrent DOS are able to act as local area networks (LANs). The user operating the console (the main computer running Concurrent DOS) can operate as many as four sessions (four individual programs, batch files, or whatever). Nine more users can work under the same operating system from PC terminals through serial cables. Each of these nine can have two independent sessions running simultaneously.

Concurrent DOS is designed with the 80386 CPU in mind and is recommended only for 386s and 386SXs. The minimum memory required to run Concurrent DOS is one megabyte, but you'll need at least another megabyte to run all those sessions. ⊡

Choosing an Interface

CPU	Suggested Interfaces
8088 or 8086	DOS *4DOS* *DeskMate* *The Norton Commander* *PC-Tools Deluxe* *Switch-It* *Take Charge!* *SoftBreeze*
80286	Any 8088/8086 interface or one of the following: *Windows* OS/2 *DESQview*
80386	Any 8088/8086 or 80286 interface or one of the following: *DESQview 386* Concurrent DOS

AMIGA VIEW

RANDY THOMPSON

Go west, young man!

It's the end of the year and the end of an era for me at COMPUTE. After four years of service, I've handed in my resignation, I've packed up my belongings, and I'm heading west (to the left coast, as my wife would say). These are my last editor's notes.

Although it's usually not kosher to tell readers why you're leaving—most editors don't even get the chance to say farewell—I'm going to break the tradition. I've chosen to accept a position at Microsoft in Redmond, Washington. Yes, Microsoft, the maker of MS-DOS (smile when you say that), *Windows* 3.0, and OS/2. No, it doesn't make any Amiga products, with the possible exception of Amiga Basic. I hope to change that.

Leaving COMPUTE was a tough decision for me. My work here has been both rewarding and fun. COMPUTE has assembled some of the best people in the industry, and it was great to be a part of that. Leaving Amiga Resource behind will be the hardest, however. The entire magazine was designed, conceived, and edited by Rhett Anderson and me, and it will be difficult to let go. But the magazine has changed, and it's taken a path I choose not to follow.

From the beginning, Amiga Resource has been unique. Unlike most magazines, it had no one all-powerful editor; it had two. As co-editors, Rhett and I made a formidable editorial tag team. And although we may disagree on many topics, we are the best of friends (we live only a few blocks apart, and neither of us has burned down the other's house). Besides, I think our often-differing viewpoints only enhanced the magazine's editorial perspective.

Rhett and I may not be here in person anymore, but we aren't cutting our ties entirely. As usual, we'll continue to write the controversial column "Taking Sides," and I'll continue to push the Commodore 64 to its limits with my "Programmer's Page" column in *COMPUTE*'s Gazette section. Don't be suprised if you see my name on a feature article or two, either.

Rest assured, my departure doesn't mark the end of Amiga Resource. In fact, *COMPUTE* would like your suggestions on what direction you'd like to see this section take. Now that Amiga Resource's original bullheaded editors are out of the way, it's your turn to take command. Write to us with your ideas and comments. Tell us what you like and don't like about the new *COMPUTE* format. Give us suggestions on what type of specialized Amiga products you'd like to see, as well. An all-Amiga newsletter? An expanded "On Disk" product? A publication composed entirely of "Readers' Feedback?" These are exciting times for the Amiga, and *COMPUTE* certainly wants to be there.

But enough about business. Before I go, I'd like to share with you some of my favorite moments in COMPUTE history. Warning: These have nothing to do with the Amiga.

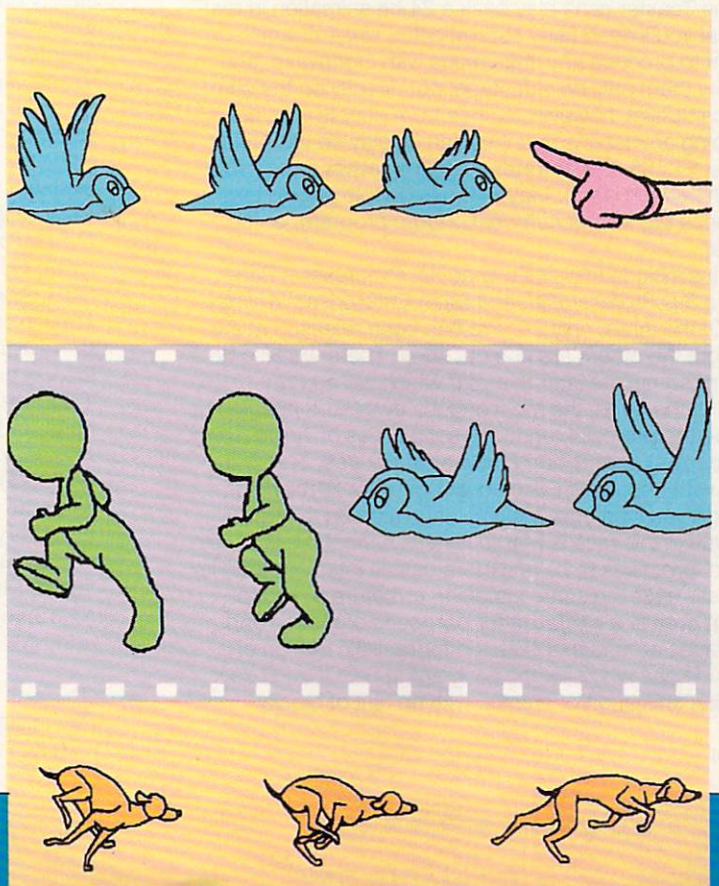
First, there were the Scotch tape wars. Initiated by one David Hensley and finalized by Troy Tucker and me, these battles left no object safe from our tape dispensers. In an attempt to find the ultimate practical joke involving clear adhesive, we taped everything from chairs to the buttons that hang up telephones (when you get a call and lift the receiver, the telephone continues to ring).

Then, of course, there was the time we had to explain to the recently hired New York native Bill Chin that the "dead baby pigs" he continually encountered on the North Carolina roads were actually animals known as opossums. Apparently they don't have any such critters in the Big Apple.

And I'll never forget when Tim Midkiff wrote a particularly volatile program on the IBM PC that, when it crashed (which it often did in its early stages), somehow managed to print a nicely formatted calendar on the screen with the current date flashing. The surprising thing about it was that he was writing an arcade game, not a datebook.

As you can probably tell, I'm going to miss *COMPUTE*, its people, and its readers.

Good-bye. ⊡



NEWS & NOTES

FIRE SALE

Commodore's marketing department says **we can expect another ad campaign** this fall, which should start about the time you read this. All I've heard about this one is that it "won't be dumb," and it won't feature our friend Stevie from last year's commercials. The company has already started a modest print campaign to promote a free monitor promotion for the Amiga 2000HD and 2500 (after bumping the memory on the 2500/30 to five megabytes). Does this promotion tell us something about the 2000HD and 2500? Since the introduction of the 3000, some people have insisted that **the days of the high-end 2000s are numbered,** particularly in light of rumors of several new Amiga models in development. The most concrete stories I've heard are about a slightly faster 3500 model in a tower case.

—SHELDON LEEMON

3-D MANIA

Most people have been pretty impressed with Alan Hastings' *Lightwave* program, but some were **thrown for a loop by Newtek's recent announcement** that it would only come bundled with the Video Toaster and not be sold separately. Although the Toaster's 24-bit color output obviously produces better quality than native Amiga display, it takes longer to produce each frame when working at such a high resolution. In addition, the Toaster can't play back a 24-bit animation in real-time. This means that you'll need fairly sophisticated single-frame recording equipment to produce any animations with *Lightwave,* and you'll be able to show them only on videotape, not directly on the computer. The biggest complaint, however, comes from people who are only interested in doing animations that they can display on the Amiga and who think that at $1,595, **the Toaster makes a rather expensive dongle** for the *LightWave* program. Maybe those people should take a look at the $3,000 price tag for the *Autodesk Studio* program, or for *Caligari Professional.*

Other new entries include Impulse's *Imagine,* Progressive Peripherals & Software's *3-D Professional,* and Hash Enterprises' *Animation: Journeyman.* Of the three, only *3-D Pro* has been released at the time of this writing, but the others are due out soon. There will also be an update for *3-D Pro* sometime later this year which will add ray-tracing capabilities. Of the three, the most eagerly awaited is *Imagine.* It promises to combine the powerful rendering capabilities of *Turbo Silver* with **a user interface that somebody could actually use.** This program will also work with Impulse's Firecracker board for 24-bit color output (natch), though you won't get realtime animation on the frame buffer. The dark horse in this race is Martin Hash's *Animation: Journeyman* program. It, too, promises to have a more usable interface than its predecessor, but it still uses the same intriguing armature model for motion, in which **you create a skeleton** for purposes of motion and then model the surfaces around this skeleton for realistic motion of people and animals. Those who saw the program at SIGGRAPH say that it produced a nice animation of sharks, with no hint of blocky polygons.

—SHELDON LEEMON

A Tad Better

There's no shortage of hot new Amiga software in the works. First out of the chute will be ASDG's *Art Department Professional.* This enhanced version of *The Art Department (TAD)* graphics conversion program adds the ability to save, as well as load, non-IFF graphics formats. Other enhancements include *ARexx* support and the ability to control and render to devices such as Black Belt's HAM-E, Digital Creations' DCTV, film recorders, and the Mimetics FrameBuffer.

Art Department Professional has enhanced color-palette control, including the ability to render in 256 colors, which is useful for transferring images to VGA PCs and Mac II systems. Special effects such as line art and color-to-gray-scale conversion are now handled using external modules, so you can easily add new effects.

The new program sells for $199.95 (*TAD* owners can upgrade for $75.00) and includes load and save modules in *DigiView, Sculpt, Turbo Silver, DeluxePaint II Enhanced, MacPaint,* GIF, IFF, and PCX formats. Also available are the *Art Department Professional Conversion Pack* (89.95), which includes loaders and savers for Targa, TIFF, PICT2, and *Rendition* formats, and the *Art Department Presentation Graphics Pack* ($129.95), a module that lets you combine multiple images with business graphics.

Contact ASDG, 925 Stewart Street, Madison, Wisconsin 53713; (608) 273-6585.

—DENNY ATKIN

=INSIDER NEWS AND GOSSIP

continued on page A-4

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Button 3 activates the Maverick OverRide(R) System: special parameters that make a program useable on a hard drive by COMPLETELY de-protecting it! Now you can take advantage of your hard drive's speed and convenience without putting up with key-disk schemes and other hassles!

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NEWS & NOTES *continued from page A-2*

TRUE COLORS

All of a sudden, *true color* is one of the big buzzwords in the microcomputer industry. Once Apple and IBM discovered the analog RGB monitor, it was only a matter of time until people started developing 24-bit color-display adapters for their computers. And once they saw the **photographic-quality color displays** these 24-bit adapters provided, they quickly agreed that this was the new standard for professional color graphics. This meant that the Amiga, which had previously been in the forefront of microcomputer graphics, had suddenly **fallen to the middle of the pack.**

Nonetheless, the true-color craze isn't necessarily bad news for the Amiga. For one thing, it means that there's a new emphasis on color input and output devices that can be used with the conventional Amiga graphics display. Take a look at the **success of the Sharp JX-100 scanner in the Amiga market,** and you'll see what I mean. As color becomes the new craze, we'll see cheaper and better color scanners, laser printers, thermal printers, and film recorders.

Nor is the Amiga community taking the true-color challenge lying down. At the recent SIGGRAPH show, Impulse was showing off its 24-bit Firecracker board for the Amiga, which allows you to **overlay the normal Workbench screen on top of the color frame-buffer display,** just as NewTek was once again showing the Video Toaster,

which includes dual 24-bit color frame buffers. Commodore was also showing the University of Lowell graphics card, which displays 1024 colors at once from a palette of 16.8 million, at SIGGRAPH. The main focus for this board appears to be as a UNIX display, possibly running a color version of X-Window, the most popular protocol for multiuser graphics workstations. The most encouraging rumor that I've been hearing is that Commodore has been making progress toward developing display-independent system software that will provide hooks for running current software (like the Workbench) on alternative displays. Until then, all such displays on the Amiga will be secondary monitors that will require special software that knows how to render to them.

For now, 24-bit color is still fairly expensive. It also is hard to manipulate the display quickly, with almost a megabyte of memory to move around for each frame. Therefore, developers are looking for ways to do onscreen compression on the fly. Ironically, **the Amiga has the lead in this area,** since the Hold-and-Modify (HAM) mode can actually be thought of as a compression scheme by which you get 12 bits' worth of color for only 6 bits' worth of data.

—SHELDON LEEMON

3 THREE NEW PRODUCTS FROM ICD

Flicker Free Video™

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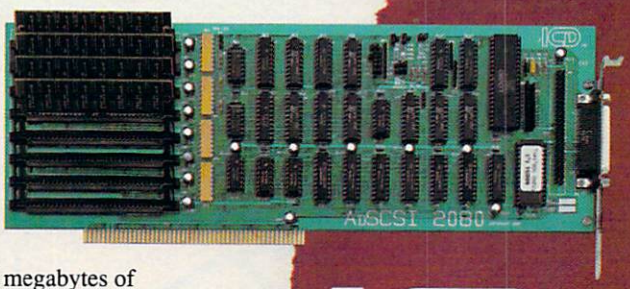
Ad*Speed*™

ICD expands its line of innovative enhancement products for the Amiga with the introduction of Ad***Speed***, a full featured 14.3 MHz 68000 accelerator for *all* 68000–based Amiga computers. Ad*Speed* differs from other accelerators by using an intelligent 16K static RAM cache to allow zero wait state execution of many operations at twice the regular speed. *All* programs will show improvement. Ad*Speed* will make your Amiga run faster than any 68000 or 68020 accelerator without on–board RAM. Ad*Speed* works with all 68000 based Amiga computers, including the 500, 1000, and 2000. Installation is simple and requires no soldering. Ad*Speed* has a software selectable true 7.16 MHz 68000 mode for 100% compatibility — your computer will run as if the stock CPU was installed. 32K of high speed static RAM is used for 16K of data/instruction cache and 16K of cache tag memory. A full read and write–through cache provides maximum speed.

AdSCSI™ 2080

The fastest, most versatile SCSI host adapter (hard drive interface) available for the Amiga 2000 now comes in a new configuration. *AdSCSI 2080 is not* DMA, but its clean design and advanced caching driver provide greater throughput than any available DMA interface. All the features you want are included at no additional charge: autoboot from Fast File System partitions, Commodore® SCSIDirect and Rigid Disk Block conformance for no mountlist editing and compatibility with third party SCSI devices, and the most advanced removable media support available, including automatic DiskChange and no partitioning restrictions. *AdSCSI 2080* also includes sockets for adding two, four, six, or eight megabytes of RAM using 1 megabyte SIMMs. If expansion slots are in high demand, then this card could be your answer.



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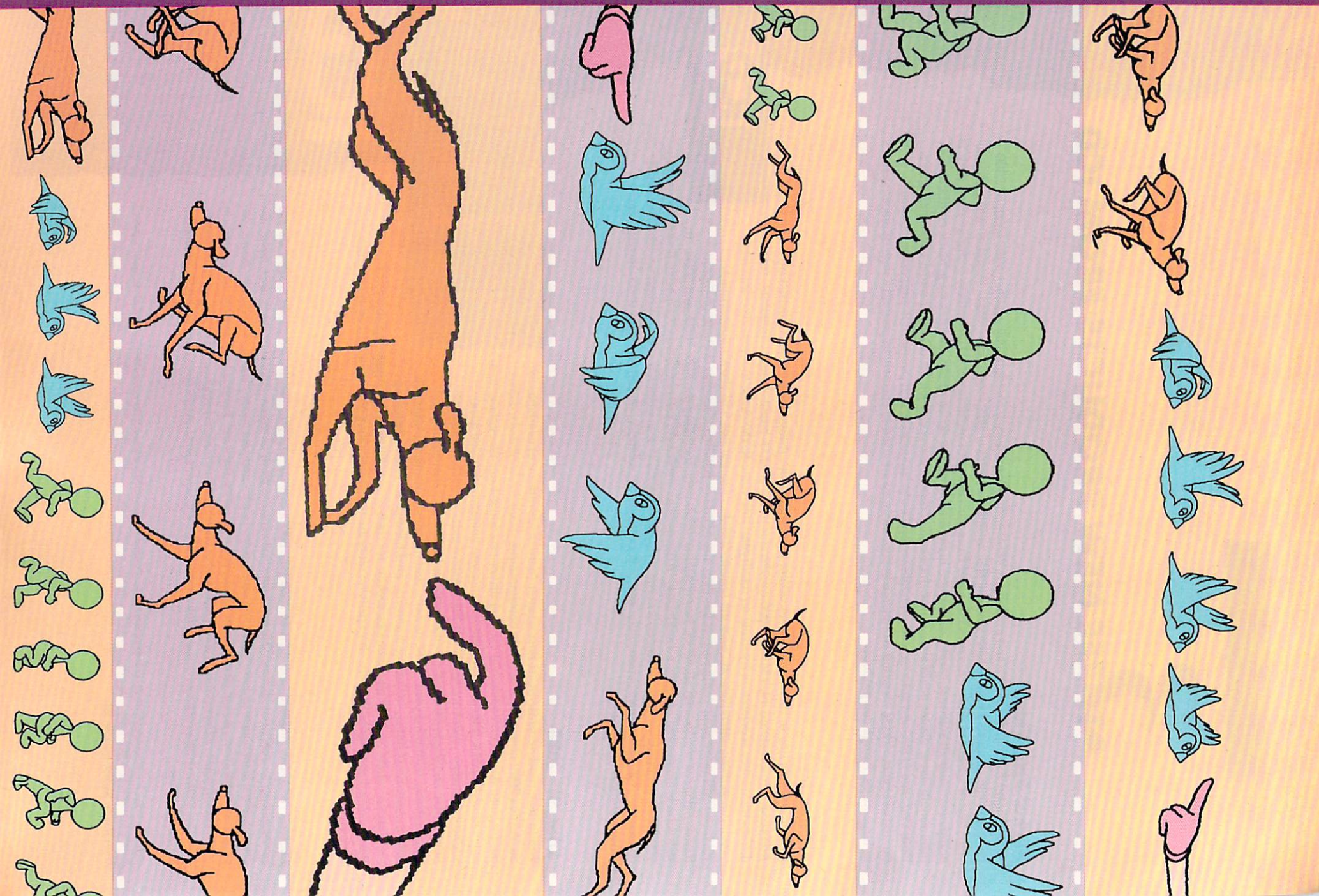

Disney has been quietly selling Amiga software under its Buena Vista title for quite some time. *The Animation Studio,* however, has broken this trend—it's the first software package to be marketed under the Walt Disney name. It's also Disney software's first creativity program, and it's only available on the Amiga.

The Animation Studio's aim is to provide Amiga animators with the tools to do Disney-style 2-D cel animation on their computers. The program has four main parts: Pencil Test, where you draw your black-and-white animation cels; Exposure Sheet, where you sequence your cels and add sounds; Ink and Paint, where you color in your black-and-white animation; and Camera, where you composite the painted cels over backgrounds. With these tools, the program simulates the traditional process of animation—at least that's the goal. Let's see if it hits the mark.▷

BEN AND JEAN MEANS

Interview with Leo Schwab Creator of Disney's *The Animation Studio*

BEN AND JEAN MEANS

How did Leo Schwab, a quiet boy from Marin County, California, become Bols Ewhac, terror of the bulletin boards, caped crusader of the graphic computer shows, inventor of the Schwabby, and author of Disney's *The Animation Studio*?

Was it fate? Was it Kismet? Was it one too many chromosomes? No, it all started with a high school prank. Leo reminisces, "Once upon a time in high school, I was doing a video for civics class about criminal justice, so I wrote a court drama, called *Death Sentence.* You could look at it as light comedy, I suppose, terminally bad. But when I faded up the title screen, it said *Death Sentence by Bols Ewhac*. I said, 'All right, who's the wise guy?' and C. H. Summers said, 'I gave it to you. It's your Swedish moniker.' So it stuck in my mind. I don't remember what grade I got on the video."

Bols Ewhac Dons a Cape

Later in college, Leo became notorious for his online antics. "At that time, there were a lot of electronic mail wars going around. I was pretty good at stopping a mail war with a rather long and eloquent flame, until one day this Tolkienesque mail war showed up. And being the kind of guy not to turn down a challenge, I thought fine, I'm going to end this with one particularly well-thought-out story."

Thus began MicroSaga, starring Bols Ewhac and Nam Rejof, which is an anagram of fellow hacker John Foreman's name. Leo adds, "The story kind of got out of hand. It's 200K worth of text now, and it's still not done. So that's how Bols Ewhac came to be part of me. The cape came about when John said he'd have to show up at our pizza parties one day as Nam Rejof in a flowing purple cape. So I had one made for him."

Leo had a matching cape made for Bols Ewhac in blue, and soon cape madness set in. A plumed velvet hat appeared after the third cape. Leo, who plans a fifth cape in a short style for bicycle riding, explains his cape fetish, "There are two ways to look distinctive in the 1990s. One way is to shave off 80 percent of your hair and stick a safety pin through your nose, and the other way is to wear a cape. Personally, I think the cape looks better."

Schwabbies

Leo wore one of his capes to SIGGRAPH '87 in Anaheim and promptly got in trouble with Pixar, though the cape wasn't at fault. Leo says, "The week before SIGGRAPH, I saw Pixar's latest production called *Red's Dream,* and it was great." Animated on a high-end graphics workstation, Pixar's demo featured a juggling unicycle. Not to be outdone, Leo promptly set out to recreate the animation on the Amiga.

Leo Schwab, the author of Disney's *The Animation Studio,* often appears disguised as a normal person.

Using *VideoScape 3-D* and his own C program, which was used to generate the points that defined several of the animated objects, Leo had a working 96-frame animation of a juggling unicycle in just a few days. With balls bouncing off the seat and pedals and the camera view circling the unicycle, the animation looked great—but not to Pixar. The people at Pixar's booth were not amused when Leo displayed his work at SIGGRAPH.

Pixar refused Leo permission to post his controversial creation on the boards and sent him a nice formal letter which said, "Although there are technical differences between the animations created on the Amiga and on our system, we feel viewers could be misled to believe otherwise, even with your disclaimers to the contrary."

So Leo created *The Dream Goes Berserk,* where an animated Boing ball (a red-and-white checkered ball that appeared in the first-ever Amiga graphics demo) juggles three unicycles, and promptly posted that to his proliferating collection of bulletin board Schwabbies.

No one knows who coined the word *Schwabby,* but Leo admits his favorite is *Robotroff,* which appears to do nothing. Says Leo, "Type ROBOTROFF, and you get your prompt back, when in fact it has forked itself into the background and is biding its time until finally a little robot comes out and attacks your pointer. The Grunt and the Enforcer destroy your pointer; then the Hulk pushes it off the screen."

Enter Reichart and Disney

SIGGRAPH '87 was a turning point in the life of Leo, for it was here that he first met the enigmatic Reichart von Wolfshield, his Dungeon Master for the last two years. It all started out quite innocently. One day Reichart described his idea for an onionskin animation program in the classic Disney style. Says Leo, "He asked me if I could program it. I thought about it for about five seconds and then said, 'Sure!'" So began two years of intensive programming with grave sacrifices, such as missing DEVCON, *the* conference for Amiga hackers, and even the Renaissance Faire.

Dragon Master Leo, the terror of the bulletin boards, had finally met his match in *The Animation Studio*'s designer Reichart von Wolfshield. Adds Leo, "Reichart's like this: He'll walk up to you, and he'll say, 'You are one of the most creative, competent people I've ever met. You've done great things; you are doing great things; you will continue to do great things; and you are an amazing person and a credit to the human race. But don't you dare forget for one damn minute that I'm better than you are!'"

The product of Leo's collaboration with Reichart was, of course, *The Animation Studio*. Says Leo, "I've always been fascinated with motion, moving stuff on the screen, but I wanted to spin cubes around as opposed to animating Mickey Mouse, which is screwy considering the program I wrote." And while Leo feels that the program still has some rough spots, his accomplishments (along with his wardrobe) have rightfully earned him a permanent place in Amiga lore: Bols Ewhac, Amiga wizard *extraordinaire.* ▷

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Onionskin

A traditional animator draws on onionskin paper set on top of a light box. After finishing a drawing, he or she lays the next piece of onionskin over the first and uses the lines of the first drawing that show through as a guide to draw the next. Similarly, *The Animation Studio*'s Pencil Test displays three previous drawings in ascending shades of gray along with your current drawing. This is the single best feature in the program; it works like a charm. You can adjust the brightness of the cels that show through to make drawing complex characters easier.

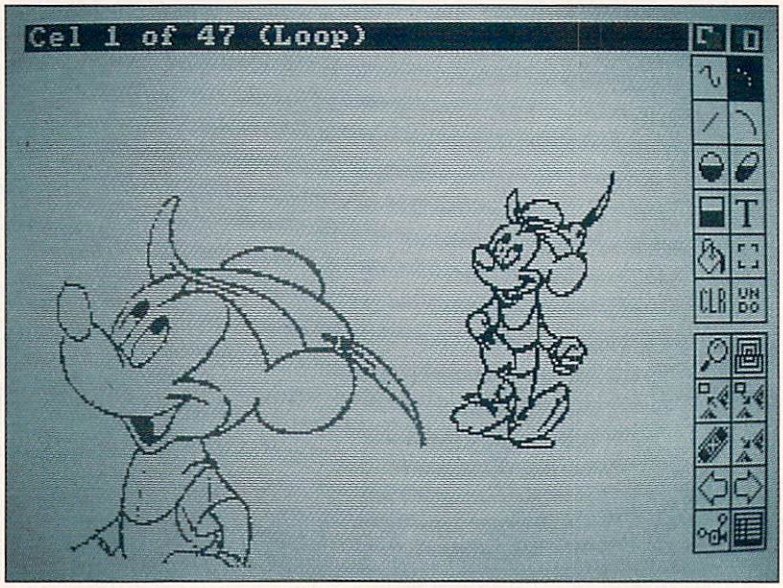
Pencil Test is strictly a black-and-white drawing program, while the Ink and Paint section adds color. The Pencil Test toolbox provides the usual freehand, line, and shape tools for drawing, with the notable lack of a polygon tool. Pencil Test works in all resolutions including overscan, but the circle tool has a few problems. In lo-res interlace, it makes flattened circles, and in hi-res noninterlace, it makes heightened circles.

Custom brushes can be picked up, sized, and rotated, but the custom brush pickup has a strange quirk. After unselecting a custom brush, you end up with no brush at all. Instead of reverting to a single-pixel brush, you have to manually pick up one pixel from your drawing. Strange.

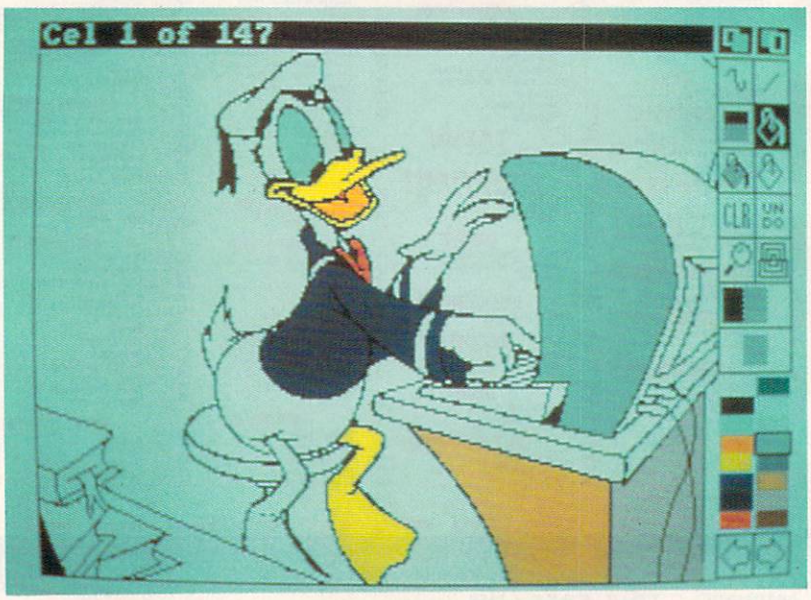
There are the usual text and magnify tools, as well as four cel-edit tools. Unfortunately, there's no undo option for the Delete Cel gadget, which is directly over the Go Back One Cel gadget. One careless click, and instead of going back one cel, your current drawing has gone to Siberia forever. Ouch!

As with *DeluxePaint III,* Pencil Test allows you to play your animations by rapidly flipping through each frame. This part of the program offers good flexibility, with frame rate settings from 1 to 30 frames per second. However, *The Animation Studio* doesn't have utilities for SMPTE synchronization or single-frame animation controllers, which limits its usefulness for professional animators.

Saving animations to disk is dreadfully slow. A 61-frame animation that took 34 seconds to save in *DeluxePaint III* took a glacial 2 minutes and 7 seconds to save in Pencil Test. Both programs were saving the animation in standard ANIM format. ▷



The Pencil Test module shows changes in the three previous animation frames by using an onionskin technique, just like pro animators.



Donald gets some color from *The Animation Studio's* Ink and Paint mode, which can dither colors and superimpose background art behind the animation.

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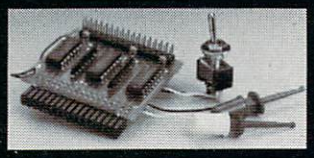

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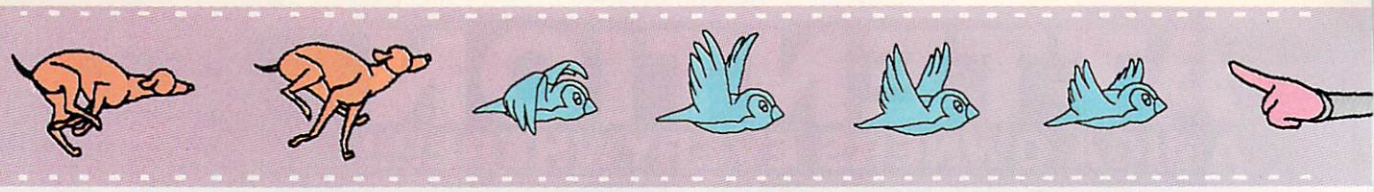


The Animation Studio's proprietary CFAST animation format saves as fast as *DeluxePaint III,* but CFAST files can't be read by other programs.

Exposure Sheet

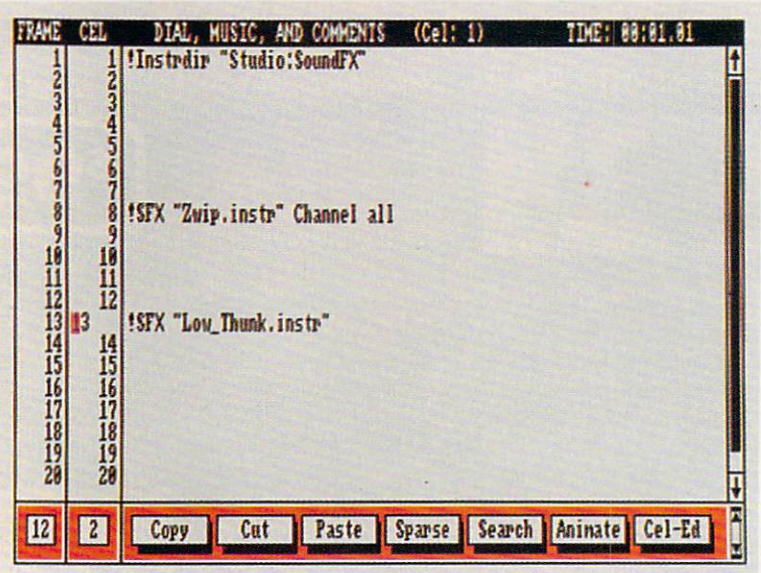
A traditional animator uses an exposure sheet to track when each word (broken down into phonemes), music, and action cue occurs within an animation. Armed with an exposure sheet, the animator creates motion that lines up exactly with the already-recorded soundtrack. This is *not* what *The Animation Studio*'s Exposure Sheet does. It creates the soundtrack after the animation has been drawn instead of before.

Exposure Sheet is a text-based editor. With it you edit the order and timing of your completed Pencil Test animations and add SMUS scores, IFF, and Sonix sounds to it. Editing the order and timing of your cels is easy, but entering sound information is downright gruesome. If you're a programmer or a CLI fanatic, you can conceivably succeed at this. As a hunt-and-peck typist, my experiences with putting sounds into Exposure Sheet were uniformly frustrating.

When you enter Exposure Sheet from the Pencil Test, you emerge into a void where the only information is that you're at Frame 1, Cel 1. To create a simple sequential exposure sheet, you hit the Return key once per cel. Hitting Return 61 times to create a simple exposure sheet list for a 61-frame animation was not amusing.

The instrument format was even less amusing. On Frame 24, we wanted to play one note of an IFF slap bass sample. Exposure Sheet insists that all IFF sound files have a .instr suffix appended to their filenames. After changing the filename to slapbass.instr, we looked up the Note command format which is !NOTE ["note.instr"] [KEY value] [OCTAVE n.] [CHANNEL <num/STEREO/ALL>] [RELEASE]. Even after two calls to Disney's user support line, we never did get to hear that bass note in our animation.

Sound also poses a problem if you want to distribute your animation files. While *The Animation Studio* includes an animation player that will also play sounds, it contains licensed code and isn't freely distributable. If you plan to give away your animations, you can only include the Flick player, which doesn't support sound.



You arrange the order of your cels, control timing, and add sound effects using a script typed in *The Animation Studio's* Exposure Sheet.

Ink, Paint, and Camera

Ink and Paint offers a rudimentary paint program for coloring the animations created in Pencil Test. Ink and Paint's toolbox has three basic drawing functions: freehand draw, line, and rectangle, along with three kinds of fill: flood, fill to color, and dither. The dither pattern is a simple checkerboard effect, which is most effective in hi-res interlace. Brush and variable dither fills are not supported. You can use 2–32 colors in each frame, and each frame can have its own unique palette! Unfortunately, neither Extra Halfbrite nor HAM modes are supported. Also unfortunate is that you can't transfer animations directly from Pencil Test to Ink and Paint. You must first save them in Pencil Test and then reload them into Ink and Paint.

Once you've colored your cel, the program's Camera options overlay the animation onto the background or scenery. Camera can automatically remap foreground to background colors, and vice versa. This works well with simple backgrounds, but complex backgrounds can lead you on a frustrating trip to the guru.

One particularly annoying feature of Ink and Paint is that you can't animate from its Exposure Sheet. To see your inked animation run with its Exposure Sheet timing, you have to quit *The Animation Studio* and load the animation into one of two players called *Flick* (without sound) or *Flicker* (with sound). Adding large areas of moving color can bog down animation playback speed. And to get back into *The Animation Studio,* you have to run the gauntlet of its manual-based copy protection, which quizzes you on words found within the program's instruction booklets.

Conclusion

The Animation Studio ($179.95) costs $30.00 more than its chief competitor, *DeluxePaint III.* Its drawing and fill tools are vastly inferior to *DeluxePaint,* but the onionskin effect of *The Animation Studio*'s Pencil Test is truly an outstanding feature. Although difficult to use, its animation editing and sound playback capabilities are powerful tools that *DeluxePaint* lacks entirely.

The bottom line is how enamored you are with Disney-style animation. The program's *User's Guide* is chock-full of hints and tips about how the Disneyites do what they do; and the sample animations of Pluto, Goofy, Mickey, and especially Donald Duck are as hilarious as they are educational. *The Animation Studio* has some rough edges—but it also has a heart of gold. ⊡

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FEEDBACK

QUESTIONS FROM OUR READERS

Reading Amiga Joysticks

I'm programming in Amiga Basic, and I want to write a program that uses two joysticks. How can I read a joystick plugged into port 1 (the port where the mouse normally goes)?

TODD LOWELL
ALBUQUERQUE, NM

Amiga Basic's STICK function works for port 2 but not for port 1. Since the mouse is used to access Amiga Basic's own menus, the designers may have assumed that you would never want to unplug it from port 1. However, it's possible to read a joystick in port 1 by PEEKing a location in memory. Location 14675978 ($DFF00A) is a 16-bit register that contains the information you need. The position of the joystick is returned in bits 0–1 and 8–9 of this location. Different bits are set to a value of 1 depending on which direction you press the joystick, as shown below.

```
Right:  bit 1 = 1
Left:   bit 9 = 1
Down:   (bit 0 XOR bit 1) = 1
Up:     (bit 8 XOR bit 9) = 1
```

Location 14675980 ($DFF00C) contains corresponding information for joystick port 2.

Amiga Basic's BUTTON function also works only for port 2. Here's a program that prints the directions and button status of a joystick in port 1.

```
Stick1:
 p1%=PEEKW(14675978&)
 bit1%=p1% AND 2
 bit9%=p1% AND 512
 IF bit1%=2 THEN PRINT "right ";
 IF bit9%=512 THEN PRINT "left ";
 IF (p1% AND 1) XOR bit1%/2 THEN
   PRINT "down ";
 IF (p1% AND 256) XOR bit9%/2
   THEN PRINT "up ";
 IF (PEEK(10952895&) AND 64)=0
   THEN PRINT "fire ";
 PRINT
 GOTO Stick1
```

The last IF statement in the program checks the joystick button in port 1. If for some reason you don't want to use the BUTTON command for port 2, you can test that button with this statement:

```
IF (PEEK(10952895&) AND 128)
=0 THEN PRINT "port 2 fire ";
```

Speed vs. Compatibility

I have an Amiga 500 and wish to purchase an expansion box and an accelerator board such as GVP's 68030 board. Will it work with all of my software, or will I have to shut it off to get it to work with some programs?

CARLOS ALEJANDRO MARTINEZ BARRERA
CANCUN, MEXICO

First of all, most accelerator boards (including GVP's) are designed to plug into the Amiga 2000's CPU slot. And since we don't know of any expansion boxes that provide the 500 with a CPU slot, you're going to have a hard time getting the GVP board to work with your 500. However, there are accelerators available for the 500—the 33-MHz 68030 Mega Midget Racer from CSA, the 16-MHz 68020 Hurricane 500 from Imtronics, and the new 16-MHz 68000 AdSpeed from ICD. All of these boards are designed to fit inside your Amiga 500.

Accelerator boards work fine with most programs, but you'll find a few that must be run in 7.14-MHz 68000 mode (that is, with the accelerator board deactivated).

We run a wide variety of software on our 68020- and 68030-based Amigas, and the programs that we have the most problems with are arcade games. Unfortunately, the copy-protection methods used in these games prevent them from running on anything but a standard Amiga with a 68000. You see, there are certain machine language instructions and illegal programming practices (such as storing non-address data in the upper four bits of a memory pointer) that don't sit well with the 68020 or 68030.

You might want to call the manufacturers of the programs that you use and ask them if their software is compatible with the accelerator board you're interested in. Better yet, if you have a local dealer who sells accelerator boards, bring in your most-used software and give the boards a test drive.

AmigaDOS Resource Project

What's ARP, and what's it useful for?

SPENCER DORM
CHAPEL HILL, NC

AmigaDOS has had some long-standing problems, especially prior to the release of Workbench 1.3. Because AmigaDOS was originally coded in a programming language known as BCPL and the rest of the Amiga's operating system was written in C, AmigaDOS commands—which have to work hard to communicate with both languages—tend to be slow and bulky. To solve these problems, several Amiga programmers (led by Charlie Heath of Microsmiths) banded together to rewrite the bulk of the AmigaDOS CLI commands. The result is ARP—AmigaDOS Resource Project (originally called AmigaDOS Replacement Project).

To make the individual commands as small and reliable as possible, the ARP authors wrote an Amiga-shared library called arp.library. This library has several functions designed to extend the Amiga's built-in dos. library (good news for programmers). The functions contained within the arp.library can be accessed by any program. All that's required is that the arp.library file be located in the libs directory of your Workbench disk.

One of the arp.library's most useful features is its file requester—a window that allows you to select files from disk for loading, saving, deleting, or whatever. The file requester should have been built into

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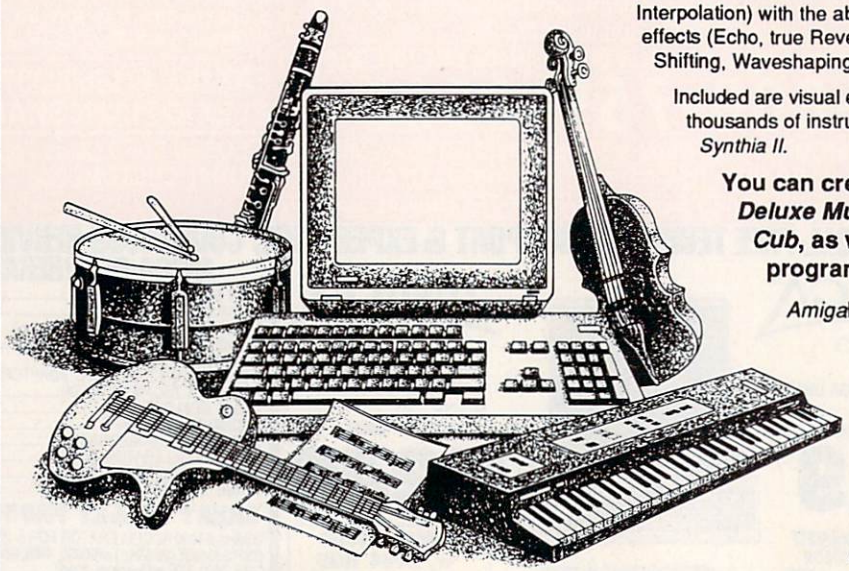

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continued from page A-14

the operating system of the Amiga from the beginning and is only now a standard feature under AmigaDOS 2.0. That's why different programs written for AmigaDOS 1.3 and earlier have different-looking (and differently-functioning) file selectors.

*For the average user, ARP means smaller, faster, and more versatile CLI commands. ARP commands tend to handle wildcards better than AmigaDOS commands do (in fact, ARP commands support * as a wildcard equivalent to the AmigaDOS #?). Following are a few size comparisons (in bytes) between the AmigaDOS 1.3 commands and the ARP 1.3 commands.*

Command	*AmigaDOS*	*ARP*
AddBuffers	*876*	*492*
Assign	*3008*	*1264*
Avail	*1964*	*692*
CD	*1756*	*580*
Copy	*9848*	*2784*
Delete	*6124*	*936*

In each case, the ARP command is smaller than its AmigaDOS counterpart. For the ARP commands to work, you must have arp.library (17,100 bytes) on your boot disk in the libs directory. The latest release is version 39.1.

*Many of ARP's improvements have been incorporated into AmigaDOS 2.0. In fact, ARP creator Charlie Heath wrote most of AmigaDOS's new ASL library, which provides programmers with a standard file requester, a font requester, and tools for displaying lists of information. AmigaDOS 2.0 also has the ability to use the * wildcard.*

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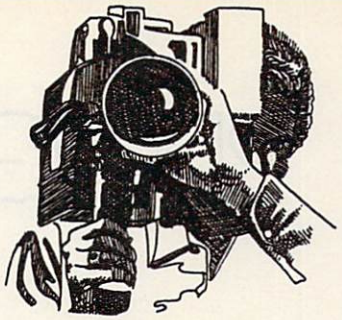

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With the vast improvements made in AmigaDOS 2.0, there isn't as big a need for the arp.library as there has been. But with the large number of programs that currently take advantage of the arp.library, including Amiga Resource's own V *file viewer, ARP should be with us for some time.*

If you're interested in the ARP system, you can obtain it from a user group, a bulletin board system, and most commercial telecommunications services. You can also contact ARP's developers directly by writing AmigaDOS Resource Project, c/o Microsmiths, P.O. Box 561, Cambridge, Massachusetts 02140.⊡

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PROGRAMMER'S PAGE

RHETT ANDERSON AND TIM MIDKIFF

CODING FOR SPEED: 68000 TIPS

The Amiga has a powerful processor—the Motorola 68000. This chip is incredibly flexible. With this flexibility comes complexity. For example, there are several ways to clear a data register.

```
CLR.L D0
MOVE.L #0,D0
MOVEQ #0,D0
SUB.L D0,D0
```

Which is the best? Amazingly, although each instruction does the same thing (clears data register 0), each requires a different number of machine cycles to execute. The fewer machine cycles required, the faster the instruction is. In this case, the third choice is the best choice. The MOVEQ variety of the move instruction (which is limited to a small range of immediate values) is actually faster than the CLR (clear) operation. Of what use is CLR? While you can use CLR to clear out a byte or a word, MOVEQ always clears out the entire longword of a register. However, neither CLR nor MOVEQ can be used on an address register.

How about these choices?

```
MOVE.L   #0,A0
SUB.L    A0,A0
```

The second choice is the better one. Let's take a closer look at the instructions we've tried so far.

Instruction		Cycles	Size
CLR.L	D0	; 6 cycles	2 bytes
MOVE.L	#$00,D0	;12 cycles	6 bytes
MOVEQ	#$00,D0	; 4 cycles	2 bytes
SUB.L	D0,D0	; 8 cycles	2 bytes
MOVEA.L	#$00,A0	;12 cycles	6 bytes
SUBA.L	A0,A0	; 8 cycles	2 bytes

These instruction timings were obtained from the *Program Module Analyzer* that comes with the *ADAPT* assembler system from Lake Forest Logic. You can also find instruction timings in most 68000 programming manuals. We found the sizes of the instructions by assembling one instruction at a time.

Moving data. Here are some general rules for using the MOVE instruction in immediate mode.

Data registers: Use MOVEQ if the immediate value is in range −128–127. Otherwise, use the normal MOVE instruction. Never use CLR.

Address registers: To move 0 into an address register, use SUB.L with the address register as both the source and destination. If the number is in the range from −128 to 127 and you have a data register that is not in use, use the following combination of instructions.

```
MOVEQ   #VALUE,D0
MOVE.L  D0,A0
```

Otherwise, use the normal MOVE.L instruction.

Address addition. Although you can't perform all of the 68000's math and logical operations on address registers, you can perform addition and subtraction on them. Here are a few timings for different methods of adding numbers to address registers.

Instruction		Cycles	Size
ADDA.L	#1000,A0	;14 cycles	6 bytes
LEA	1000(A0),A0	; 8 cycles	4 bytes
ADDQ.L	#1,A0	; 8 cycles	2 bytes
ADDA.L	#1,A0	;14 cycles	6 bytes
LEA	1(A0),A0	; 8 cycles	4 bytes

The first two instructions add 1000 to address register 0. Surprisingly, the load effective address (LEA) instruction is faster at addition than the standard ADDA instruction. The next three instructions in the table add 1 to address register 0. Here, ADDQ wins out. Thus, this is the rule for adding an immediate value to an address register: Use ADDQ when adding numbers within that instruction's value range (1–8); otherwise, use the LEA instruction as shown above.

Data arithmetic. Here are some representative timings for adding numbers to data registers in immediate mode.

Instruction		Cycles	Size
ADDI.L	#127,D0	;16 cycles	6 bytes
MOVEQ	#127,D1	; 4 cycles	2 bytes
ADD.L	D1,D0	; 8 cycles	2 bytes
ADDQ.L	#1,D0	; 8 cycles	2 bytes
ADDI.W	#127,D0	; 8 cycles	4 bytes
MOVEQ	#127,D1	; 4 cycles	2 bytes
ADD.W	D1,D0	; 4 cycles	2 bytes
ADDQ.W	#1,D0	; 4 cycles	2 bytes

To add a number in the add-quick range (1–8), use ADDQ. To add a number in the move-quick range (−128–127), move the value into a scratch register and add it with a data-register to data-register add (note that this helps only longword adds, not word adds).

In general, replace all ADD, SUB, and MOVE immediate instructions with their quick counterparts whenever you can.

Since moving and adding are the most common 68000 instructions, these hints should help you write significantly better code. Here are a few other tricks that you might want to keep up your sleeve.

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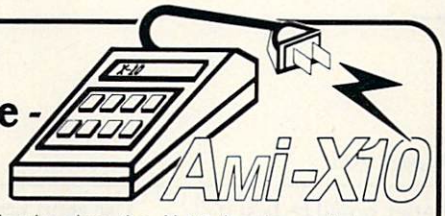

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PROGRAMMER'S PAGE *continued from page A-18*

Replace ASL.L #1,D0 with ADD.L D0,D0. Replace ASL.W #1,D0 with ADD.W D0,D0 and ASL.W #2,D0 with two consecutive ADD.W D0,D0 instructions.

Avoid multiply and divide if you can. MULU takes on the order of 70 cycles. DIVU takes about twice that number of cycles. If it's practical, use a lookup table or shift instructions instead. For example, the following shows two ways to multiply D0 by 10.

```
Instruction          Cycles      Size
MOVE.L  D0,D1    ; 4 cycles    2 bytes
ADD.L   D0,D0    ; 8 cycles    2 bytes
ADD.L   D0,D0    ; 8 cycles    2 bytes
ADD.L   D1,D0    ; 8 cycles    2 bytes
ADD.L   D0,D0    ; 8 cycles    2 bytes

MULU    #10,D0   ;74 cycles    4 bytes
```

The first method uses ten bytes but only 36 cycles, whereas the second uses four bytes and 74 cycles. The former method would be best inside loops, while the latter would be best if called only once.

Miscellaneous tips. The MOVEM instruction should only be used with three or more registers. Replace MOVEM.L D2/A2,-(SP) with the two instructions MOVE.L D2,-(SP) and MOVE.L A2,-(SP). Remember to pop the register off the stack in the correct order when you make this change.

Use PC relative mode if possible. This will cut down the size of your program significantly. The *Devpac* assembler from Michtron converts all instructions to PC relative mode automatically if you use the OPT A+ directive. If you use any absolute addressing in your program, *Devpac* will warn you to change an instruction like MOVE.B $BFEC01,D0 to MOVE.B ($BFEC01).L,D0. The results are well worth the trouble. Inovatronics' *CAPE* and Lake Forest Logic's new *ADAPT* assembler packages also have some support for PC relative mode.

Use short branches if you can. Change all JSR and BSR instructions to BSR.S instructions. Change BEQ and other branches to BEQ.S instructions. If the branch is too long, your assembler will warn you.

Know your assembler. If it changes appropriate MOVEs to MOVEQs or BNEs to BNE.Ss, you won't have to worry about making the changes yourself. If your assembler manual doesn't explicitly tell you what alterations it makes, you should purchase a disassembler to find out exactly what code is being generated.

The best way to learn how to code efficiently is to try several approaches and anaylze the results. But don't lose sight of the forest for the sake of the trees. First concentrate on eliminating bugs and improving your code; then worry about optimizing it. But if you know that your code is spending a significant amount of time deep in the center of a nested loop, attention to every cycle will pay off. ⊡

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ABSTRACTIONS

ARLAN LEVITAN

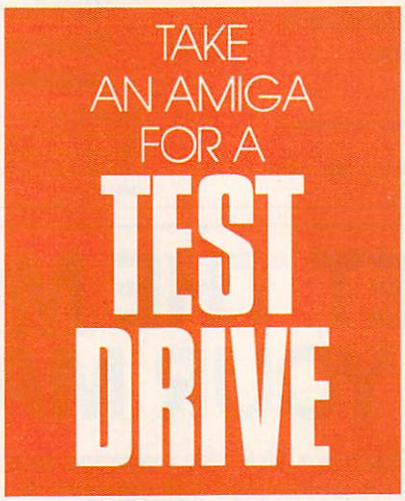
Now that "Abstractions" is part of the new improved *COMPUTE* (with secret ingredient GMI-90), there's a high likelihood that owners of other computers are reading Amiga coverage for the first time. A little background on this column is in order for the benefit of those newcomers. "Abstractions" is loosely patterned on the public executions of medieval England and France, but it lacks much of the structure and good taste associated with those sporting events.

Roughly one-third of the old *Amiga Resource* subscribers are convinced that the portions of my brain devoted to logical thought processes have been surgically removed. Another third is assembling incontrovertible proof that I'm a petty functionary in an international conspiracy whose sole purpose is vilifying the Amiga and Commodore Business Machines in print. The rest know that I'm just plain ornery when it come to computer manufacturers and purveyors of software.

As much as I enjoy micros and the people who use them, I firmly believe that the computer industry deserves the lifetime underachievement award in respect to actually delivering innovative and intuitive hardware and software for just plain folks. Home computing is getting more and more homogenized, and, for my money, the milk is starting to curdle.

Some industry observers claim that increasing standardization and the accompanying convergence of user interfaces across machine platforms will benefit the home user in the end. If you buy into that claptrap, let's meet down at McDonalds, Wendy's, or Burger King for some insanely great food, watch a few terrific sitcoms on the boob tube, and hop over to the local mega-mini-theater complex for the midnight screening of *Bill and Ted's Excellent Adventure.*

My Amiga friends (both of them) have lately taken to reminding me that I should be try to behave in a more dignified manner in print, since it's not polite to beat up on your peer group while company's around. They've even gone so far as to suggest that this column should be used to promote and extoll the wonderfulness of eating, walking, talking, and sleeping the Amiga way. I'm afraid I'd rather eschew such evangelism and remain on the technical sidelines (hmmmm . . . guess that makes me a diAgnostic).



I will make a couple of concessions, since the in-laws have apparently moved in to stay with us and this is, after all, the Amiga section of *COMPUTE.* The rules of engagement should be slightly modified now that we're in mixed company. I might as well refrain from beating up on Commodore's public relations hacks for at least a couple of months. That should give them enough of a breather to unlock their jaws so they can switch feet. I'll try to keep a low profile until Commodore launches another Amiga advertising campaign spawned from an inadvertent mix of ethanol and Valium.

I've got some friendly advice for our new neighbors, which will likely horrify those lost editorial souls who still pray for IBM to resurrect the home computer market with the new PS/1. Before you plop down over a thousand bucks on tired technology with a nose job, go spend time with an Amiga.

Since our new reader mix requires more even-handedness, I might as well incur the wrath of tens of thousands of fanatic Amiga fans by not even making a weak stab at telling you folks on the fence why I think you should buy an Amiga. Look, this may be the Amiga section of the magazine, but that doesn't give me a license to ignore the mechanics operating behind the quasireality of the publishing world. Spending four or five paragraphs here waxing poetic over the capabilities of Amiga computers is inherently suspect, an easy way to fill copy, and soothingly reassuring to current Amiga owners. I won't do it.

Our lives are awash with torrents of "information" intended to convince us that *(a)* we need widgets and *(b)* ACME widgets are the ones to buy. In point of fact, this column is in itself a mild eddy in the currents of persuasion.

Our media fill us with secondhand bites of information that we do not experience directly. Since we tend to blindly trust our regular sources of information, we assume that assimilating what is served up results in real knowledge. There is an implicit bond of trust between reader and information provider which all publications seek to build and maintain. The greater the trust, the greater the capacity to mold opinion.

Reviews of hardware and software in magazines are fine starting points for making purchasing decisions, but there's no substitute for first-hand experience. I don't want you to trust me. I want you to trust yourself.

If you're interested in computers, go see an Amiga and decide for yourself. Don't be deterred by negative comments from dealers who don't sell Amigas. Go see an Amiga. If you're thinking of buying an XT-class machine, check out an Amiga 500. If an 80286- or SX386-based PC clone is on your shopping list, test drive an

ABSTRACTIONS

Amiga 2000. Power users who believe they need the muscle of an 80386 should slip on the new Amiga 3000.

Go use an Amiga. Not for 5 or 15 minutes—take 2–3 hours. If dealers won't spend a that much time with you before a potential sale, they don't deserve your hard-earned cash. Period.

Trust your own eyes, ears, and hands. If you come away from the experience with the impression that a PS/1 would better suit your needs, go buy one. You'll probably have a great time perusing IBM's new Prodigy information service.

If you already own a PC or Mac, you're as welcome here as anyone else. Keep your machine, and use it in good health. In my book, it's perfectly acceptable to use Apple and IBM machines on a daily basis for text-oriented and desktop publishing drudgery. But do yourself a favor. Before you add a CD-ROM player or new hard drive to your present system, add an Amiga to your computing stable. An Amiga 500 will cost a lot less and will widen your options and eyes at the same time.

If you own an Amiga, consider buying a Mac or a PC (oh well, here come the calls for a Holy War on "Abstractions"). This isn't the Persian Gulf, folks! You can play both sides and come out ahead of the game. Anyone who has the temerity to suggest that one size fits all can go build a house with a screwdriver.

So much for hardware flag-waving. Let's move on to mushier material. Rumor has it that the manner in which the industry measures software sales is changing radically. Most bizarre is the new MDI (Mass to Dollar Index) rating for application software. For a favorable MDI, the discounted price of the software must be less than the weight (in ounces) of the shrink-wrapped packaging. Manufacturers who want to keep their prices and profit margins up are being forced to load up on bulk. The latest release of one popular database package tips the scales at over 19 pounds. Add a handle and the product would be perfect for impromptu self-defense or power walking.

For years, telephone handsets have been routinely filled with lead shot to yield a solid heft, and the software-packaging biz has cleverly come up with its own variation on that theme. Who cares if your terminal package's documentation is shorter than Sean Penn's temper? Slap 12 ounces of free sign-up offers for an assortment of information services in the bundle and you're playing with the big boys.

The weight wars have crossed over into the entertainment arena as well. Flight simulators are usually good for a pound and a half, but those who require heavyweight material will opt for tank simulations which average well over a deuce.

Those who can't go head-to-head on the basis of sheer poundage are opting for volume instead. Prominent among the last batch of entertainment titles I perused were a handful that may not have weighed much, but occupied three times the normal amount of shelf space. An eye-catching move, but it's rather disconcerting to excitedly shred a garishly decorated two-inch-thick package, only to find an inch and three-quarters of plastic foam, one disk and a six-page instruction booklet.

FOR A FAVORABLE MASS TO DOLLAR INDEX RATING, THE DISCOUNTED PRICE OF SOFTWARE MUST BE LESS THAN THE WEIGHT (IN OUNCES) OF THE SHRINK-WRAPPED PACKAGING

Since it's grouse season, is anyone else growing weary of the multi-tiered code wheels used in lieu of traditional copy protection? Talk about storage problems. I've got two cross-indexed files—one for disks, the other for code wheels. The last code wheel I tried using was as much fun as a high-security padlock. It had no less than five interlocked wheels, and the pivot grommet was just enough off-center to make using it an exercise in clairvoyance. Besides, unless filed immediately after use, such devices disappear into a black hole within minutes. I wonder if anyone has considered recycling old Captain Midnight secret decoder rings as a substitute for those flimsy and bulky cardboard wheels?

Speaking of games, I'd be less than forthright if I didn't comment on the disappointing quality of much of the entertainment software being released for the Amiga these days. On the other hand, I haven't been thrilled with Jack Nicholson's last few flicks either. I don't discern a lack of talent in either case; the problem is the material.

For better or worse, the display and speed capabilities of today's ubiquitous IBM clones have become the least common denominator (LCD) in the entertainment software biz. IBM's VGA and MCGA graphics are better than a poke in the eye with a sharp stick, but even pricey 386 systems lack adequate horsepower to perform the feats of animation magic supported on the humble Amiga 500.

So what's happening? Due to the sheer number of PC owners out there, the prototype versions of most of today's entertainment titles are developed for the IBM. Yesterday's clunky CGA and EGA graphics are gradually being supplanted by VGA-specific renderings, but despite their seductive look, the end products are inherently static. When the Amiga translation is undertaken, we usually end up with a straight copy of the IBM version.

There are a few notable exceptions who have managed to evade the strait jacket of the "pump code and port" strategy. Firms such as Psygnosis *(Shadow of the Beast),* ReadySoft *(Dragon's Lair),* FTL *(Dungeonmaster),* and Innerprise *(Battle Squadron)* have continued to release Amiga-specific products that steadily push the Amiga's perceived performance envelope. Their efforts deserve to be rewarded, but how long they can resist the siren song of the tens of millions of IBM PCs is anybody's guess.

On second thought, let's count our blessings. If the ubiquitous Nintendo Entertainment System becomes the LCD for entertainment software, we're in serious trouble—yesterday an adult asked me what kind of tapes I had for my Amiga. . . .

I don't think we're in Kansas anymore, Kyoto. ⊡

SPOTLIGHT

JOHN FOUST

There's the old joke about asking a laconic Yankee farmer for directions, and after a moment of characteristic silence, he declares "You can't get there from here." When hoping to move bitmap graphics image from program to program or machine to machine, don't be surprised if you get the Yankee Farmer answer.

This month's "Spotlight" explores exporting Amiga images to machines such as the Macintosh and IBM PC. Last month, we covered the basics of moving files from here to there, but largely ignored the complications of actually *using* this data on foreign computers.

Sometimes there's nothing to worry about at all. For instance, Electronic Arts makes versions of *DeluxePaint* for both the IBM PC and the Amiga, and their Studio series is the Mac version of this popular product. Each program can load and save images that are instantly compatible with versions of the program on other platforms, once you've moved the file between disk formats.

Chances are, though, you won't have it that easy. Conspiracy theorists have yet to explore the latent evil intent behind the abundance of conflicting, yet seemingly similar, software standards. Apparently, software companies create their own file standards because they're so impressed with the success of other companies' standard formats. This conspiracy can make life very complicated for the computer artist. Suppose, for example, that you prefer to work in *Photon Paint,* but your client expects to receive your artwork in TIFF format for a Macintosh. Or your client has clip art in PCX format and you want to enhance it in *DeluxePaint.* Changing between proprietary formats can be a big obstacle.

As you've seen so far, image conversion involves lots of three-letter acronyms (TLAs). There's PCX, IFF, HAM, TIFF (oops, that's an FLA), MAC, IMG, and TGA. Using the English alphabet, there are only 17,576 possible TLAs. When these are exhausted, we can start adding punctuation marks, leading to the A&$ format, which will be all the rage by 1997.

Getting from here to there can be a multistep process. You might convert an Amiga IFF image to GIF format, then move the GIF file to a PC disk, and then use a third PC program to convert the GIF file to PCX format. If you're lucky, your picture will still resemble the original.

On the PC, if you have a hand scanner or a paint program, be sure to examine its documentation for signs that it can load and save other formats, thus shortening the number of steps in the conversion. On the Macintosh, the paint program family tree has grown a new branch for programs that clean and prepare images for desktop publishing, such as Adobe's *PhotoShop.* These programs import Amiga IFF images, but don't be surprised if they can't handle HAM and

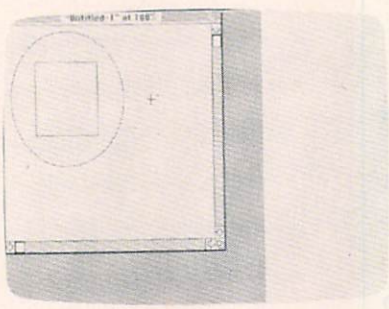


Figure 1

the latest Superhires and super-HAM variants. There's a similar incompatibility with 256-color VGA images from *DeluxePaint* on the PC. Some Amiga HAM paint programs can load them, such as Impulse's *Prism,* but the Amiga version of *DeluxePaint* won't handle 256-color pictures. It will load PC pictures with 16 or fewer colors in their palette with no problem.

If you're shopping for a program to solve your conversion problems, don't forget public domain (PD) software. There's a good *MacPaint* translator for the Amiga called *MacView.* CompuServe's GIF format has grown popular, and PD GIF conversion tools are available for the Amiga as well as many other machines. If you can convert an image to GIF, chances are there's a way to display it on another computer. As a side benefit, GIF files are compressed to a minimum size, making them smaller than images in other formats. Another important PD tool is a screen-capture utility. Once this type of program is running, a certain magic keystroke will save the current screen to disk as an image. Again, these are available for all computers.

These PD programs might not solve all your problems. For example, you might notice that perfect circles in a *MacPaint* image look like ovals when moved to the Amiga. Beyond simple format conversion is the land of image processing.

Computers display graphics in different ways. The Amiga's high-resolution mode displays 640 × 400 pixels, while an IBM PC might fit 640 × 480 pixels on the same screen. Given the same amount of screen space, a computer display might use a different number of pixels in a horizontal inch than it would in a vertical inch. For example, when you load a lo-res image into an interlaced screen in *DeluxePaint,* the image is squished lengthwise because of the difference in aspect ratio between lo-res and interlace.

On the Amiga, higher resolutions double in one direction or the other, making it relatively easy to correct squished pictures. The situation is worse when exchanging images with the Macintosh. Its black-and-white screen has a different aspect ratio than the Amiga, and the problem isn't solved by doubling pixels in one direction or the other. *MacPaint* images are 576 × 720 pixels, assuming 72 square pixels per inch. Displayed in 640 × 400 pixels in Amiga hi-res, *MacPaint* images look slightly stretched. For the same reason, all A-

Max screens look elongated. Mac monitors display square pixels, but Amiga pixels are slightly rectangular.

There are several companies rushing to help you move images from one format to another, including formats native to other machines. To varying degrees, these programs include image-processing abilities to help solve the problem of elongated images. Stretching or shrinking an image along one axis can compensate for differences in screen aspect ratio. This isn't a perfect process. Some information will be lost, meaning some pixels might be blurred. For many video-presentation applications, this is a bonus, because antialiased (blurred) pixel boundaries look good on video.

MiGraph's Hand Scanner includes *Touch-Up,* software for manipulating scanned images. Aside from some paint program features, *Touch-Up* imports Amiga IFF, monochrome TIFF, PCX, *MacPaint,* PrintMaster, and IMG files. The IMG format is native to GEM, the user interface on the Atari ST. GEM is also used on the PC, mainly by people using the *Ventura Publisher* desktop publishing software. The latest versions of *WordPerfect* on the PC import IMG graphics, too. Touch-Up software exports all the formats it imports, plus monochrome and dithered IFF, giving effectively 31 grays in some cases, as well as the CompuServe GIF format, EPSF encapsulated PostScript files, and hi-res mono images for *Degas,* a popular Atari ST paint program. The scanner and software retail for $399 (MiGraph, 200 South 33rd, #220, Federal Way, Virginia 98003; 800-223-3729).

ImageLink from Active Circuits (106 Highway 71, Suite 101, Manasquan, New Jersey 08736; 201-223-5999) converts to and from a handful of formats, such as IFF (including HAM and 24 bit), *Sculpt* RGB, *Turbo Silver* RGBN and RGB8, Rendition (the image format used in *Caligari Broadcast*), Macintosh PICT and PICT2 bitmaps (but not included structured drawings), PCX from the PC world, CompuServe GIF, Sun Rasterfile, and, by the time you read this, TIFF. All this is $199.95.

ASDG's *The Art Department* is based on the technology it used in its Sharp color scanner software. It has a host of image-processing abilities, including great stretching and dithering. It can load images from many formats and convert them to Amiga IFF format. It can read and write IFF files, including Dynamic HiRes, Dynamic HAM, and Rhett Anderson's Sliced HAM, plus *Sculpt* RGB, Impulse RGBN and RGB8, and *DigiView* DV21. It lists for $89.95. Modules for loading other formats are sold separately. (At press time, ASDG announced *Art Department Professional,* which lets you save in non-IFF formats.) The TIFF module is $49.95; PCX is $39.95; CompuServe GIF is $39.95; Rendition is $49.95; Targa is $39.95; *DeluxePaint II Enhanced* from the PC is $19.95 (ASDG, 925 Stewart, Madison, Wisconsin 53713; 608-273-6585).

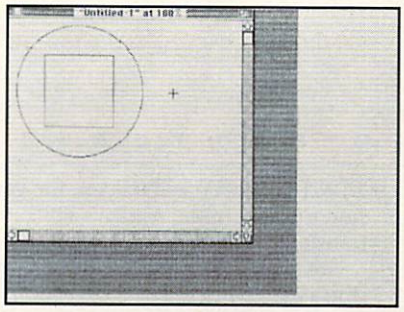


Figure 2

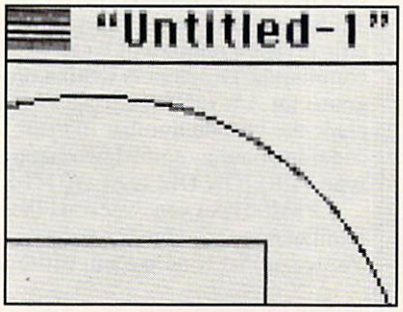


Figure 3

To demonstrate how getting from here to there might work for you, here's an example of moving a Mac screen image to the Amiga, via an IBM PC. Why would someone do this? Imagine you're using the Amiga for desktop publishing and your client wants to document a Macintosh program. You need good-looking, realistic screen shots of the client's program in action.

Figure 1 is an unretouched screen grab of a *MacPaint* picture of a circle and a square. Note that the circle looks like an oval and the square like a rectangle. (The Mac in question is actually an Amiga, running the A-Max emulator.) A screen grab desk accessory called *Camera* saved the image as a *MacPaint* file. Next, I used a Mac terminal program to send the file to a PC clone for temporary storage. After all, it would be nice to grab several images at a time and then process them en masse on the Amiga.

On the PC, I used the CONVERT utility that comes with *DeluxePaint II* to convert the image to IFF format. I copied the file to a 3½-inch MS-DOS floppy and then copied it to the Amiga using *CrossDOS,* described last month. Once in the Amiga, *The Art Department* reduced the height of the image to 88 percent of its original size, turning the two-color *MacPaint* image into a 16-color dithered image with the proper aspect ratio, as shown in Figure 2. The circle looks like a circle. Looking closely at the corrected image, we can see how the image was reduced in the Y direction and how 16-gray-shade dithering was used to smooth the jagged corners (Figure 3.)

What does the future hold? Like the Amiga's custom graphics display chips, we can expect future computers to contain chips dedicated to image compression and decompression, leading to new generations of image file formats. These will encompass realtime decompression of computer generated animations, too. If we're fortunate, these chips will reduce the popularity of obscure image formats. As another spinoff, these custom compression chips could take over much of the work of archiving and compression programs such as *PKZIP* and *LHARC,* making them faster and better than before.

On the downside, these new compression formats could leave some computers behind in the "can't get there from here" wasteland. Performing the compression magic in software might be too time-consuming for some computers. After all, that's why they switched to dedicated hardware for these tasks. In other words, don't expect anyone to emulate hardware compression in your Commodore 64 paint program. ⊡

CLI CLIPS

JIM BUTTERFIELD

This column covers the whole Amiga spectrum and will continue to do so, even though some users will be upgrading to Workbench 2.0 while others choose to stay behind. Because Workbench 1.3's Shell is so versatile and convenient, I will often emphasize it. You may have noticed my hints that if you haven't upgraded to 1.3 yet, you should do so. Techniques that work on 1.3 systems will continue to work with AmigaDOS 2.0. From time to time, I'll throw in tidbits about how an AmigaDOS 2.0 system goes about certain jobs.

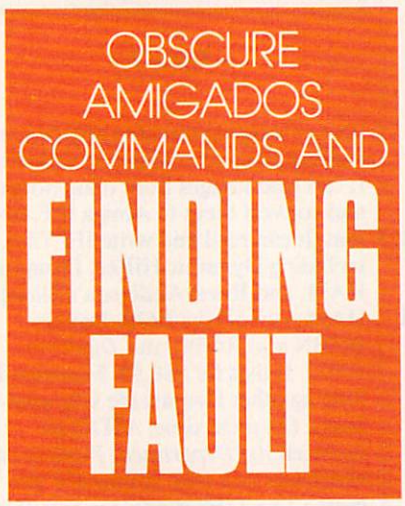
Version. Few Amiga users know about the CLI command Version, but it can be useful. Say you get a new program and notice a comment in its documentation that says *This program runs only with Workbench 34.27 or subsequent.* How can you tell what version of Workbench (or Kickstart) you have? You might have spotted these values at the time your computer started up. If not, type VERSION at any Shell prompt, and you can see them again.

But Version has more features: It can check the versions of libraries and devices for you. For example, type VERSION GRAPHICS.LIBRARY or VERSION PRINTER.DEVICE and the computer gives the specific revision number of these system elements. This way, you can tell if they're up to date. Some programs need a specific library version in order to work. There's even an option within Version that allows script files to ask questions such as *Is the narrator device version 33.2 or later?*

Your system may contain more libraries than those originally provided by Commodore. Supplementary libraries may have been added for ARP, the AmigaDOS Resource Project, or for such commercial products as *ARexx* and *WordPerfect.* Type DIR LIBS: to see all the shared libraries on your Amiga's system disk. The Version command can give you details on any of these libraries. For example, typing VERSION LIBS:TRANSLATOR.LIBRARY will tell you the version number of the Amiga's voice translator library.

AmigaDOS 2.0 expands on Version's capabilities. The 2.0 Version command allows you to ask for information about commands and programs. Thus, you can type VERSION C:COPY or VERSION SYS:UTILITIES/MORE in order to get the specific revision number of these commands. Developers writing programs for AmigaDOS 2.0 can even include the version number in their code, so you may someday be able to type VERSION DELUXEPAINT4.

Fault. Have you ever used the Fault command? Here's a surprise: You've probably used Fault without knowing it. Fault is often called in by the system when you have trouble.



Let's hide this command and see what happens. Type RENAME C:FAULT C:FLT (you can only do this under Workbench 1.2 and 1.3). This changes the name of the command so that the system can't find it. We'll restore it later, of course. Now enter a nonsense command such as DIR DF9:. A requester will appear; just click on Cancel. You'll see a response in your CLI window that says *Error Code 218,* which isn't too useful unless you look up the number in the manual. Now restore the Fault command by typing RENAME C:FLT C:FAULT. Type DIR DF9: again and then click CANCEL on the requester that pops up. This time, the response is *Device (or Volume) Not Mounted,* which makes a lot more sense. We didn't type the Fault command, but the system found the command in the C: directory and used it to make its error message more understandable.

Finding the commands. The first word you type on a CLI or Shell line is the command—the name of a program that is loaded into memory and run to produce the action you want. Most of these programs are found in a logical device named *C:,* which is normally assigned to the C directory on your system (boot) disk. The directory name *C* stands for commands; it has nothing to do with the C computer language. A few commands may be found elsewhere; the System and Utilities directories contain commands such as Format and Say.

The S (Script) drawer contains script commands, batch files that can be executed like programs if they have the S protection bit set.

With all of these directories, how does your Amiga know where to look for the command you type at the Shell prompt? The computer keeps a list of directories called the *path* so it knows which directories to search in which order. Type PATH at the Shell prompt, and the Amiga will display a list of directories in the order they will be searched.

Not all commands are found on your disk in a directory, though. Some may have been made resident. When a command is resident in memory, it can be loaded and run almost instantly. Type RESIDENT, and you'll see a list of any such turbocharged commands.

There's one more way a command can be implemented; it may be built in. You won't find these commands in any directory, since they are built into the Shell. On Workbench 1.3, Alias is the only embedded command, but you'll see quite a few more when AmigaDOS 2.0 arrives. ⊡

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JUST FOR FUN

SHAY ADDAMS

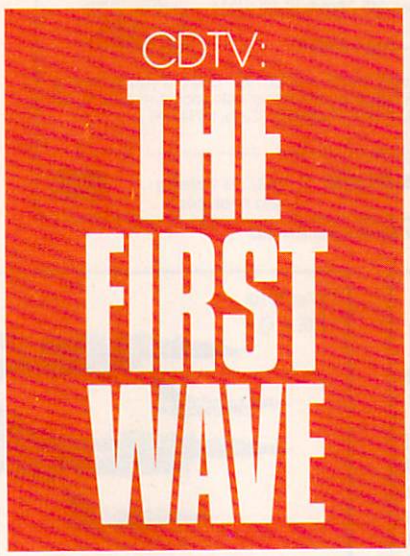
As a Commodore watcher since the early eighties, I've had as much fun watching the company's ill-planned and poorly timed ventures as I've had playing games on its computers. True, things haven't been as colorful since Jack Tramiel left, but I still find the corporate antics amusing, from the overpricing of the original Amiga, which nearly killed it from the start, to the futile efforts to kill the C-64—the Computer That Wouldn't Die. And what was that C-128D thing all about?

So it's depressing to see Commodore finally do something right for a change. Just when I thought I could count on its usual ineptitude (you know, the kind of thinking that says, "Hey! It's Tuesday. Let's switch PR firms again!"), it comes out with the CDTV player. CDTV stands a good chance of finally coaxing the mass market into accepting computers, which hasn't happened so far because 98 percent of the public has trouble setting digital clocks and VCRs. Commodore hopes to achieve that acceptance by getting rid of the keyboard and not calling it a computer.

Because the success of a new computer hinges on the support it draws from software publishers, Commodore is partially funding development and providing technical assistance for some games. This might even pay off for people with Amigas, since a disk-based version of some CDTV games could be put together while the CD-ROM game is being converted or written.

Accolade leads the way. Though I contacted everyone in the wide world of sports, adventures, simulations, and every other kind of game you can name, only one company, Accolade, revealed plans to do an all-new, second-wave game for the CDTV right out of the chute. Producer Shelly Safir says Accolade is eager "to take full advantage of the power CDTV will provide, instead of just porting over something from another format." Accolade's first release will be a golf simulation endorsed by Jack Nicklaus. You'll play on one of the courses designed by Nicklaus himself, and Accolade executives are already running up huge expense accounts as they check out golf courses around the world in search of the best site for the game.

"Through CDTV, we feel we can provide people the closest experience possible to actually being on the golf course," Safir explained moments after returning from Tahiti. Peter Doctrow, Accolade's head honcho of product development, elaborated on the possibilities as he prepared to catch the Concord for the Bahamas: "We'll probably use live footage as much as possible. If Jack's available, we'll use digitized images of his swing, and he'll offer audio tips. Thanks to the CDTV's tremendous storage, we'll be able to provide images we couldn't do on a regular disk drive." While this game, due out in the spring, could be ported to the Amiga, it would be a significantly different product. "You'd need at least 15 floppies," says Safir, and even then the game still couldn't reproduce all the CDTV visuals.



Accolade has discussed other games with Commodore, but future releases depend on the public's response to CDTV. According to Safir, "The prospect of what could be done is very broad—suddenly you take games out of the realm of a stream of data and put them into the realm of an emotional experience, something people can be more involved with. And due to [CDTV's] location in the home, it will be more of a family experience."

Making waves at Cinemaware and Origin. Cinemaware looks like another surefire CDTV supporter. Most of its highly visual interactive movies are perfectly suited for the keyboardless environment. Cinemaware's first Amiga game, *Defender of the Crown,* has been out in CD-ROM format in Europe for two years, so it has a good lead on most of the competition.

According to Cinemaware's Jerry Albright, *Defender of the Crown* and *TV Sports Football* are good contenders to become the company's first CDTV games. Albright figures we'll see two waves of CDTV games. The first will be like Cinemaware's European *Defender of the Crown,* which is essentially an enhanced version of the computer game with genuine voices and music. He predicts this wave will start rolling in by Christmas. Next year we'll witness the second wave, which will incorporate live TV and film footage. *It Came from the Desert,* with its monster-movie motif, is a natural for this treatment. And we'll see brand new games in the second wave, not just conversions.

CD-ROM has been making waves in Japan since last year, when people started questing in *Ultima I, II,* and *III* on a CD-ROM computer called the FM Towns. Development for this 80286-powered computer was done by Japanese programmers, but Origin will now be developing CDTV products in Austin, Texas. The first Origin products should be *Ultima VI* and *Wing Commander.* An Amiga version of *Ultima VI* had already been planned, and the advent of CDTV most likely means we'll see that sooner than we would have otherwise. *Wing Commander,* Origin's spectacu-

lar space game, had not even been on tap for an Amiga conversion, so the CDTV player can be thanked for this bonus. These are likely to fall into the first-wave category, with both tentatively set for release in the fall of 1991. And you can expect more. Greg Malone, who wrote Origin's *Moebius* and *WindWalker,* says, "The kind of fantasy worlds we create are well suited for CDTV, which gives us the room we need for greater detail, vaster environments, and a greater range of interactive possibilities."

Interplay is another leader in fantasyland development, and producer Troy Worrell says, "We believe CD-ROM is the future; it's the way the technology is going." And *BattleChess,* with better sound and music and some improved graphics, will be available on the CDTV player by Christmas. *Dragon Wars,* just out for the Amiga, might be converted next year. Interplay is also planning games designed specifically for CDTV, games that will incorporate digitized film footage or video instead of computer animation.

Lucasfilm and Sierra. No announcements were forthcoming from Skywalker Ranch, so I can only speculate on that company's plans for CDTV. Its representatives refused to say a word "until the official press release is released to the press," a clue that something is up. First-wave remakes of *Loom* and the Indiana Jones adventures are likely. But look for Lucasfilm to exploit a unique advantage it has over other software developers, the one found in the last syllable of the company name—film. With access to so much footage from the Indy films and other projects, CDTV is a natural for Lucasfilm; unlike other companies, it won't have to spend a fortune shooting live footage to digitize and splice into the games.

Among the most stalwart supporters of the Amiga this year, Sierra On-Line has no clear-cut plans for CDTV. But gonzo PR man Kirk Greene says the company's policy regarding this new format is, "If it's CD-ROM, we're doing it." With its CD-ROM versions of *King's Quest V* and *Mixed-Up Mother Goose* for MS-DOS computers, Sierra has practically paved the way for the format.

Space Quest IV is also being written for CD-ROM, though, like the others, it is for MS-DOS machines. What Sierra has done with it for MS-DOS machines is remarkable. Those cartoon-style graphics seen in previous animated adventures have been replaced with cinemagraphics—digitized, Disney-esque scenes painted by a staff of 60 artists now slaving away at Sierra's rustic high-rise in the California mountains that gave the company its name. They're the closest thing yet to true interactive movies, and the characters' lips are even synchronized with their dialogue. *Space Quest IV* and *King's Quest V* will arrive for regular Amigas next year, and a sequel to *Hero's Quest* is on the way.

Origin's *Wing Commander* should be available for CDTV in the fall of 1991.

A NUMBER OF COMPANIES ARE WAITING TO SEE IF ANYONE ACTUALLY BUYS A CDTV BEFORE THEY SUPPORT IT

Wait and CDTV. A number of companies are waiting to see if anyone actually buys a CDTV before they support it. Brøderbund's Jessica Switzer says, "When we were at CES, it seemed like a fantastic machine. We don't have anything for it right now, but we are looking into it." From an outside source, I hear Brøderbund has already scheduled an educational game, and I'm betting it will be a Carmen Sandiego adventure.

Strategic Simulations is also taking a wait-and-see approach. It has been slow to bring the Advanced Dungeons & Dragons games to the Amiga, probably because it's relying on UBIsoft in Europe to do the conversions. MicroProse does Amiga conversions mainly for Europe and is not planning anything for CDTV. Data East says it will convert *Drakkhen* next year.

The voice of doom. The most negative note has been sounded by former Amiga supporter Electronic Arts, whose Stuart Bonn (a vice president and overall head of development) says, "We have bigger opportunities that are more interesting and less risky. There's no need to rush in." Those opportunities are cartridge-based games for the Sega and Nintendo videogame machines, to which EA has shifted so much of its talent and time. (But if videogames are so hot, why is Nolan Bushnell, godfather of the Atari 2600 machine, working with Commodore on CDTV?)

Electronic Arts is not only ignoring CDTV but has also dropped all development for the Amiga, C-64, and Apple II computers. It's going to be an MS-DOS and videogame world, according to its current visions of the future. [We contacted Electronic Arts and were assured that Amiga development is continuing full-steam, with over 13 new titles and conversions in the works.—Ed.] Should CDTV score big this Christmas, however, Bonn says EA will "revise our position. We can respond very quickly." (Didn't Custer say the same thing right before riding out for the Little Big Horn?)

Commodore promises. Perhaps Commodore will follow through quickly on its promise of a press release listing the games and other software titles scheduled for CDTV. All the company had to do was get it approved by two departments and cleared by legal in three days. As a veteran Commodore watcher, I know better than to keep an eye on the mailbox. But perhaps next month I'll be able to tell you about even more games on the way for CDTV.

Maybe we'll even know whether Commodore actually got the machine to the stores on schedule. Regardless, I have at least managed to add a few more words *(CDTV, cinemagraphics, and Disney-esque)* to my spelling checker, so I can finally shut this thing down and get back to playing games instead of talking about them. ⊡

ART GALLERY

AFRICAN GIRL

Dan Bradford

Baltimore, MD

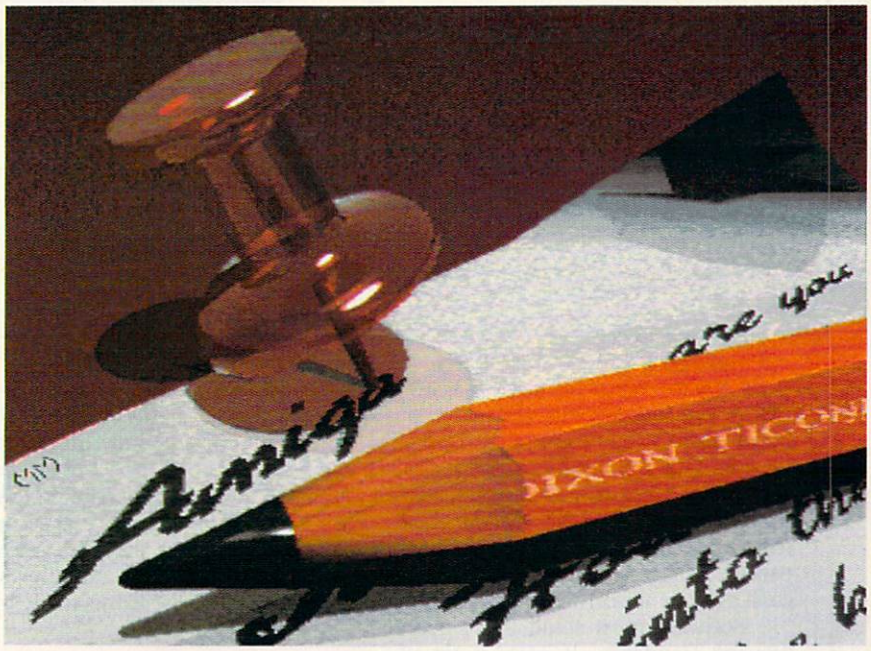
This unique combination of digitized images and freehand art was created on a 3MB Amiga 500 with the help of NewTek's Digi-View digitizer. "Although the images are complete in themselves," says artist Dan Bradford, "I often use these types of compositions in large paintings."

PUSHPIN

Mike Malloy

North Hollywood, CA

Pushpin was created on a 3MB Amiga 500 armed with a 20MB Supra hard drive. To create the three-dimensional pin, pencil, and paper, Mr. Malloy used *Sculpt 4-D.* The text was then created and turned perspectively using *Deluxe-Paint III,* and the entire picture was brought together in *Photon Paint* 2.0 using 320 × 400 HAM mode.



SUFI DANCER

Charles Morpheus

Bedford, TX

Sufi Dancer was drawn using *Photon Paint* 2.0. Regarding the picture's name, Charles Morpheus admits, "*Sufi Dancer* is really called . . . *and we lost ourselves in the dance,* but that wouldn't fit in the Amiga's string gadget." Mr. Morpheus is an artist of the Invisible College, a small multimedia co-op whose goals include the integration of video, music, hermetic philosophy, quantum theory, and brainwave entertainment.

If you'd like to see your art in these pages, send it to us on disk at the address below. We pay $100 for each piece of art we accept. Rejected submissions are returned only to artists who enclose a self-addressed, stamped envelope.

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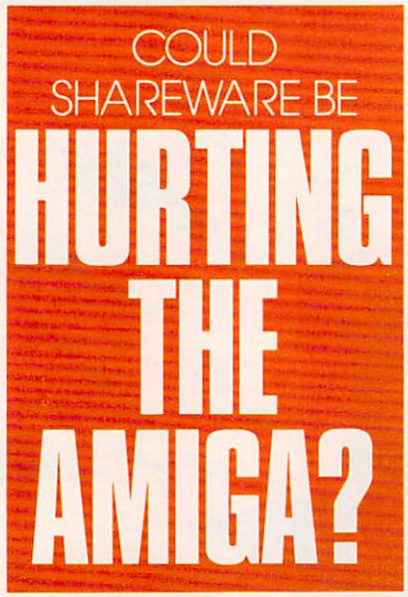
TAKING SIDES

RHETT ANDERSON vs. RANDY THOMPSON



OUCH! It all started with IBM. Decades ago, when you bought a mainframe computer from IBM, Big Blue set up the computer, maintained and serviced it, and wrote your software. At the time, a computer cost so much that software expenses were a drop in the bucket. People got used to the idea that software was cheap and hardware was expensive. That's not true any more. Hardware prices have gone down, and software prices have gone up.

Software must stand up to ever-growing standards. It costs a lot of money to produce a commercial program. The days of photocopied documentation and plastic-bag packaging are over. The Amiga market is small enough that every software developer is taking a risk when he or she puts half of a year (or more) into a single product. It must be disheartening when the developer finally ships the product and then sees three or four "clones" of the program show up within a matter of weeks.

Granted, these derivative products may not always be as slick or useful as the original, but when a computer user has a chance to download *RGB Exchange* for free or to buy *ImageLink* for $199.95, it's clear that *ImageLink* is going to lose some of its potential customers.

Where did all this shareware come from? The Amiga took a long time to grow into a healthy market. Publishers found out that they couldn't make much money in the Amiga market, so they abandoned it. Desperate Amiga owners could find software only by downloading it from bulletin boards and by copying club disks and Fred Fish PD disks. Amiga owners ended up with an astounding number of modems.

On the Amiga, shareware and public domain software have run amuck. That's not to say that there's no place for these programs. The problem is that they're enough of a force (along with software piracy) to hurt the commercial software market.

Obviously, I can't blame the programmers who take their time out to produce this software for the benefit of all Amiga owners. I don't have a solution to the problem. But that doesn't mean it's not a problem. It is—just ask your friendly neighborhood software developer.

Looking over at Mr. Thompson's side, I read that shareware is "try before you buy" software. It's more like "use instead of buying" software. Amiga owners are used to getting their software for free. That devalues the work of programmers and promotes piracy. You see, with shareware, both the user and the programmer lose out. Maybe that's why the Amiga's biggest problem is software.

DON'T BE RIDICULOUS! When the Amiga first came out, something interesting happened. People wrote software.

I'm not talking about big corporations creating commercial programs that sold for half your paycheck. These were real computer enthusiasts, like you and me, who saw the Amiga's potential and wrote software for the computer because they wanted to. And instead of selling their programs to the highest bidder, many Amiga programmers uploaded their work to telecommunications networks and distributed disks through user groups. These programs, referred to as public domain and shareware, were either given away or sold for a nominal charge.

As hard as it is for a non–MS-DOS computer to make it in today's marketplace, the contribution made by public domain and shareware authors went a long way to help sell the Amiga. No one wants to buy a computer that doesn't have any software, and thanks to the grass-roots support of early Amiga programmers, the Amiga had (and has) plenty.

The Amiga is older now, and things have changed. Many commercial software companies are supporting the Amiga, and lack of software isn't that big of an issue. But shareware is still strong and still important.

Shareware, which works on the honor system (you use the program for a while, and if you like it, you send the author the requested donation), provides Amiga users with the unique opportunity to "try before you buy"—something we can all appreciate.

In the shareware system, both the user and the programmer win. The user can obtain software for just a few dollars, and the programmer has an inexpensive means of distributing and selling his or her software without releasing all rights to a commercial distributor.

Best of all, shareware software keeps commercial developers on their toes. It gives them a bit of competition, forcing manufacturers to sell truly commercial-quality programs instead of quick-and-dirty hacks. In effect, this mild competition has raised the quality of Amiga programs, and in my opinion, that's good.

Looking over at Mr. Anderson's side, he once again displays his uncanny knack at finding something wrong with everything. Yes, some commercial software sales are hurt (albeit minimally) by shareware clones, but commercial software—with its dealer distribution channels and magazine advertisements—clearly has the upper hand in the sales race. As with life, shareware may have its problems, but it's definitely *not* hurting the Amiga. ⊡

64/128 VIEW

TOM NETSEL

'Twas the night before Christmas,
when all through the house
Every creature was stirring with
joystick or mouse.
The 1541 was humming, but its speed was a bore;
I knew by the wait it had to be a Commodore.

The kids were all snuggled by the monitor's bright glow
While multicolored sprites danced to and fro.
I'd just settled down for a long winter's nap,
Waiting for *Rambo* to load and some bad guys to zap,

When out on the lawn there arose such a clatter,
I glanced at my drive to see what was the matter.
I could tell by the glare of its steady red light
It was still sending data; at least it was all right.

I ran to the window, banged my head on the sash
(The kids continued to play and ignored the loud crash),
When what to my watering eyes did appear
But a miniature sleigh and eight tiny reindeer.

With a little old driver who handled his team
As lively and smoothly as machine language routine.
Though they looped through the heavens, he was never space sick,
Yet I get quite queasy just debugging BASIC.

His eyes—how they twinkled; his waist was not slim.
For a moment he reminded me of a Butterfield named Jim.
He shouldered his pack, though it was quite a chore,
Then trod 'cross my lawn and burst open the door.

I gasped in amazement (he no doubt thought me a jerk),
But he ignored us completely and went straight to his work.
He placed gifts 'neath our tree after clearing a place;
The kids—paying him no heed—blasted aliens from space.

He brought *Bard's Tale,* and *Krynn, Seven Cities of Gold*—
Great software titles, both new ones and old.
There was *SuperBase* and *EasyScript,* and what did I detect?
There was even a hard drive from the folks at Xetec!

He unpacked extra RAM, CPUs, and such things,
Plus a mysterious black box that made my floppy drive zing.
Then a wrapped gift he handed me; it wasn't a weighty one,
But I knew in a moment 'twas a new 1581!

Modems and monitors he pulled out of his sack
And even a plotter I made him take back.
But one gift he gave me I couldn't dispute:
A lifetime subscription to the revamped *COMPUTE.*

The jolly elf chuckled as he made for the door.
But he stopped, turned, and asked if there was anything more.
I booted up *SpeedScript* on my wife's 128
And dashed off a missive, praying I wasn't too late.

Though it's scratched, dinged, and dented, and sometimes quite slow,
My 64's a delight that others should know.
'Twould be such a pity to walk into a store,
Only to be told, "It's not made anymore."

So before Santa left on this magical night,
I pressed a note in his hand and squeezed it real tight.
"Take this message to Commodore in West Chester, PA.
It says, 'Keep the 64s coming, guys, at least through next May.'"

"Now, Dasher! Now, Dancer! Now, Prancer and Vixen!
On, Comet! On, Cupid! On, Donder and Blitzen!"
Up to the garage-top the coursers did loop
And turned a neat figure eight past our basketball hoop.

As they flew to the north past my satellite dish,
I was hoping that Commodore would grant my last wish.
But even if it didn't, I was still brimming with cheer
Because finally tonight I'd learned the names of those deer.

Rambo was still loading on my old 64
As I reentered the house and closed the front door.
A carol was playing on our stereo SID,
And the kids were apologizing for something they did.

I went to the window and gazed into the night,
But something caught my attention and gave me a fright.
Santa's last gift rested there on the sill.
I opened it up; 'twas a credit card bill.

If Clement C. Moore had access to a 64 and a good word processor, no telling how "A Visit from St. Nicholaus" *might have turned out. Happy holidays and my appologies to Mr. Moore.* ⊡

NEWS & NOTES

Not Dead Yet

Upon hearing a rumor that he was dead, Mark Twain once quipped, "The reports of my death are greatly exaggerated." Similar rumors abound about the demise of the 64, and they've been circulating throughout user groups across the country and in their newsletters. In order to seek out the truth, Gazette contacted Charles Russell, Commodore's national marketing manager for consumer electronics, and put the question to him. His answer was almost as succinct as Twain's: "The 64 is in production and still going as usual."

TOM NETSEL

Meanwhile, Back in the Dungeon

Dragons of Flame is the most recent release for the Commodore 64/128 from Strategic Simulations.

The second Advanced Dungeons & Dragons action game to take place in TSR's Dragonlance game world, *Dragons of Flame* ($19.95) challenges you to save the world of Krynn from Takhisis, the Queen of Darkness. You lead eight "Companions of the Lance" through the land of Dragonlance, acquiring valuable allies in your quest.

Dragons of Flame is available from Electronic Arts (1810 Gateway Drive, San Mateo, California 94404), distributed under its affiliated label program.

LIZ CASEY

A Little Help from Our Friends

A further indication that there's still life in the 64 is a new service Commodore has announced for its 8-bit computer.

Commodore Express, a Commodore/Federal Express joint venture, offers a 24-hour toll-free "helpline" and door-to-door customer service for owners of the 64 and Commodore's MS-DOS–compatible Select Edition computers. This protection service was introduced earlier in the year for Amiga 500 owners.

Commodore Express is part of a new customer service package designed with the home computer user in mind. It offers free pick-up and return delivery for in-warranty repairs, plus free telephone assistance to help users set up and operate their computers. The Commodore Express contact number is (800) 448-9987.

According to Tom Kilcoyne, Commodore's director of consumer marketing, in the first two months of the program, 75 percent of the incoming calls were serviceable over the telephone, and the average turnaround time on Federal Express pick-up/delivery has been 48 hours.

TOM NETSEL

***The Magician*, by Jack Modjallal (DocJM) of Encino, California, is this disk's Picture of the Month. Enjoy it and the rest of the fine pictures found only on the *Gazette Disk*.**

Welcome to "Gazette Gallery." Each month the *Gazette Disk* features a collection of the best 64/128 artwork submitted by our readers. We pay $50 for each piece of art we accept and an extra $50 for the one selected as Picture of the Month. (You retain the rights to your work.) Send your original 64/128 art in Doodle, Koala, or any other popular format to Gazette Gallery, COMPUTE Publications, 324 West Wendover Avenue, Greensboro, North Carolina 27408. Enclose a self-addressed, stamped disk envelope if you want your submission returned. We want to see your best work today!

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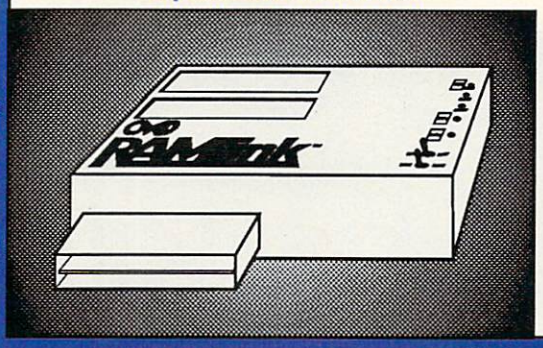

What is RAMLink?

RAMLink is a multi-purpose hardware interface designed to overcome the limitations of existing RAM expansion units (REUs). RAMLink delivers the performance and compatibility lacking in past REU's by incorporating CMD's proprietary RL-DOS and advanced features into a compact unit which allows most software to utilize Commodore 1700 series REU's, GEORAM, PPI's RAMDrive, and CMD's RAMCard as if it were a disk drive. Optional RAMCard installs internally and can be used alone or in combination with the storage of an external REU for a maximum capacity of 16 Megabytes.

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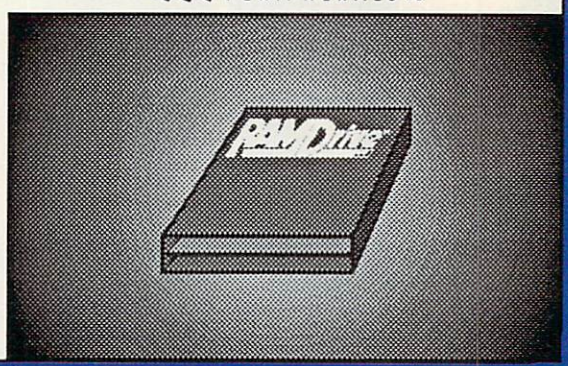

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Desktop publishing and the 64? Anyone who has performed professional-level desktop publishing could be excused for doing a double-take. The fact is that the 64 only has one drawback when it comes to placing graphics and formatted text on paper: its severely restricted memory.

In the days when the 64 was first introduced, memory was not a problem. Most programs were text-based and RAM-frugal. New users were grateful to have any graphics capability at all. A lack of memory is the root cause of much of what is good and bad about the 64. On the one hand, there isn't much room for storing data and code when they aren't in use, which means that they must reside on disk. On the other hand, tight memory restrictions make programmers more efficient. Sloppy programmers don't last long in the Commodore arena. They quickly move on to the world of the PC, whre owners are programmed to add megabytes of memory at a whim. The 64 has no space to waste. ▷

ROBERT BIXBY

While the memory continues to be a roadblock, the processor is a good one. Most people unfamiliar with the Commodore 8-bit line have missed out on the fact that the 6510 is actually a very capable chip.

One solution to the RAM problem is geoRAM, which was reviewed in these pages about a year ago. Scanntronik's *Pagefox,* a desktop publishing package newly imported from Germany, takes a similar approach by providing an additional 100K of RAM for its own use. *Pagefox* avoids yet another of the 64's drawbacks by coming etched in the ROM of the same cartridge that contains the expanded memory. This avoids the necessity of loading the program from the escargotesque Commodore disk drive.

Pagefox is not a single program, but like all other desktop publishing programs, it contains several modules, including a good monochrome graphics package, a text editor, and a formatter that can integrate graphics and automatically format text into columns.

A Professional Look

If you're really a fan of desktop publishing on the 64, Scanntronik offers two other options that have the potential of making your efforts look professional: a hand scanner and a character editor, known respectively as Handyscanner 64 and *Character Fox.*

A scanner is a device that can import text and graphics directly into a computer. It's different from a digitizer like ComputerEyes in that it does not require a camera. It is used primarily for importing two-dimensional images, while a digitizer can be used with three-dimensional subjects.

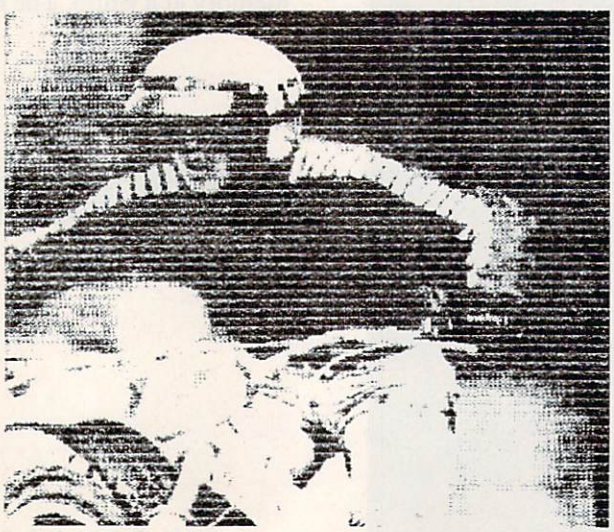
A hand scanner is not used to scan hands, as one person suggested, though it could be used for that. It's called a *hand scanner* because it's small enough to fit in a person's hand. Most professional-level scanning units look like photocopiers or fax machines. They generally take up a lot of desk space and scan whole pages at a time. A hand scanner is about twice as big as a mouse. It's perfect for use with the 64 because it will only scan an image about four inches wide and a few inches high—which quickly fills all available memory in the 64. Larger images can be scanned by reducing the scanner's sensitivity, but these images are usually unrecognizable.

The hand scanner and character editor will be discussed later. For now let's look closely at *Pagefox.*

Design a Page

To be blunt, when I sat down with *Pagefox,* I didn't find it as intuitive as *geoPublish,* but with a little practice, I found I could accomplish some of the same tricks while avoiding the overhead of loading GEOS. *Pagefox* occupies a middle range between *geoPublish* and *Outrageous Pages,* another page-formatting program that, despite its capabilities, actually lived up to its name by outraging many of its users and was quickly withrawn from the market.

PASS THE SCANNER OVER A PHOTOGRAPH, CHECK THE RESULTS, AND THEN PRINT IT.



One of the things that made *Outrageous Pages* difficult to use was its idiosyncratic user interface. *Pagefox* also takes a tremendous risk by asking users to forget everything they know about operating system interfaces and start learning a new one. It's more than some people can bear. In my opinion, now that GEOS is widely used, programmers should turn to it and stop reinventing the wheel. Every new program shouldn't require reeducation.

On the other hand, *Pagefox* didn't just suddenly appear, as did *Outrageous Pages.* The heart of the program was available in different German versions known as *Printfox* and *Hi-Eddi,* so the designer has had a chance to shake out the bugs in the European market. In this latest version, the operation is fairly smooth. In fact, many of my criticisms of *Pagefox* have to do with its incomplete translation from the German version. This will be covered later.

Pagefox, true to its name, is geared for designing the single page. It's capable of chaining multiple pages at print time, but each page is discrete. There's no way to flow text from a column on one page to a column on another without creating discrete text files.

Pagefox contains a complete text editor, though it can only work with files of up to 9000 characters. The reason is, as the manual points out, "More than 9000 characters you won't get on one page." (The page size is 640 × 800 pixels—enough to fill a standard sheet of paper.)

The text editor sports search-and-replace. The search-and-replace supports wildcards, identified as *jokers* in the manual. There's no insert mode; the text editor is locked permanently in overwrite mode. The delete key is a true delete key, like on the PC. It draws in characters from the right of the cursor and deletes them. The f7 key is used as a backspace/delete key, erasing characters from the cursor to the left.

Pagefox also features a Caps Lock key similar to that found on the PC

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continued on page G-8

keyboard. The program accepts imported text in ASCII, PetASCII, and screen code format as used by *SpeedScript*. If your word processor supports any of these formats, you won't need to use *Pagefox*'s text editor for your text.

The program provides good-looking close quotation marks ("), but it has no way to enter open quotation marks ("). Where you might expect to find open quotation marks, you will find close ones lowered to the baseline.

Pagefox can do some limited hyphenation, though the manual is unclear on this point. Evidently, if you want a hyphen to appear in the middle of a word, you must capitalize the letter before which the hyphen may fall. When the word is printed out, the capitalization is removed and, if the word falls in the hyphenation range at the right margin, it will be broken according to your wishes. There is another method, using a dictionary-style hyphenation and embedded codes, that doesn't appear to be as reliable as inserting capital letters at paragraph breaks. The manual states in more than one place that the automatic hyphenation is based on German grammar, so if you happen to be writing in some other language, hyphenation (or "syllabification") may not work.

Translate That Again

To do the program justice, the manual needs to be translated into real English instead of the pidgin English in which the German translator left it: "But even with all these simplifications you won't be able to control whithin [sic] minutes such a complex and effecient [sic] program like the *Pagefox*. Especially as a beginner for DTP you will need a few hours time to become well acquainted with the different program parts, before you are able to print out your first pretentious work."

Any of us who have read the instructions provided with Pacific Rim stereos, watches, and calculators can follow the meaning of this kind of text, though the awkwardness and idiosyncrasies of the translation will probably make the user smile for a while. Then, the user begins to go crazy. The effect of reading page after page of text that ignores syntax and is ignorant of the English idiom is like having your skull half-full of ginger ale.

Desktop publishing is so complicated, even at its simplest, that a friendly, lucid manual is a minimum requirement. (That's another reason for my preference for *geoPublish*.) In the words of the manual, "This is especially with the C 64 are not so easy. . . ."

A Foxy Editor

Character Fox is a character/font editor. It contains an editing field familiar to those who have worked with sprite and character editors. Its manual is written in an interesting way: The author takes on the persona of the program, explaining its actions as if they were his own.

Character Fox can work with images scanned with the hand scanner (described below), allowing you to import text from a book, magazine, or clip-art collection, modifying it into your own typeface. This one capability is enough to recommend it. I only wish the creator of these programs had made them GEOS-compatible so the fonts would be applicable beyond the world of *Pagefox*.

Handyscanner 64

As mentioned earlier, scanning is a method for bringing real-world art and text directly into the computer. There are three basic types of scanning equipment: a flat-bed scanner that resembles a photocopy machine, a page-fed scanner that resembles a fax machine, and a hand-scanner that resembles a mouse with a severe thyroid condition.

The Handyscanner 64 allows you to scan small images. It operates with software that closely resembles the graphics part of *Pagefox*. The scanner itself emits a greenish light from a bank of LEDs (Light-Emitting Diodes). When you press the scan button on top of the scanner, the lights become a little brighter. Since these LEDs would represent a significant power drain on a 64's power supply, the scanner comes with its own power transformer. The scanner attaches to the user port of the 64 with a small interface device, into which you also plug the power cord from the transformer.

With the power cords from your computer, disk drive, monitor, printer, and hand scanner, you should think seriously about investing in a multioutlet surge-protector power strip, if not rewiring your computer room to provide a dozen outlets at your desk.

The scanner can be set to scan in pure black-and-white with no attempt at shading, or to provide one of three levels of dithered shading. Dithering is a technique of approximating a shade of gray by placing random dots in the area. A darker area has more dots; a brighter area, fewer dots.

In addition, Handyscanner provides you with separate brightness and contrast adjustments. Unlike many hand scanners, the scanner itself offers no dot-per-inch setting. This is set through the software. You can set any sensitivity between 33 and 300 dots per inch (dpi), but any sensitivity less than 200 dpi will provide a very poor scan.

The Handyscanner provides a simple, handy way to import real-world images into the 64. I was skeptical that the Commodore's graphics capabilities were up to handling scanned images. I work a great deal with scanned images on the PC. They take up a lot of disk space and are time-consuming to manipulate. Furthermore, a hand scanner is tricky; you have to pull it down the page at a perfectly uniform speed and in a perfectly straight line to prevent distortion. To my surprise, Handyscanner provided consistently good scans despite my shaky hands and a sticky scanning surface. The hardware must cope with minor inconsistencies better than the Logitech scanner I am accustomed to using.

The software associated with the Handyscanner compresses the images efficiently, although interpreting the scanned image and bringing it up on the screen take several seconds.

Conclusions

When I bought my 64, my plan was to use its graphics and text-editing abilities to save myself the labor of endlessly recreating graphics and rewriting text. It worked better than I had imagined. If I had also been able to bring real-world images into the machine, I would have been ecstatic. The foundation of the value of *Pagefox*, in my estimation, is the Handyscanner. Other, better, alternatives exist in word processing, graphics, and desktop publishing than *Pagefox*. But, as far as I know, only one scanning alternative is available for the 64—the Handyscanner—and, since it only works with *Pagefox* and *Character Fox*, it makes these products worth having as adjuncts to its power. ⊡

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Circle Reader Service Number 118

PROGRAMMER'S PAGE

RANDY THOMPSON

This month I've compiled some reader tips that are sure to catch your attention. I like to call them *dazzlers* because of their flashy, graphic appeal. Try a few and see what you think.

Flash!

After running the following program, all shifted characters displayed on the 64's screen flash wildly. By taking advantage of the computer's extended color background mode, this machine language routine toggles the characters' background colors, making the letters appear to flicker and glow.

```
MQ 100 FOR I=679 TO 758:READ D
       :POKE I,D:NEXT
PB 110 SYS 679:POKE 251,1:POKE
        252,6:POKE 253,3 :POKE
        53281,0:POKE 53280,0
XF 120 POKE 53283,15
BE 130 PRINT"{CLR}WITH THIS PR
       OGRAM ANY {YEL}SHIFTED
       {CYN} CHARACTERS"
JJ 140 PRINT"{11 SPACES}ARE HI
       GHLIGHTED"
BD 150 REM POKE 251,SPEED OF F
       LASH
KB 160 REM POKE 252,COLOR 1
QG 170 REM POKE 253,COLOR 2
HK 180 DATA 120,169,192,141,20
       ,3,169,2,141,21,3,173,1
       7,208,9,64
PS 190 DATA 141,17,208,169,0,1
       33,162,88,96,165,162,19
       7,251,240,3,76
SB 200 DATA 49,234,173,252,3,2
       01,1,240,4,201,2,240,17
       ,165,252,141
FJ 210 DATA 34,208,169,2,141,2
       52,3,169,0,133,162,24,1
       44,225,165,253
SC 220 DATA 141,34,208,169,1,1
       41,252,3,169,0,133,162,
       24,144,208,2
```

You can change the speed at which the letters flash by POKEing a value 0–255 into memory location 251 after running the program. The lower the value, the faster the characters flash—except in the case of the value 0, which is the *slowest* setting possible (1 is the fastest).

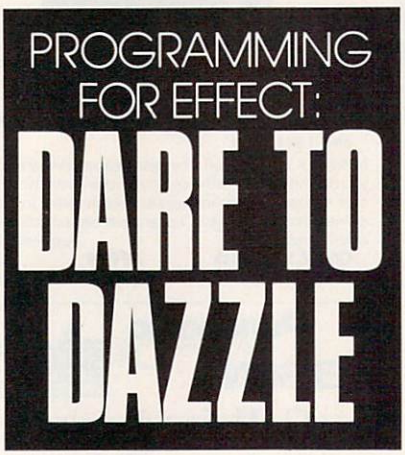
To change the background color of the flashing characters, POKE two different color values into locations 252 and 253. The machine language routine will alternate between these two colors to create the flashing effect.

You can easily disable the flashing by turning off extended background color mode. Turn it off with POKE 53265,PEEK(53265) AND 191. If you want the effect to run again, turn it back on with POKE 53265,PEEK (53265) OR 64.

JOEL SUDQUIST
STERLING HEIGHTS, MI

Screen Scrambler

Here's a routine that scrambles and then clears your computer screen. It works by decreasing the value of each



character's screen code until all of the characters turn into spaces. It's an eye-catching way to remove information from the screen, and it works with the 64 and the 128 in 40-column mode.

```
MS 10 AD=4864
QQ 20 FOR I=0 TO 49:READ D:POK
      E AD+I,D:NEXT
GS 30 DATA 169,4,133,251,160,0
      ,132,250
FJ 40 DATA 132,252,177,250,201
      ,32,240,15
AX 50 DATA 162,1,134,252,201,0
      ,208,2
QC 60 DATA 169,33,170,202,138,
      145,250,230
KQ 70 DATA 250,208,231,230,251
      ,165,251,201
KF 80 DATA 8,208,223,165,252,2
      01,0,208
QH 90 DATA 207,96
```

After you've run the program, execute SYS 4864 to clear the screen. For the best results, get a bunch of characters on the screen first. For such a simple concept, the effect is really quite impressive.

By default, this program stores its screen-clearing machine language routine in memory at 4864–4913. By changing the value assigned to AD in line 10, you can move the routine to any 50-byte area of free memory. Just remember to change your SYS statements to reflect this change. For example, if you move the routine into the 64's cassette buffer located at 828, you must enter SYS 828 to invoke the screen scrambler.

STACY OLIVAS
GRAHAM, WA

128 Screen Split

For an interesting example of scrolling the 128's split graphics screen, type in and run the following demo program. Don't clear the graphics screen before you run the program. In fact, it's best if you turn the computer off and then on again before entering the listing.

```
PH 10 GRAPHIC 2,0,0
EB 20 FOR I=48 TO 249
QS 30 POKE 2612,I
QG 40 NEXT
MR 50 FOR I=249 TO 48 STEP -1
QA 60 POKE 2612,I
RJ 70 NEXT
QF 80 GOTO 20
```

This program opens a hi-res graphics screen and smoothly scrolls it down over the text screen and back up again. It does this by altering memory location 2612. This location holds the raster number used by the interrupt routine that controls the GRAPHIC 2 and GRAPHIC 4 split screen.

STEVE SCHOWIAK
GIESSEN, WEST GERMANY

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BEGINNER BASIC

LARRY COTTON

Happy holidays! In the past few months, we sharpened our BASIC skills with a program that demonstrated how to create and control a sprite, or Movable Object Block. The 64 is not restricted to a single sprite, however; it can simultaneously maneuver up to eight sprites in BASIC.

When dealing with more than one sprite, things get a bit more complicated. Before we actually create some sprites in shapes that are appropriate for the season, here's what we have to do:

- Create shape data for the sprites.
- Tell the computer where to look for the data.
- Locate the sprites horizontally and vertically.
- Determine their sizes.
- Assign them one or more colors.
- Turn them on.

Last month's program contained 63 pieces of data which defined our single sprite's shape. For each additional sprite shape, 63 more pieces of data are required to be POKEd into memory registers.

In addition, you must tell the computer where to look for the data. Memory registers 2040–2047 are the eight sprite data pointers; they tell the computer in which memory registers the sprite shape data can be found.

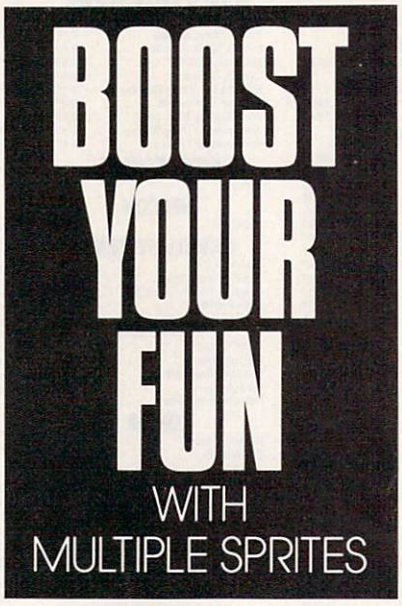
When we located sprite 0's shape-defining data from 12288 to 12350, we POKEd 2040 with 192. The sprite data pointers and their corresponding data locations are detailed below.

Sprite	Data Pointer	Value	Data At
0	2040	192	12288–12350
1	2041	193	12352–12414
2	2042	194	12416–12478
3	2043	195	12480–12542
4	2044	196	12544–12606
5	2045	197	12608–12670
6	2046	198	12672–12734
7	2047	199	12736–12798

Each sprite doesn't need unique data; one may share the data of another. If you want, say, sprite 7 to have the same shape as sprite 0, you would POKE 2047 with 192.

When you're working with three sprites or fewer, there are other popular locations in which to put sprite shape data. When you use them, the same pointers are used, but different values are POKEd there.

Sprite	Data Pointer	Value	Data At
0	2040	13	832–894
1	2041	14	896–958
2	2042	15	960–1022



This month we'll begin a short program for the 64 that should give you an understanding of how to handle more than one sprite. Be sure to save lines 10–90 because we'll add to them next month. First clear the screen and color the screen white:

```
10 PRINTCHR$(147):POKE53280,
   1:POKE53281,1
```

Next, because we'll use sound with our sprites (since the 64 is so musically gifted, I almost always include sound in my programs), we must clear the sound-producing chip and set the maximum volume, envelope, and a frequency for voice 3. These have been discussed in previous columns.

```
20 FORT=54272TO54295:POKET,
   0:NEXT:POKE54296,15
30 POKE54277,8:POKE54278,255:
   POKE54287,3
```

Read in the sprite shape data:

```
40 FORJ=12288TO12350:READD:
   POKEJ,D:NEXT
50 DATA0,16,0,0,0,0,0,16,0,0,56,0,0,
   124,0,0,254,0,0,56,0,0,124,0,0,254,
   0, ,255
60 DATA0,3,255,128,0,254,0,
   1,255,0,3,255,128,7,255,192,15,
   255,224,0,56,0, ,56
70 DATA0,0,254,0,0,0,0,
   0,0,0
```

Because we're using only one sprite shape (I won't tell you what it is yet), we can point all eight data pointers to the same data (from 12288 to 12350).

```
80 FORT=2040TO2047:POKET,
   192:NEXT
```

Define constants:

```
90 V=53248:X=157:Y=129:K=255:
   V1=54276:VF=54273:M=79
```

V is the important first memory register of the 64's sprite-controlling chip. Many other registers will be addressed as an offset of V. X and Y are the starting horizontal and vertical coordinates for all eight sprites. V1 and VF are voice 1's control and high-frequency registers, respectively.

We'll stop here for this month. Next month I'll explain M and K and finish the program.

Now, you may recall that way back in March I challenged you to send me some examples of programs that use NOT. Thinking that the mailbox wouldn't yield many responses, I shrugged off NOT as a keyword of minimal interest.

I was wrong. Apparently, there

are those of you who actually use NOT in your BASIC programming. Several people wrote to explain how they use the NOT statement in various ways. Thanks for the feedback, which I always welcome.

Walt Schumacher, a computer teacher at St. Ferdinand School in Florissant, Missouri, sent in perhaps the clearest and best documented use of the NOT logical operator. He writes:

"My use of NOT stems from seeing its real-world analogy: the ON/ OFF push button. To utilize this function, one must be aware that on Commodore machines, 0 stands for false, and −1 stands for true. I used this feature recently to toggle between upper- and lowercase for a keyboard practice program."

Here's a slightly revised version of Walt's program.

```
10 BIG=0:CASE=53272: UP=21:DOWN=23
20 PRINT CHR$(147)
30 FOR T=1 TO 11:PRINT:NEXT
40 PRINT TAB(10)"WATCH THIS MESSAGE!
150 BIG=NOT BIG:REM TOGGLE
160 IF BIG THEN POKE CASE, UP
170 IF NOT BIG THEN POKE CASE, DOWN
180 FOR DELAY=1 TO 400:NEXT
190 GOTO 150
```

Line 10 defines the variable BIG and the constants CASE, UP, and DOWN. In the 64 and 128, memory register 53272 controls, among other things, whether your monitor or TV screen displays upper- or lowercase lettering. POKEing 21 (UP) or 23 (DOWN) to that register determines whether the computer prints in upper- or lowercase, respectively.

Lines 20–40 clear the screen, center the cursor vertically on the screen, and print a message.

Line 150 contains the ON/OFF toggle switch. BIG takes turns having the value 0 or −1. If BIG is 0, for instance, NOT BIG changes it to −1, and vice versa.

Lines 160 and 170 evaluate BIG and alternately POKE 53272 with either 21 or 23. If BIG=0, the message switches to lowercase; if BIG=−1, the message switches to uppercase. Thanks, Walt, for shedding more light on NOT. ⊡

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D'IVERSIONS

FRED D'IGNAZIO

MAKING FRIENDS WITH COMPUTER AGENTS

Eight years ago I wrote a column in *COMPUTE!* magazine detailing how people could program their own "computer friends" inside their home computers. A computer friend was a program written in BASIC. When the program began running, the friend would come to life inside your computer and have a conversation with you. You could name the friend, teach it your name, and give it personality traits, special interests, and lovable quirks. You could even program the friend to tell your favorite jokes.

The idea for a computer friend came from my habit of naming my cars. Over the years I have gone through several cars, each with its own name (like George, Eric the Orange, Mishy Kiku, and Peppy) and each with its unique personality. I began thinking that if cars could have names and personalities, then so could computers. You can decorate your car and give it a personality all its own, so you should be able to program a computer to act as your friend.

I was also inspired by a famous artificial intelligence (AI) program called *Eliza* written by MIT computer scientist Joseph Weizenbaum. When you sat down at the computer, *Eliza* would act like a psychoanalyst trying to get to know a new patient. The session would start with *Eliza's* asking you some friendly questions, such as *What is your name?* and *Do you have any brothers or sisters?*

You would type in answers, and *Eliza's* questions would start getting more and more personal. Before you knew it, you would be telling "her" all sorts of extremely private things, such as how you felt about your mother and father, if you had ever been mean to your cat, and other secrets. Even world-famous computer scientists would sit down and begin chatting with *Eliza,* telling her embarrassing personal tidbits that they wouldn't dare share with another human being.

In my column I challenged *COMPUTE!*'s readers to invent their own computer friends. The readers' response was unbelievable. I received hundreds of letters and over five dozen disks in the mail, each with its own customized "Friend" program written in BASIC and each with its own special design. Many of the programs printed out a picture of the computer friend. Some of the computer friends were good at reciting poetry, puns, and odd bits of trivia. Others had a special knowledge of comic-book heroes, offbeat movies, science-fiction books, and rock music.

Each time I ran one of the readers' friend programs, I felt I was meeting a new person, and in a funny way I knew that the friend was a reflection of the human who invented it (just as my cars were a fun house–mirror reflection of me). I came to think of the computer friends as if they were sidekicks of their inventors, like the dummy Charlie McCarthy and his creator Edgar Bergen or Kermit the Frog and Jim Henson.

I wrote several columns featuring many of the best computer friends that readers sent in. Interest in computer friends was high for many months, but eventually it faded.

Recently a new type of computer friend has become popular. These new friends are called *agents.* An agent is a program, as the computer friend was. Its job is to "live" inside your computer. Whenever the computer is turned on, the computer agent does special chores for you.

What chores does an agent do? It can automatically sign onto your online information services and bulletin boards and assemble a personalized electronic newspaper for you out of news stories and data it has collected overnight, concerning topics especially interesting to you. It can print out this newspaper, and you can read it at the breakfast table before you leave for school or work.

What else can an agent do? If your computer were wired into some household appliances, your agent could do things like shut the house lights off and on when you wanted, start coffee brewing in the morning, or turn on the VCR and TV whenever your favorite program came on. It could play your stereo system, print out messages to remind you of your best friends' birthdays, and even play games with you.

Thanks to the growing popularity of agents, it's time to take another look at computer friends. What kind of agent or friend would you invent? Would your agent have human characteristics, or would it resemble an animal, a robot, an alien, or something completely different? What sorts of tasks would you assign to your agent? What machines would it control for you? Would your agent have a name? A fictitious past? Some favorite computer jokes? Would your agent be reliable and trustworthy? Or fickle and unpredictable? Would it be fun-loving and a practical joker or an awful nag?

Please send me your ideas. I'll gather a few of the best ideas and publish them in one of my upcoming columns. Mail your letter to Fred D'Ignazio, COMPUTE Publications, 324 West Wendover Avenue, Greensboro, North Carolina 27408.

Meanwhile, be on the lookout for real computer agents living inside your machine. According to software publishers, agents will be designed into most of the new computer programs reaching the market in the future. When you buy a piece of software, you'll get a free, built-in agent along with it! ⊡

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MACHINE LANGUAGE

JIM BUTTERFIELD

THE 128 MLM: BANK ON IT

In its favor, the Commodore 128 comes with a built-in machine language monitor (MLM) with many attractive features. If a program crashes, just hold down the Run key and press the reset button. The computer will recover into the MLM so you can investigate the cause of the problem. The BASIC SYS command allows values to be preset for the A, X, Y, and status registers. BLOAD and BSAVE are big BASIC improvements.

On the negative side, 128 BASIC can relocate. Also, special code and new system calls are needed to reach data or a subroutine across banks. The interrupt has so many jobs—such as graphics, animation, and sound—that it's easy for new code to conflict with built-in operations.

The bank system makes it hard to put code higher than location $3FFF. Beginners are advised to place ML programs below $4000 and stay in bank 15. That way, you can SYS to the ML program from BASIC and use a JSR to call subroutines in the Kernal.

What happens if you try to put code at higher addresses? Suppose you wish to locate a program at $6000. The trouble is that, if BASIC stays in its normal bank 15 state, a call to $6000 (SYS 24576) wouldn't take your program to RAM but to the overlaying ROM containing the BASIC interpreter. Bank 15 configures RAM from $0000 to $3FFF, ROM from $4000 to $CFFF, I/O chips from $D000 to $DFFF, and ROM from $E000 to $FFFF. The program at $6000 wouldn't be visible.

The obvious solution—enter the command BANK 0 before the SYS call—usually ends in disaster. The SYS gets to your program, but when your program calls a Kernal routine such as BSOUT at $FFD2 for printing, the ROM's gone! Instead, the program arrives at empty RAM in Bank 0 and gets lost. Even if you somehow transfer valid program code into that area, you can't achieve output since the I/O chips are no longer accessible.

What you need is a configuration that will give you RAM from $0000 to $BFFF, Kernal ROM from $C000 to $CFFF and $E000 to $FFFF, and I/O chips in the $D000 to $DFFF slot. No bank number gives you this; bank 12 is sometimes used to produce a similar effect, but it's not the best way.

You can produce the desired configuration by a direct store to address $FF00; a value of decimal 14 stored there will do the job. But you can't do that from BASIC. That powerful POKE to address $FF00 would make the BASIC interpreter itself disappear!

The solution is to use BASIC to select BANK 0 to make your program visible so you can SYS to it. Once the program starts, it puts $0E into address $FF00, reconfiguring to the desired map. It's a good idea to restore the configuration to Bank 0 just before the program returns to BASIC, so BASIC will be there waiting when control is returned to it, thus preventing a crash. Bank 0 can be restored by storing $3F into $FF00.

Here's a simple 128 program to print HELLO! to the screen just to show how a program may be positioned above the $4000 barrier. BASIC will have set up BANK 0 before the call to $6000 (the program's location). The program's first task is to make sure the Kernal ROM and I/O chips are accessible.

```
6000  LDA  #$0E     ;"special" config
6002  STA  $FF00
6005  LDX  #$00
6007  LDA  $6018,X
600A  JSR  $FFD2
600D  INX
600E  CPX  #$07
6010  BNE  $6007
```

The string HELLO!, followed by a carriage return, is printed from a buffer to be established at $6018. Now restore the original configuration (bank 0, value $3F in $FF00).

```
6012  LDA  #$3F     ;restore config
6014  STA  $FF00    ; ("BANK 0")
```

You return to BASIC with the RTS command. It seems a little odd that you can go back to BASIC when the Bank 0 configuration has switched out the BASIC interpreter. Don't worry. The mechanism of the SYS call takes care of all the bank arrangements.

```
6017  RTS
```

The text to be printed ("HELLO") must be stored in memory.

```
6018 48 45 4C 4C 4F 21 0D 00
```

It takes a while to get used to the architecture of the 128, but with careful planning it all works well.

You could enter the program using the built-in monitor, but here's a BASIC program to do the job.

```
100 DATA 169,14,141,0,255,162,0
110 DATA 189,24,96,32,210,255
120 DATA 232,224,7,208,245
130 DATA 169,63,141,0,255,96
140 DATA 72,69,76,76,79,33,13
150 BANK 0
160 FOR J=24576 TO 24606
170 READ X:T=T+X
180 POKE J,X
190 NEXT J
200 IF T< >3605 THEN STOP
210 BANK 15
300 BANK 0
310 SYS 24576
320 BANK 15
```

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FEEDBACK

QUESTIONS FROM OUR READERS

A Dynamic Loader

Recently, I was going through one of your back issues and found a program similar to the one below.

```
CE 10 POKE 184,2:POKE 185,0:PO
      KE 186,8
KG 20 INPUT "FILENAME";N$:IFLE
      N(N$)>16THEN20
FQ 30 INPUT "STARTING ADDRESS"
      ;S:IFS<0ORS>65535THEN30
KG 40 POKE 183,LEN(N$):POKE 18
      7,0:POKE 188,2
XK 50 FOR I=1 TO LEN(N$):POKE
      {SPACE}511+I,ASC(MID$(N$
      ,I,1)):NEXT I
XK 60 POKE 780,0:POKE 781,S-IN
      T(S/256)*256:POKE 782,IN
      T(S/256)
CE 70 SYS 65493:IFST<>64THENPR
      INT"FILE NOT FOUND"
```

It POKEs a few numbers into memory and then SYSs to an address. When I run it, it loads a program into a selected memory area.

I've seen programs similar to this one in other magazines. Could you explain to me the principles behind this program and how it might be used?

JERRY HALLETT
STOCKTON, NY

The program uses the Kernal LOAD routine to load a file beginning at a specific address. The three POKES in line 10 set the logical file number, secondary address, and device number as you would for an OPEN command. (The equivalent OPEN command would be OPEN 2,8,0.) Lines 20 and 30 request the filename and the file's starting address from the user. The first POKE in line 40 sets the length of the filename, and the other two represent the address (512) of the filename in low-byte/high-byte format. Line 50 actually stores the filename in locations 512–527.

Line 60 sets the 6502's registers to prepare for calling the Kernal LOAD routine. The first POKE sets the accumulator to 0 to tell the routine to perform a load. (Placing a 0 in the accumulator would cause the routine to verify.) The next two POKEs store the low and high bytes of the starting address into the X and Y registers, respectively. Line 70 calls the Kernal routine and then checks for an error after it has returned.

You didn't mention a save routine in your letter, but we've included one to demonstrate how to call the Kernal's SAVE routine from BASIC.

```
QH 10 DV=8:INPUT "FILENAME";N$
      :OPEN15,DV,15:OPEN1,DV,1
      ,N$+",P,W"
JA 20 INPUT#15,EN:IFEN<>0THENP
      RINT"DISK ERROR":GOTO70
FQ 30 INPUT "STARTING ADDRESS"
      ;S:IFS<0ORS>65535THEN30
SR 40 INPUT "ENDING ADDRESS";E
      :IFE<SORE>65535THEN40
KS 50 POKE 193,S-INT(S/256)*25
      6:POKE 194,INT(S/256)
PE 60 POKE 174,E-INT(E/256)*25
      6:POKE 175,INT(E/256):SY
      S62957
KM 70 CLOSE1:CLOSE15
```

Line 10 inputs the filename from the user and attempts to open it. Line 20 checks to see whether the open was successful. Lines 30 and 40 get the starting and ending addresses for the file from the user. Line 50 sets a pointer to the starting address while line 60 sets the pointer to the ending address and calls the routine. Line 70 closes the file after the save.

Big CPU in the Sky

In your recent article "Into the Crystal Ball" (June 1990), many people blamed software companies or the market for the declining interest in the 64. They blamed everything except what's really wrong. It's hardware, not software or the market. The main problem is that the 64 isn't attractive anymore. The 64 has already died and gone to the big CPU in the sky.

I've had a 64 for close to ten years, but it lacks hardware capabilities. It should be taken into the factory and given a total overhaul. When it comes out, it should have 256K of ROM, an operating system that takes up minimal space in memory, a faster CPU, 64K or 128K of video RAM, a ramdisk, and a built-in program that would still let it run conventional 64 software.

It may sound like I have MS-DOS in mind, but the 64 has to have some sort of hardware enhancement and a true operating system.

C. SYMONDS
BECKENHAM, W.A.
AUSTRALIA

No Joy

I am writing out of sheer frustration regarding your *MLX* program. I have tried to enter this program with and without *The Automatic Proofreader,* and in both instances line 130 gives no joy. Please help!

It is also noted that *The Automatic Proofreader* program printed in my December 1989 *Gazette* is different from the ones printed after. I have tried to load both, and only the December one works. The big question is, is it me or my overgrown calculator?

ALAN CULPH
MOOROOLBARK, VIC.
AUSTRALIA

Alan, we checked line 130 of MLX *with several versions of* The Automatic Proofreader, *and we got the correct checksum with all of them. The handwritten sample you provided was missing an equal sign after the L$, but we have no way of knowing whether it was absent from your typed-in version or not.*

Line 130 does contain several points for possible confusion. Where it says S$=" ", there is one space between the quotation marks. It is typed by pressing the quote key, the space bar, and then the quote key again. Where it says T$="{13 RIGHT}", press the quote key and then tap the right Crsr key 13 times before pressing the quote key again. If you press the space bar 13 times, the final result may be the same but your checksum will be different. Be sure to read and familiarize yourself with the instructions on how to type in Gazette programs. ▷

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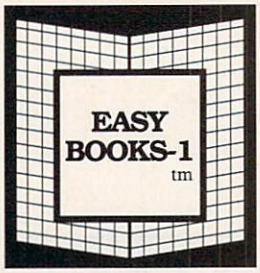

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FEEDBACK

The Automatic Proofreader *has undergone several revisions over the years, and it was changed slightly in January 1990 when we dropped reference to the Plus/4 and 16 computers. It works the same as the earlier version, but you must be careful to enter it correctly since the* Proofreader *can't check itself.*

So It's Your Birthday!

I am 72 and not at all interested in games, but I'm having trouble with a program that shouldn't be too complicated for you smart young fellows. I have a list of 86 names, addresses, and birthdays from my mailing label program, and I'd like a utility to go through the data and select the names and birthdays of all the people born in a particular month. It would be nice to have it print them to the screen or printer.

DON SHEA
LAKE CITY, FL

Here's a simple program that should do what you want, Don. It reads six pieces of information from data statements about each person. The first name, last name, address, phone number, and birth date are all single items; but notice that the city, state, and ZIP code are also listed as one item. For the program to work properly, make certain that you have six entries separated by commas for each data statement. Use a space if you need to leave an item blank.

Once you've entered your data statements, change the value of MAX in line 10 to equal the number of names on your list. Our sample program has only two people; therefore, MAX=2. If you have 86 names on your list, then MAX=86.

```
GM 10 MAX=2:DIM A$(MAX),B$(MAX
      ),C$(MAX),D$(MAX),E$(MAX
      ),F$(MAX),MO$(12)
GE 20 FORX=0TO11:READMO$(X):NE
      XT
PK 30 FOR X=0TOMAX-1:READ A$(X
      ),B$(X),C$(X),D$(X),E$(X
      ),F$(X):NEXT
FE 40 PRINT"{CLR}{WHT}{3 DOWN}
       ENTER MONTH (EXAMPLE:JA
      N)";:INPUT M$
FD 50 IF LEN(M$)>3 THEN 40
MF 60 PRINT"{2 DOWN} PRESS (P)
       FOR PRINTER OR "
PQ 70 PRINT"{7 SPACES}(S) FOR
      {SPACE}SCREEN OUTPUT"
ME 80 GET P$:IF P$=""THEN 80
PB 90 FORX=0TO11:IF M$=MO$(X)
      {SPACE}THEN 120
MH 100 NEXT
CM 110 GOTO40
KM 120 FOR X=0TOMAX-1:IF LEFT$
       (F$(X),3)=M$ THEN GOSUB
       170
XJ 130 NEXT:PRINT "{2 DOWN}
      {RVS}PRESS ANY KEY{OFF}
      "
ER 140 GETA$:IFA$=""THEN 140
CR 150 GOTO40
BG 160 REM ** PRINT ROUTINE **
KB 170 IF P$="P"THENOPEN4,4:CM
      D4
SX 180 PRINT:PRINT
RJ 190 PRINT"NAME:{2 SPACES}";
      A$(X);" ";B$(X)
XD 200 PRINT"ADDR:{2 SPACES}";
      C$(X)
BK 210 PRINT"{7 SPACES}";D$(X)
CD 220 PRINT"PHONE: ";E$(X)
PP 230 PRINT"B'DAY: ";F$(X)
RA 240 IF P$="P"THEN PRINT#4:C
      LOSE4
SG 250 RETURN
SX 260 REM ** NAMES **
PC 270 DATA JAN,FEB,MAR,APR,MA
      Y,JUN,JUL,AUG,SEP,OCT,N
      OV,DEC
PF 280 DATA JOHN A.,DOE,RT 1 B
      OX 123,SILER CITY NC 27
      344,555-0123,AUG 31
KD 290 DATA JANE B.,EDWARDS,RT
       2 BOX 334,PLANT CITY F
      L 32055,555-9876,JAN 10
KC 999 DATA JAN,FEB,MAR,APR,MA
      Y,JUN,JUL,AUG,SEP,OCT,N
      OV,DEC
JS 1000 DATA JOHN A.,DOE,RT 1
       {SPACE}BOX 123,SILER C
      ITY NC 27344,555-0123,
      AUG 31
EM 1001 DATA JANE B.,EDWARDS,R
       T 2 BOX 334,PLANT CITY
        FL 32055,555-9876,JAN
       10
```

Scanning for Scanners

I would like to know if you can help me with a question. I would like to know if there are any companies out there that make scanners that are compatible with the 64. If there are, I'd like the address or information about them.

JOSEPH PATRICK
APO, NY

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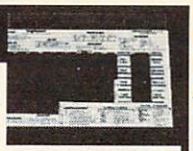

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Circle Reader Service Number 108

Good timing, Joseph. As a matter of fact, COMPUTE *associate editor Robert Bixby takes an in-depth look at a new import from Germany. Read his Gazette article "Take a Scan at This," which is about a handy hand-held scanner designed especially for the 64.*

More about *SpeedScript*

I am wondering if there will be any *128 SpeedScript* enhancements in the future. This has been the best word processor that I have ever used. Simple, but it gets the job done. One program I'd like to see is one that would let me use *SpeedScript 128* with my second disk drive as the data disk and have the necessary POKEs to accomplish this. Also, I would like to have a program that would alphabetize the *128 SpeedCheck* files. I have done this by hand, and it tends to make the spelling checker run a little faster. I'd like the spelling checker accessed by using Ctrl-C. The word under the cursor could be checked with the main program in drive 8.

I enjoy the new format for your magazine, and I'm looking forward to each new issue. I was afraid your magazine would stop the articles on the 8-bit machines. Many people and I think there's a place for a small machine in this world. I'll be watching the pages of Gazette for any response to the ideas I have proposed.

ROBERT HARTLE
TIONESTA, PA

Thanks for the kind words, Robert. Over the years we've been able to add a number of utilities to SpeedScript *to make it even more useful to our readers. A few of those enhancements have come from our staff, but most of them have come as submissions from our readers. By*

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Circle Reader Service Number 161

FEEDBACK

posting your suggestion here, you may inspire someone to develop your ideas and share their programs with us. We're always eager to see SpeedScript *enhancements or other useful programs. Send them to the Submissions Reviewer in care of this magazine. Don't forget that we're also looking for original 64 artwork for "Gazette Gallery," our new on-disk feature.*

EPROM Primer

I am interested in EPROM programming using the 64. I want to know how to manage the memory of a 16-kilobyte or larger EPROM. I've seen this done on cartridges.

MATTHEW HUDSON
DORAN, VA

The EPROM (Erasable Programmable Read Only Memory) chip is a powerful tool in the programmer's arsenal. These chips hold your own programs or code on a cartridge. They can even be used as custom replacements for standard chips that come with the computer.

EPROMs come in several capacities, usually in multiples of 4K (16 CBM disk blocks). The hardware required for customizing and using them is relatively inexpensive and easy to use. It consists mainly of an "eraser," for reinitializing EPROMs during the process of program development, and a "burner," or programmer for putting your code into the chips.

There's a wide variety of cartridge formats for the 64. Some cartridge boards are little more than ROM/EPROM sockets on a plug-in card, while others are sophisticated enough to have their own logic elements. The possibilities vary widely.

For more information about EPROM and cartridge availability and price, as well as devices such as EPROM erasers and burners, write to Jason-Ranheim, 580 Parrott Street, San Jose, California 95112.

A Little Help

Several years ago our school purchased six MicroIllustrator light pens and disks produced by Tech Sketch. Recently, the pens have started to malfunction, and I would like to purchase replacements. Unfortunately, mail to this company has been returned, and no one seems to stock these pens.

I tried the Flexidraw light pens, but they didn't seem to work with the MicroIllustrator program.

Does anyone know who repairs these pens? Does anyone have an old one he or she would like to donate to a school? If you have a new one, I would buy it for a reasonable price.

JOHN SCHICK
NORWALK MIDDLE SCHOOL
64 CHRISTIE AVE.
NORWALK, OH 44857

I am desperate and don't know where to turn. I have been searching in vain for a tractor feed for a Blue Chip D12/10 (or Brother HR10) printer. I would appreciate it if anyone could point me in the right direction.

RAYMOND McALISTER
2215 S. PERKINS AVE.
INDIANAPOLIS, IN 46203

I recently purchased a PET/CBM 8032 with an 8050 dual disk drive. Does anyone have a word processing program, editing program, or spelling checker that will run on this computer? I am interested in public domain programs or software that's reasonably priced. I have tried several user groups without much luck. Please help! I really need a word processor.

JANELLE HARVEY
20 CLAY ST.
DANSVILLE, NY 14437

I have been looking for a *geoPrint* cable as sold by Berkeley Softworks until about three years ago. BSW has discontinued the product, and I am unable to locate it or the alternative Power Print Cable.

Does anyone know where I can buy either of these cables? Perhaps someone could draw me a wiring diagram so I can make one for myself.

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How about it, readers? Can you help these people with their needs?

Do you have a question, comment, or problem? Have you discovered something that could help other Commodore users? We want to hear from you. Write to Gazette Feedback, 324 West Wendover Avenue, Greensboro, North Carolina 27408. We regret that, due to the volume of mail received, we cannot respond individually to questions. ⊡

DANNY ENGLISH

CROWN QUEST

EXPLORE A VAST KINGDOM IN THIS ACTION/ADVENTURE GAME FOR THE 64. JOYSTICK REQUIRED.

Put on your armor and sharpen your sword! The black knight has stolen the king's crown, and it's up to you to get it back. It won't be easy. To solve this intricate puzzle, you must find your way through six castles, 16 rooms, and more than 50 maze screens.

Pick up keys to unlock castles, but watch out! The black knight is waiting for you inside one of them. You must defeat him in order to retrieve the crown, but you're not safe until you slay the dragons.

Getting Started

Crown Quest is written entirely in machine language, so you'll need to use *MLX,* the machine language entry program, to type it in. See "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: 0801
Ending address: 2058

When you've finished typing *Crown Quest,* be sure to save a copy of the program before exiting *MLX.*

Although *Crown Quest* is written in machine language, it loads and runs like a BASIC program. When you're ready to play, plug a joystick into port 2. Load the program and type RUN. *Crown Quest* requires disk access, so don't remove the disk from the drive until you've finished playing.

Playing the Game

In *Crown Quest*, you're a knight of the white castle. Your mission is to find and return the king's crown as quickly as you can. When you run *Crown Quest,* the program will search for a file on the disk named CQ.TIMES. If the file isn't there, it will be written automatically. This file is a record of the best playing times of people who have won the game. Once this file has loaded, the title and the best times are displayed.

Use the joystick to select one of four versions of the game. Each version uses the same *Crown Quest* kingdom, but the objects are located in different places. Game 1 is easiest; game 4, the most difficult.

Play begins with your knight standing in front of the white castle, where you must return the crown to win the game. Control the knight with the joystick and begin exploring. The kingdom is connected by a series of rooms with mazes between them. Some of the mazes may be simple, but they can be up to 12 screens large and have many rooms connected to them.

Somewhere in the kingdom is a toll bridge. Once you've crossed it, you enter the realm of the black knight, which consists of two challenging mazes, one room, and the black castle.

There are nine different objects to collect and use as you play *Crown Quest*. These objects appear in the lower left corner of the screen. You press the fire button to pick up an object, but you may carry only one item at a time. You may not drop objects when you're inside a maze. The object you're currently carrying is displayed in the text window at the bottom of the screen. Should you attempt to pick up an object while you're already carrying one, the two will be swapped.

You may find piles of gold worth either 5 or 10 points. Your gold points are displayed at the bottom of the screen. You'll need 50 gold points before you can pay to cross the black knight's toll bridge.

Other objects you may find are castle keys, a sword, a magnet, and the crown. You cannot enter a castle until the gate is open. If the gate is closed, you'll need to find a key that's the same color as the castle. The one exception is the white castle. Since it is already open, you won't need a key to enter it.

When exploring mazes, you may come across dragons flying toward you above the maze. If the dragon hits you, you'll see a flash of bright light. You can sustain only two or three hits in one maze before you're struck down, penalized two minutes, and sent back to the white castle. If you find the sword, you can defend yourself against the dragon.

The Black Knight's Lair

When you cross the toll bridge, 50 gold points will be taken, and you'll enter a corridor that leads to the black knight's kingdom. Once inside the black castle, you'll come face to face with the black knight himself. He stands twice as tall as you, guarding the entrance to a deep, dark, invisible maze—his hiding place for the crown. If you attempt to pass him without a sword, you'll be struck by his mighty fist and sent back to the white castle. Your only hope is to carry your sword, get a long running start, and try to strike him down.

Once past the black knight, you enter the most challenging maze of all. You're surrounded in darkness, but suddenly lightning illuminates the path for an instant. You must find your way through the maze using only the lightning as your guide. When you finally reach the crown, you'll see that the black knight has hidden it inside the maze wall. One of the other ob-

jects in the game can help you take possession of the crown. I won't tell you exactly how to get it out of the wall, but you'll need one of the objects mentioned earlier.

Winning the Game

When you have the crown, take it back to the white castle. The king will congratulate you, and your winning time will be displayed. Press the fire button, and the best-times screen will appear. If your time is better than the current best time for the game you played, you may type in your name. Press Return, and the best-times file will be updated on your disk. If your time did not make the list, the title screen will appear. Press the button to play again.

The first few times you play *Crown Quest*, it may take you more than 20 minutes to get through game 1. Once you've become familiar with a certain game, it becomes much easier to get a decent time. Game 4 should take you about an hour to solve.

To pause the game, press f1. The screen's border will flash different colors to let you know play is suspended. To continue the game, press f1 again. To restart the game completely, press f3.

Without question, the most difficult task in *Crown Quest* is trying to find your way through a maze with a dragon on your tail. The best way to solve this problem is to find the sword first and then to kill the dragon. However, in the more difficult games, you might have to pass through two or three mazes before you locate the sword. When a dragon is in your path, avoid it by backing into the previous maze for a second and then return. This will confuse the dragon and give you more time to escape. Remember that you can survive a couple of dragon hits.

Another challenging aspect of *Crown Quest* is that you can carry only one object at a time. You may find yourself retracing your steps many times during a game. When you cross the toll bridge, you must go back for necessary objects to recover the crown. The best strategy is to remember where you left certain items so you can recover them quickly.

Keep in mind that there are many hidden rooms branching off from the mazes that could contain valuable objects. You may have to explore every passageway in the kingdom before you locate them all. It's not easy to be victorious in your quest for the crown, but when you are, you'll agree it was well worth the adventure.

Crown Quest

```
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0829:B9 0C 08 99 FF 03 88 D0 A1
0831:F7 A9 00 85 2D A9 30 85 F5
0839:2E 4C 00 01 19 B4 03 00 25
0841:30 D1 1E B9 6E 09 99 E8 F0
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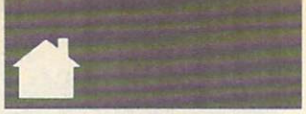

PROGRAMS

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0D91:0A 67 90 50 A2 14 67 90 66
0D99:78 A2 1E 67 90 A0 A2 28 47
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1129:90 3A B0 19 60 4F 05 0A 1E
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1149:A0 CE F1 88 03 90 39 8F 92
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1179:B0 8A 6C 49 96 40 31 9A 6B
1181:FC 8D D5 0B 17 FF 8D 0F D3
1189:46 1D 12 D4 AD 1B D4 DC 06
1191:09 D2 4F C9 7F 90 4D FF 4C
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11C9:03 0A 80 38 85 18 25 26 80
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1211:48 C1 91 A9 0F 2E 81 11 DB
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1241:06 92 A2 0E 83 0D 0A 30 D6
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1289:8F BC C0 1F 94 C6 B1 57 29
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12A9:C9 B9 B0 03 4A 85 C2 B2 08
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12B9:B1 12 76 0B 60 55 4E E0 90
12C1:FF C5 29 BD 46 01 A2 45 19
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12D9:C2 30 85 FB AD 2C 85 FC 02
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12F9:57 A5 FB 20 9C 51 AC AA E2
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13C1:2A 02 02 8D 07 BB C8 E0 30
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13D1:02 18 43 81 8D 05 60 04 C4
13D9:80 8D 06 46 21 8D 04 60 70
13E1:04 0A 8D E4 A9 14 8D 00 45
13E9:D4 A0 14 00 FC A3 AB 49 3C
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PROGRAMS

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1439:C0 19 20 54 55 52 4E 45 27
1441:44 85 59 48 45 20 43 52 20
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1689:0C 7C 49 5B 07 74 5E 33 B3
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2011:C7 F0 03 FC 92 F4 86 0E 25
2019:0F 83 39 06 32 02 A0 04 28
2021:0A 1C EE 70 3A 81 08 44 7E
2029:20 0C 44 60 0E EE 86 0B 4F
2031:E0 0F FF E0 94 05 71 08 57
2039:07 FF C0 00 94 07 FE FE D2
2041:FE 00 EF EF EF 00 EE EE 4A
2049:EE 9B 7C 20 F7 00 7F 00 38
2051:53 A0 18 18 18 3C 18 00 C9
```

ONLY ON DISK

There's something new on the *Gazette Disk*. In addition to the type-in programs found in each issue of the magazine, we're putting more features and programs every month on the *Gazette Disk*. Check out the original 64 and 128 artwork on display in "Gazette Gallery," and look for our bonus programs as well. These programs and their instructions appear only on disk. Here are descriptions of this month's bonus programs.

AFK

Ben Campbell

AFK (Attack, Fire, Kill) is a two-player shoot-'em-up written in machine language. Players guide their attack helicopters from a split-screen perspective through a maze of caverns in this aerial game of hide-and-seek.

Sprite Grabber

Hubert Cross

Sprite Grabber allows you to grab sprites and save them to disk as BASIC data statements, assembly language .BYT statements, or an ML file.

Sprite Album

Hubert Cross

Sprite Album is a database for storing sprites you've collected. Besides storing, you can edit and animate the sprites, too.

PROGRAMS

GARY DUGGERT

STOCK MARKET 128

BECOME A MILLIONAIRE IN THIS FASCINATING ONE- OR TWO-PLAYER STOCK MARKET SIMULATION FOR THE 128

The secret to making money on the stock market is simple: Buy low and sell high. The trick is picking a stock whose value is going to increase after you've bought it. Here's your chance to become a Wall Street tycoon in this exciting game for the 128 in 80-column mode.

Stock Market 128 is fast paced and operates entirely from the keyboard or keypad. It requires no skill or knowledge of the actual stock market and will provide you with unlimited hours of family entertainment.

Getting Started

Stock Market 128 is written entirely in BASIC. To avoid typing errors, enter the program using *The Automatic Proofreader*. See "Typing Aids" elsewhere in this section. When you've finished typing, be sure to save a copy of the program to disk.

Each player starts the game with $5,000, and the object is to become a millionaire before your opponent does. Use this bankroll to buy stock from any or all of six stock options that are presented at the start of the game.

Once the main screen appears, the game, just like the actual stock market, is active. Stock values are moving up and down. When you're ready to make your purchases, press either Return or the space bar. You're presented with the option to select player 1 or 2. From there you have the option to buy stock, sell stock, or return to the game.

Since you have no stock at the start of the game, select the buy option. You're then asked which stock you wish to purchase. Choose by selecting the number next to the stock's name. You're then asked how much stock you want to buy. The program tells you how many shares you can purchase depending on the amount of cash you have on hand. You may decide on a diverse portfolio by spreading your money over a number of stocks, or you may invest heavily in just a few.

Because of the instability of the market, stocks can take devastating crashes or make incredible gains in a matter of seconds. You can buy or sell stock at any time by pressing Return or the space bar.

Dividends and bonuses are paid to those who have the foresight to buy into stocks whose worth rises to more than $100 per share, but there's also a risk that the stock will crash and most of the investment will be lost.

If a stock goes broke, all investors lose the monies in that stock, and a new commodity will take its position on the board at a value of $50 per share. Taxes are assessed every 200 updates, which is equivalent to one year's time. Uncle Sam wants 25 percent of the profits (including dividends/bonuses) each year. Game speed can be varied using the + or − keys, and it can be paused by pressing the P key.

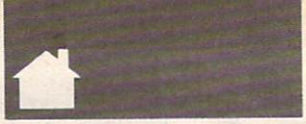
If a player's total net worth declines for three consecutive years, then that player's seat on the stock market is sold. At that point, the game is over, and the opponent is victorious.

Stock Market 128

```
CG 10 REM COPYRIGHT 1990, COMP
      UTE PUBLICATIONS INT'L L
      TD. ALL RIGHTS RESERVED.
CS 20 FAST:WINDOW 0,0,79,24:CO
      LOR6,1:SCNCLR:PRINTCHR$(
      142)
CX 30 PRINTTAB(26)"{3}{D}
      {26 I}{F}"
MH 40 PRINTTAB(26)"{RVS}{K}
      {CYN}{26 SPACES}{3}{OFF}
      {K}
MS 50 PRINTTAB(26)"{RVS}{K}
      {CYN}{2 SPACES}$$ STOCK
      {SPACE}MARKET 128 $$
      {2 SPACES}{3}{OFF}{K}"
QE 60 PRINTTAB(26)"{RVS}{K}
      {CYN}{26 SPACES}{3}{OFF}
      {K}
BS 70 PRINTTAB(26)"{3}{C}{RVS}
      {26 I}{OFF}{V}"
FX 80 A$="COPYRIGHT
      {SHIFT-SPACE}1990 COMPUT
      E PUBLICATIONS INT'L LTD
      ":PRINT"{WHT}{DOWN}":GOS
      UB1160
EC 90 A$="ALL RIGHTS RESERVED"
      :PRINT"{DOWN}{YEL}":GOSU
      B1160
JJ 100 WINDOW 5,13,74,24:SCNCL
       R:PRINT"{CLR}{HOME}";:Y
       =INT(RND(0)*6)+1:Z=1:P=
       0
HB 110 PRINT"{7}{RVS}
       {70 SPACES}"
KM 120 FORX=0TO6:PRINT"{RVS}
       {OFF}{8}+++++++++++++++
       ++++++++++++++++++++++
       ++++++++++++++++++++++
       +++++++{7}{RVS} ":NEXT
FX 130 PRINT"{7}{RVS}
       {70 SPACES}{DOWN}"
RS 140 A$="{3}PRESS ANY KEY TO
        START{6}":PRINTTAB(24)
       A$;
MF 150 PRINT"{HOME}":FORX=1TOY
       -1:PRINT:NEXT:PRINTTAB(
       1)
BF 160 GET A$:IFA$=""THEN170:E
       LSE250
RD 170 X=INT(RND(0)*2):IFY<1TH
       ENY=1:ELSEIFY>7THENY=7
ER 180 IFP=0ANDX=0ANDY=7THENA$
       ="N":X=1:GOTO240
XP 190 IFP=0ANDX=0THENA$="
       {DOWN}M":Y=Y+1:GOTO240
```

PROGRAMS

```
DF 200 IFP=0ANDX=1THENA$="N":G
       OTO240
AE 210 IFP=1ANDX=0THENA$="M":G
       OTO240
HG 220 IF P=1AND X=1ANDY=1THEN
       A$="M":X=0
DD 230 IFP=1ANDX=1THENA$="{UP}
       N":Y=Y-1
GJ 240 PRINTA$;:P=X:Z=Z+1:IFZ=
       69THEN100:ELSEFORQ=0TO1
       10:NEXT:GOTO160
CB 250 FORX=0TO5:READSK$(X):SV
       (X)=50:NEXT:CH(1)=5000:
       CH(2)=5000:OW(1)=5000:O
       W(2)=5000:YR=0:LT$="*":
       UY=6
JM 260 PRINTCHR$(14)"{CLR}
       {HOME}";:DE$=CHR$(27)+"
       Q":COLOR6,1
RQ 270 DATA "SILVER","GOLD","C
       ARS","TRUCKS","TRAINS",
       "PIZZA","SOAP","FURS","
       SOCKS","BEADS","CORN","
       SHEEP","SHIRTS","HOTELS
       ","BUSES","STEEL","OIL"
       ,"COPPER"
GF 280 DATA "NICKEL","BRASS","
       PHONES","PAPER","PANTS"
       ,"MILK"
JS 290 DATA "COFFEE","TIRES","
       RADIOS"
QB 300 WINDOW0,0,79,24:PRINT"
       {CLR}{HOME}"TAB(30)"
       {GRN}CURRENT STOCK VALU
       E{DOWN}"
MG 310 PRINTTAB(15)"{2}0
       {3 SPACES}10{2 SPACES}2
       0{2 SPACES}30{2 SPACES}
       40{2 SPACES}50
       {2 SPACES}60{2 SPACES}7
       0{2 SPACES}80{2 SPACES}
       90{2 SPACES}100 110 120
       "
DE 320 IFRR=0THENFORX=0TO5:COL
       OR5,2+INT(X*1.2):PRINTS
       K$(X)TAB(15)"**********
       **********";TAB(70)"$50
       .00":NEXT:RR=1:GOTO350
EG 330 FORX=0TO5:COLOR5,2+INT(
       X*1.2):PRINTSK$(X)TAB(1
       5);:IFSV(X)=0THENPRINT"
       {G}"TAB(74)SV(X):NEXT:E
       LSEFORY=0TOINT(SV(X)/10
       ):PRINT"****";:NEXT:PRI
       NTTAB(68);
AD 340 PRINTUSING"#$###.##";SV
       (X):NEXT
BG 350 WINDOW 0,10,79,24:SCNCL
       R:PRINTTAB(10)"{6}PLAYE
       R ONE'S ASSETS"TAB(50)"
       {YEL}PLAYER TWO'S ASSET
       S{DOWN}"
KE 360 PRINTTAB(9)"{7}BOUGHT
       {9 SPACES}CURRENT"TAB(4
       9)"BOUGHT{9 SPACES}CURR
       ENT"
RK 370 FORX=0TO5:COLOR5,2+INT(
       X*1.2):PRINTSK$(X);TAB(
       40)SK$(X):NEXT
GX 380 PRINTCHR$(27)+"M";"
       {YEL}";:FORX=0TO5:GOSUB
       540:NEXT
MH 390 WINDOW0,9,79,9:FORZA=0T
       O79:PRINT"*";:NEXT
JH 400 WINDOW0,0,20,0:PRINT"
       {WHT}GAME SPEED =";TS+1
       ;:WINDOW60,0,79,0:PRINT
       "{CLR}{HOME}TAX DUE IN
       {SPACE}-";200-YR:IF RT=
       1 THEN RETURN
JH 410 SLEEP TS:GETA$:IFA$THEN
       420:ELSEGOSUB1530:GOSUB
       1250:GOSUB920:IFYR=0THE
       N300:ELSE GOTO400
QJ 420 IFA$="P"THEN COLOR6,13:
       GETKEYA$:COLOR6,1:GOTO4
       00
KK 430 IFA$="+"THEN TS=TS-1:EL
       SEIFA$="-"THENTS=TS+1
SF 440 IFTS>4THENTS=4:ELSEIFTS
       <0THENTS=0
RD 450 IFA$<>CHR$(13)ANDA$<>CH
       R$(32)THEN 400
DG 460 WINDOW 0,10,79,24:PRINT
       "{CLR}{HOME}{YEL}";:A$=
       "PLAYER 1 OR 2?":GOSUB1
       160
PM 470 FAST:GETA$:IFA$=CHR$(13
       )THEN350:ELSEIFA$=""ORA
       $<"1"ORA$>"2"THEN470
KA 480 P=VAL(A$)
HR 490 WINDOW 0,10,79,24:PRINT
       "{CLR}{HOME}{RVS}{WHT}1
       . {OFF}{2}BUY":PRINT"
       {RVS}{WHT}2. {OFF}{2}SE
       LL":PRINT"{RVS}{WHT}RET
       URN{OFF}{2} FOR GAME"
PS 500 GETA$:IFA$=""THEN500:EL
       SEIFA$=CHR$(13)THEN350
XP 510 A=VAL(A$):IF A<1 OR A>2
        THEN 500:ELSE ON A GOT
       O 630,790
HC 520 LL$="":COLOR5,2+INT(X*1
       .2):WINDOW 15,3+X,79,3+
       X:PRINTDE$:FORY=0TO(SV(
       X)/2.5):LL$=LL$+LT$:NEX
       T:PRINTLL$;
DK 530 PRINTTAB(54);:PRINTUSIN
       G"#$##.##";SV(X):IFRR=>
       2THENRETURN
GE 540 COLOR5,10:WINDOW 10,13+
       X,38,13+X:TV(X,1)=BG(X,
       1)*SV(X):PRINTDE$;:PRIN
       TUSING"####";BG(X,1);:P
       RINTUSING"#$##,###,###.
       ##";TV(X,1)
PA 550 TW(1)=0:FORN=0TO5:TW(1)
       =TW(1)+TV(N,1):NEXT:WIN
       DOW 0,20,38,20:PRINT"
       {7}STOCK VALUE {WHT}";:
       PRINTUSING"#$##,###,###
       .##";TW(1)
ED 560 WINDOW 0,21,38,21:PRINT
       "{GRN}CASH ON HAND{WHT}
       ";:PRINTUSING"#$##,###,
       ###.##";CH(1)
CD 570 FT(1)=TW(1)+CH(1):WINDO
       W 0,22,38,22:PRINT"
       {PUR}TOTAL WORTH {WHT}"
       ;:PRINTUSING"#$##,###,#
       ##.##";FT(1)
JF 580 TV(X,2)=BG(X,2)*SV(X):W
       INDOW 50,13+X,78,13+X:P
       RINT"{2}"DE$;:PRINTUSIN
       G"####";BG(X,2);:PRINTU
       SING"#$##,###,###.##";T
       V(X,2)
EE 590 TW(2)=0:FORN=0TO5:TW(2)
       =TW(2)+TV(N,2):NEXT:WIN
       DOW 40,20,78,20:PRINT"
       {7}STOCK VALUE {WHT}";:
       PRINTUSING"#$##,###,###
       .##";TW(2)
QF 600 WINDOW 40,21,78,21:PRIN
       T"{GRN}CASH ON HAND
       {WHT}";:PRINTUSING"#$##
       ,###,###.##";CH(2)
MB 610 FT(2)=TW(2)+CH(2):WINDO
       W 40,22,78,22:PRINT"
       {PUR}TOTAL WORTH {WHT}"
       ;:PRINTUSING"#$##,###,#
       ##.##";FT(2)
XR 620 RETURN
PG 630 WINDOW0,10,79,24:SCNCLR
       :A$="BUY OPTIONS":COLOR
       5,11:S=(80-LEN(A$))/2:P
       RINTTAB(S)A$"{DOWN}"
QF 640 PRINT"{PUR}STOCK"TAB(15
       )"CURRENT VALUE"TAB(30)
       "AMOUNT OWNED"
XQ 650 FORX=0TO5:PRINT"{WHT}"X
       +1"{LEFT}. ";:COLOR5,2+
       INT(X*1.2):PRINTSK$(X)T
       AB(15);:PRINTUSING"#$##
       .##";SV(X);:PRINTTAB(30
       )BG(X,P):NEXT
XJ 660 WINDOW45,12,79,18:PRINT
       "{2}PLAYER "P" CASH ON
       {SPACE}HAND{2 DOWN}
       {YEL}":PRINTUSING"#$##,
       ###,###.##";CH(P):IFCH(
       P)=<0 THEN GOTO780
PM 670 WINDOW0,22,79,22:SCNCLR
BA 680 PRINT"{1}WHICH STOCK DO
        YOU WISH TO PURCHASE?"
       ;
PK 690 GETA$:IFA$=CHR$(13)THEN
       WINDOW0,10,79,24:SCNCLR
       :GOTO460
BR 700 IFA$<"1"ORA$>"6"THEN690
       :ELSEX=VAL(A$)-1
CS 710 PRINTA$
HC 720 IFSV(X)=0THENPRINT"
       {CLR}{HOME}{6}NOT
       {SHIFT-SPACE}FOR
       {SHIFT-SPACE}SALE":FORZ
       =0TO5:SOUND1,6000,1:SOU
       ND1,0,2:NEXT:SLEEP2:GOT
       O670
GP 730 WINDOW 40,23,79,23:PRIN
       T"{CLR}{HOME}{YEL}MAXIM
       UM AMOUNT AVAILABLE-";I
       NT(CH(P)/SV(X))
HS 740 WINDOW0,23,39,23:B=0:IN
       PUT"{CLR}{HOME}{PUR}HOW
        MUCH DO YOU WANT";B:IF
       B<0THEN 740
CG 750 PR=B*SV(X):IF PR>CH(P)
       {SPACE}THEN PRINT"{CLR}
       {HOME}{3}NOT ENOUGH MON
       EY FOR THAT MUCH!":SOUN
       D1,5000,30,2,3000,500,1
       :SLEEP2:B=0:PR=0:GOTO74
       0
JS 760 BG(X,P)=BG(X,P)+B:CH(P)
       =CH(P)-PR
GF 770 A$="":GOTO630
CE 780 PRINT"{CLR}{HOME}
       {2 DOWN}{3}INSUFFICENT
       {SPACE}FUNDS":PRINT"SEL
       L SOMETHING FIRST!":SOU
       ND1,6000,30:SLEEP2:GOTO
```



PROGRAMS

```
      490
BJ 790 WINDOW0,10,79,24:SCNCLR
       :A$="SELL OPTIONS":COLO
       R5,11:S=(80-LEN(A$))/2:
       PRINTTAB(S)A$"{DOWN}"
HP 800 PRINT"{PUR}STOCK"TAB(15
       )"CURRENT VALUE"TAB(30)
       "AMOUNT OWNED"
CF 810 FORX=0TO5:PRINT"{WHT}"X
       +1"{LEFT}. ";:COLOR5,2+
       INT(X*1.2):PRINTSK$(X)T
       AB(15);:PRINTUSING"#$##
       .##";SV(X);:PRINTTAB(30
       )BG(X,P):NEXT
GJ 820 WINDOW45,12,79,18:PRINT
       "{2}PLAYER "P" CASH ON
       {SPACE}HAND{2 DOWN}
       {YEL}":PRINTUSING"#$##,
       ###,###.##";CH(P)
PA 830 WINDOW0,22,79,22:PRINT"
       {GRN}WHICH STOCK DO YOU
        WISH TO SELL?";:GETA$:
       IFA$=CHR$(13)THENWINDOW
        0,10,79,24:SCNCLR:GOTO
       460
RX 840 IFA$<"1"ORA$>"6"THEN830
       :ELSEX=VAL(A$)-1:PRINTA
       $
EJ 850 IF BG(X,P)=0THENPRINT"
       {CLR}{HOME}{3}YOU DON'T
        OWN ANY OF THAT STOCK!
       ":SOUND1,4291,30,2,2145
       ,2146,2,2048:SLEEP 2:GO
       TO830
HA 860 WINDOW0,23,79,23:B=0:IN
       PUT"{CLR}{HOME}{6}HOW M
       ANY";B:IFB<0THEN910
HX 870 IFB>BG(X,P)THENPRINT"
       {CLR}{HOME}{3}YOU DON'T
        OWN THAT MUCH":SOUND1,
       8583,30:SLEEP2:GOTO860
JF 880 PR=B*SV(X)
HE 890 BG(X,P)=BG(X,P)-B:CH(P)
       =CH(P)+PR
XB 900 GOTO790
MF 910 PRINT"{CLR}{HOME}{3}DO
       {SPACE}I LOOK THAT STUP
       ID! TRY AGAIN.":SOUND1,
       3000,30,1:SLEEP2:GOTO86
       0
CX 920 YR=YR+1:IFYR<200THEN RE
       TURN:ELSE YR=0:COLOR5,1
       :COLOR6,16:SOUND 1,3433
       4,90,0,4291,100,2,2048
SD 930 FORP=1TO2:WINDOW0,0,79,
       24:PRINT"{CLR}{HOME}"
RH 940 A$="UNCLE {RVS}{RED} S
       {SPACE}{WHT} A {7} M
       {BLK}{OFF} WANTS HIS SH
       ARE OF THE PROFITS!":GO
       SUB1160:PRINT"{DOWN}"
RJ 950 A$="PLAYER"+STR$(P):GOS
       UB1160:PRINT"{DOWN}"
AR 960 PRINT"YOU ENDED THIS YE
       AR WITH"TAB(54);:PRINTU
       SING"#$##,###,###.##";F
       T(P)
AD 970 PRINT"YOU STARTED THIS
       {SPACE}YEAR WITH"TAB(54
       );:PRINTUSING"#$##,###,
       ###.##";OW(P)
HG 980 YP=FT(P)-OW(P):
KG 990 IFYP=0THENPRINT"
       {3 DOWN}":A$="YOU CAN'T
       LIE TO US!{2 SPACES}TH
       E IRS IS GOING TO INVES
       TIGATE THIS!":GOSUB1160
       :GOTO1130
EM 1000 IF YP<0THENBEGIN:LY(P)
       =LY(P)+1:WS=3-LY(P):IF
       LY(P)=3THEN1170
BH 1010 A$="{RED}WARNING{BLK}"
       :PRINTCHR$(2);:GOSUB11
       60:PRINT"{2 DOWN}"
BQ 1020 A$="{3 SPACES}THROUGH
       {SPACE}COMPLETE INCOMP
       ETENCE, YOU HAVE MANAG
       ED TO COMPLETELY UNDER
       WHELM THE":PRINTA$
FF 1030 A$="NEW YORK STOCK EXC
       HANGE, EMBARRASSING YO
       UR FRIENDS, NEIGHBORS
       {SPACE}AND RELATIVES.
       {2 SPACES}IF":PRINTA$
CS 1040 A$="THIS UNSEEMLY BEHA
       VIOR CONTINUES FOR"+ST
       R$(WS)+" MORE YEARS, Y
       OUR SEAT ON THE STOCK"
       :PRINTA$
RB 1050 A$="EXCHANGE WILL BE G
       IVEN TO ONE WHO IS MOR
       E WORTHY!":PRINTA$:PRI
       NT"{DOWN}":OW(P)=FT(P)
QF 1060 IFDT(P)>0THENBEGIN:TX=
       INT(DT(P)/4):PRINT"YOU
        DID MANAGE TO COLLECT
        $ {LEFT}"+STR$(DT(P))
       +" IN DIVIDENDS.{DOWN}
       "
DJ 1070 PRINT"LET'S SEE... AH
       {SPACE}YES, A MERE 25%
        FOR UNCLE SAM AMOUNTS
        TO";:PRINTUSING"#$##,
       ###,###.##";TX:CH(P)=C
       H(P)-TX
KX 1080 PRINT"THANK YOU FOR YO
       UR GENEROSITY":BEND:BE
       ND
BA 1090 IFYP<=0THEN1130
MP 1100 TX=INT(YP/4):PRINT"YOU
        HAVE EARNED";TAB(54);
       CHR$(2);:PRINTUSING"#$
       ##,###,###.##";YP:
MP 1110 PRINT"UNCLE SAM WANTS
       {SPACE}HIS 25%, SO THA
       T MEANS YOUR TAXES ARE
       ";:PRINTUSING"#$##,###
       ,###.##";TX:CH(P)=CH(P
       )-TX
AS 1120 PRINT"{2 DOWN}HAVE A N
       ICE DAY!":LY(P)=0
XH 1130 WINDOW0,24,79,24:A$="
       {RED}PRESS ANY TO CONT
       INUE.":GOSUB1160:DT(P)
       =0
CF 1140 GETA$:IFA$=""THEN1140
JK 1150 OW(P)=FT(P):DT(P)=0:NE
       XT:COLOR6,1:RETURN
SP 1160 S=(80-LEN(A$))/2:PRINT
       TAB(S)A$;:RETURN
GG 1170 WINDOW0,0,79,24:SCNCLR
       :COLOR6,3:COLOR5,1
ED 1180 A$="{BLK}PLAYER"+STR$(
       P):GOSUB1160:PRINT
KS 1190 PRINT"{2 DOWN}{BLU}GAM
       E IS OVER FOR YOU.
       {2 SPACES}THE OTHER PL
       AYER BEAT THE PANTS OF
       F OF YOU!"
CA 1200 PRINT"TOO BAD..HAHAHA,
        HE HE .. HAHAHA,..
       {2 SPACES}EXCUSE ME, B
       UT IT IS FUNNY."
MA 1210 PRINT"{3 DOWN}WOULD YO
       U LIKE ANOTHER CHANCE?
       "
SD 1220 GETA$:IFA$="Y"ORA$="N"
       THEN1230:ELSE1220
BP 1230 SLEEP2:PRINT"SORRY BUT
        I CHANGED MY MIND, YO
       U CAN'T HAVE ANOTHER C
       HANCE!"
AA 1240 PRINT"{3 DOWN}GOOD-BYE
       ":SLEEP1:COLOR5,1:COLO
       R6,1:END
CK 1250 X=INT(RND(Y)*6):Y=RND(
       X)*10+1:Z=INT(RND(X)*2
       ):IFZ=1THENY=0-Y
KJ 1260 SV(X)=SV(X)+Y
BQ 1270 IFSV(X)=<0THENSV(X)=0:
       ELSEIFSV(X)=>120THENSV
       (X)=120
BH 1280 IFSV(X)=0THENBEGIN
GD 1290 WINDOW 0,10,79,24:SCNC
       LR:COLOR5,2+INT(X*1.2)
       :A$=SK$(X)+" HAS GONE
       {SPACE}BROKE!":GOSUB11
       60:PRINT"{YEL}"
MC 1300 PRINT"{DOWN}A NEW COMP
       ANY HAS REPLACED THIS
       {SPACE}FAILURE.
       {2 SPACES}ALL STOCKS O
       F THIS COMPANY HAVE BE
       EN"
JK 1310 PRINT"REMOVED FROM YOU
       R PORTFOLIO.{2 SPACES}
       YOU WILL NOTICE THAT I
       F YOU OWNED STOCK IN T
       HIS"
BH 1320 PRINT"YOU NO LONGER OW
       N IT.":BG(X,1)=0:BG(X,
       2)=0:READSK$(X):SV(X)=
       50:WINDOW0,3+X,8,3+X:S
       CNCLR
KP 1330 COLOR5,2+INT(X*1.2):PR
       INTSK$(X):RR=2:GOSUB52
       0
GR 1340 SOUND 1,2000,30,0,0,0,
       1,1000
SH 1350 WINDOW0,20,79,20:COLOR
       5,2+INT(X*1.2):A$="PRE
       SS ANY KEY TO CONTINUE
       ":GOSUB1160:IF UY=>26
       {SPACE}THEN RESTORE:UY
       =0:ELSE UY=+UY+1
XC 1360 GETA$:IFA$=""THEN1360
EB 1370 COLOR6,1:RT=1:GOSUB350
       :BEND
JP 1380 IFSV(X)=0THEN1520:ELSE
        PS=INT(RND(Y)*5):IFSV
       (X)<10ANDPS=3THENSV(X)
       =SV(X)+30:RR=2:GOSUB52
       0:RR=1:SOUND 1,10000,1
       00,0,600,100,3,500
QM 1390 PS=INT(RND(Y)*5):IFPS=
       2ANDSV(X)>100THENBEGIN
       :SV(X)=SV(X)/5:RR=2:GO
       SUB520
JX 1400 FORT=1TO16:COLOR6,T:FO
       RTT=0TO20:NEXT:NEXT:CO
       LOR6,1:SOUND1,9000,120
       ,1,0,20,0,2048:SOUND2,
```

```
        7000,120,1,0,20,0,2048
        :SOUND3,6000,120,1,0,2
        0,0,2048:BEND
SA 1410 IF SV(X)>100THENBEGIN
CM 1420 DV=INT(RND(Y)*10)+10:F
        ORP=1TO2:IFBG(X,P)=0TH
        EN1510:ELSEDX(P)=BG(X,
        P)*DV:CH(P)=CH(P)+DX(P
        )
AF 1430 WINDOW0,10,79,24:SCNCL
        R:A$="{7}PLAYER"+STR$(
        P):GOSUB1160:PRINT"
        {WHT}{3 DOWN}"
DX 1440 PRINT"YOU OWN "BG(X,P)
        " PIECES OF "SK$(X)".
        {2 SPACES}THEY ARE WOR
        TH";TAB(60);:PRINTUSIN
        G"#$##,###,###.##";BG(
        X,P)*SV(X)
CA 1450 PRINT"{DOWN}YOUR COMPA
        NY IS PAYING YOU A DIV
        IDEND OF";TAB(60);:PRI
        NTUSING"#$##,###,###.#
        #";DX(P)
DC 1460 IFSV(X)=120THENDB=BG(X
        ,P)*25:CH=CH+DB:DT(P)=
        DT(P)+DB:PRINT"{DOWN}F
        OR YOUR LOYALTY TO THE
         COMPANY,":PRINT"YOU R
        ECEIVE A SPECIAL BONUS
         OF";TAB(60);:ELSEGOTO
        1480
HP 1470 PRINTUSING"#$##,###,##
        #.##";DB
MQ 1480 PRINT"{DOWN}DON'T SPEN
        D IT ALL IN ONE PLACE!
        "
DX 1490 WINDOW 0,23,79,23:A$="
        {CYN}PRESS ANY KEY":GO
        SUB1160:RR=3:GOSUB520
DD 1500 GETA$:IFA$=""THEN1500
SP 1510 NEXT:BEND:IFRR=3THENRT
        =1:GOSUB350:RT=0:RETUR
        N
BQ 1520 IFRT=1THEN RT=0:X=X-1:
        RETURN:ELSE IFRR>1THEN
        RR=1:RETURN:ELSE RR=1:
        GOSUB520:RETURN
AG 1530 FORP=1TO2:IFFT(P)<100
        {SPACE}THEN BEGIN
FS 1540 WINDOW 0,0,79,24:COLOR
        6,13:SCNCLR
JB 1550 A$="{BLU}PLAYER"+STR$(
        P):GOSUB1160:PRINT"
        {BLK}{2 DOWN}"
CM 1560 PRINT"YOUR TOTAL WORTH
         HAS DECLINED TO LESS
        {SPACE}THAN $100.00.
        {2 SPACES}WE REGRET, (
        HEHEHE),"
DP 1570 PRINT"TO INFORM YOU TH
        AT YOUR SEAT ON THIS E
        XCHANGE HAS BEEN SOLD!
        {2 SPACES}PLEASE SHAKE
        "
GH 1580 PRINT"THE WINNER'S HAN
        D ON YOUR WAY OUT THE
        {SPACE}DOOR, AND DON'T
         SLAM IT!{3 DOWN}"
RE 1590 SOUND 1,6000,60:RR=3
QA 1600 A$="{RVS}{WHT} PRESS A
        NY KEY ":GOSUB1160
HC 1610 GET A$:IFA$=""THEN1610
        :ELSE RUN
SH 1620 BEND
AF 1630 IF FT(P)=>1000000.00TH
        ENBEGIN:WINDOW0,0,79,2
        4:SCNCLR
HK 1640 A$="{3}PLAYER"+STR$(P)
        :GOSUB1160:PRINT"{2}
        {3 DOWN}"
JA 1650 PRINT"CONGRATULATIONS!
        {2 SPACES}YOU ARE A MI
        LLIONAIRE.{2 SPACES}GO
         AHEAD AND SHAKE THE L
        OSER'S HAND."
HM 1660 PRINT"HE NEEDS THE COM
        FORT AFTER SUCH A CRUS
        HING DEFEAT.{2 SPACES}
        WELL DONE, NOW GET UP
        {SPACE}OUT"
RH 1670 PRINT"OF THAT CHAIR AN
        D LET SOMEONE ELSE PLA
        Y FOR A WHILE.":CH(P)=
        5000:FORZ=0TO5:BG(Z,P)
        =0:NEXT
JD 1680 SOUND1,9000,180,2,100,
        1000,0,100
PX 1690 PRINT"{3 DOWN}{YEL}":A
        $="PRESS ANY KEY":GOSU
        B1160
JQ 1700 GETKEYA$:RUN
FQ 1710 BEND
KQ 1720 NEXT
CQ 1730 RETURN
HP 1740 WINDOW0,0,79,24:PRINT"
        {CLR}{HOME}"
QR 1750 PRINTERR$(ER);EL
HS 1760 END
```

HUBERT CROSS

FUSE

ADDING FUEL TO THE FIRE IS THE WHOLE IDEA BEHIND THIS BURNING ARCADE GAME FOR THE 64. JOYSTICK REQUIRED.

Lengths of fuse have been laid out in overlapping patterns on a playing screen of movable tiles. Your job, once the fuse has been lit, is to join lengths of fuse in order to keep the flame burning for as long as possible

Like many other puzzles, *Fuse* appears deceptively simple at the beginning, but it grows in complexity as the game progresses. You find that quick thinking and careful planning yield the highest scores.

Getting Started

Fuse is written entirely in machine language, but it loads and runs as a BASIC program. You'll need *MLX*, the machine language entry program, to type it in. See "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: 0801
Ending address: 15F0

After you've entered all the data for *Fuse*, save a copy to disk before exiting *MLX*. When you're ready to play, plug a joystick into port 2, load *Fuse*, and type RUN. Press the fire button to start playing.

The object of *Fuse* is to keep the flame burning for as long as possible. Help the flame stay alive by moving the tiles with the joystick. The longer you manage to keep it going, the higher your score. The game ends when the flame runs out of fuse or when it reaches one of the borders.

Don't wait until the flame is about to run out of fuse to start moving. Look ahead and follow the fuse to its end; then move to that area and maneuver the tiles to create the longest possible path. You won't be able to keep it going forever, but the longer you do, the more points you receive. As the flame travels, the fuse is burned up, leaving only a blank tile behind. So you must continuously shuffle the tiles around to keep the flame lit.

Sometimes it's a good idea to make the flame change paths by waiting beside a tile and moving that tile when the flame is on it. You'll have to be fast, though, because you'll lose if the flame reaches the tile's border before the tile stops moving.

PROGRAMS

Fuse

```
0801:0A 08 00 00 9E 32 30 36 6C
0809:31 00 00 00 BA 8E 12 08 ED
0811:A2 00 9A A2 00 A9 00 9D 34
0819:00 50 E8 D0 FA A9 3C 8D EB
0821:53 50 AD EF 15 8D 59 50 85
0829:A9 05 8D 55 50 A9 05 8D 17
0831:56 50 A9 0B 8D 57 50 A9 7A
0839:DF 8D FB 07 A9 CF 8D F9 2E
0841:07 20 81 FF A9 1F 8D 18 0A
0849:D0 A9 D8 8D 16 D0 A9 01 68
0851:8D 20 D0 A9 00 8D 21 D0 2E
0859:A9 0E 8D 22 D0 A9 06 8D 5C
0861:23 D0 A9 EE 8D 1C D0 A9 83
0869:0E 8D 25 D0 A9 01 8D 26 28
0871:D0 A9 07 8D 27 D0 A9 06 E3
0879:8D 28 D0 A9 06 8D 29 D0 98
0881:A9 06 8D 2A D0 A9 06 8D 03
0889:2C D0 A9 06 8D 2D D0 A9 E5
0891:06 8D 2E D0 20 0F 10 20 58
0899:8F 10 20 39 0F A9 09 8D CB
08A1:86 02 20 44 E5 A2 77 A9 10
08A9:00 9D 3D 13 CA 10 FA A9 30
08B1:0A 8D 72 13 A9 05 8D 4C 72
08B9:50 A9 04 8D 4D 50 A0 27 C9
08C1:A9 02 20 71 0C A0 27 A9 1D
08C9:01 20 71 0C 20 F0 12 20 5A
08D1:0A 0D A9 02 20 65 0D AD DD
08D9:00 DC 29 10 D0 F9 A9 03 0C
08E1:20 65 0D 78 A9 3E 8D 14 F9
08E9:03 A9 0A 8D 15 03 58 A9 0F
08F1:D0 8D 20 50 A9 06 8D 28 7F
08F9:50 A9 08 8D 30 50 20 F7 71
0901:0C 20 CE 0B A9 0F 8D 15 65
0909:D0 20 60 0C 20 DC 0D F0 D7
0911:F8 AD 4C 50 18 79 51 0B ED
0919:C9 0C B0 ED 8D 4E 50 AD FB
0921:4D 50 18 79 55 0B C9 0A FC
0929:B0 DF 8D 4F 50 8C 1E 0A 2D
0931:AD 4E 50 AC 4F 50 18 79 E7
0939:33 13 A8 B9 3D 13 8D 62 0E
0941:50 8C 63 50 AD 4E 50 CD 25
0949:55 50 D0 0B AD 4F 50 CD FD
0951:56 50 D0 03 4C C4 09 AC 21
0959:62 50 B9 3E 0B 8D FE 07 5F
0961:B9 48 0B 8D FD 07 A9 DF DB
0969:8D FF 07 A2 07 20 A6 0C 5F
0971:CA E0 04 D0 F8 AD 15 D0 28
0979:09 E0 8D 15 D0 AC 63 50 9B
0981:A9 0A 99 3D 13 20 F0 12 FE
0989:A9 07 8D DA 0A 20 1D 0A A6
0991:20 60 0C AD 50 50 D0 F8 86
0999:AD 4C 50 AC 4D 50 18 79 BF
09A1:33 13 A8 AD 62 50 99 3D C6
09A9:13 AD 4E 50 8D 4C 50 AD 6B
09B1:4F 50 8D 4D 50 20 F0 12 FC
09B9:AD 15 D0 29 1F 8D 15 D0 BE
09C1:4C 0A 09 AC 63 50 B9 3D 75
09C9:13 48 A9 0A 99 3D 13 20 55
09D1:F0 12 AD 4C 50 AC 55 50 8B
09D9:8D 55 50 8C 4C 50 AD 4D 27
09E1:50 AC 56 50 8D 56 50 8C 0A
09E9:4D 50 A9 03 8D DA 0A 20 28
09F1:1D 0A 0E 54 50 90 03 20 07
09F9:14 0D AD 5B 50 30 1A AD E9
0A01:50 50 D0 EE AD 55 50 AC 6A
0A09:56 50 18 79 33 13 A8 68 96
0A11:99 3D 13 20 F0 12 4C 0A 18
0A19:09 4C 70 0B A0 00 B9 29 25
0A21:0B 8D 48 50 B9 2D 0B 8D 52
0A29:49 50 B9 31 0B 8D 4A 50 B3
0A31:B9 35 0B 8D 4B 50 B9 39 F1
0A39:0B 8D 50 50 60 A2 07 BD 9E
0A41:30 50 F0 16 DE 40 50 D0 6A
0A49:11 9D 40 50 DE 38 50 F0 C3
0A51:06 FE F8 07 4C 5B 0A 20 BB
0A59:F7 0C CA 10 E2 0E 5C 50 1F
0A61:90 07 A9 00 8D 5A 50 F0 1C
0A69:22 AD 5B 50 30 2F CE 59 9F
0A71:50 D0 2A AD EF 15 8D 59 4A
0A79:50 EE 5A 50 AD 5A 50 CD 07
0A81:F0 15 90 07 A9 80 8D 5B 9B
0A89:50 30 12 AC 5A 50 B9 F1 58
0A91:15 8D 5D 50 B9 05 16 8D DF
0A99:5E 50 20 85 0C CE 53 50 DF
0AA1:D0 29 A9 3C 8D 53 50 EE AA
0AA9:51 50 D0 03 EE 52 50 A9 CF
0AB1:80 8D 54 50 AC 51 50 CC 11
0AB9:ED 15 AD 52 50 ED EE 15 12
0AC1:90 09 8C ED 15 AD 52 50 25
0AC9:8D EE 15 AD 50 50 F0 39 BC
0AD1:CE 50 50 A9 03 8D 64 50 6D
0AD9:A2 07 BD 10 50 18 6D 48 BF
0AE1:50 9D 10 50 BD 00 50 6D 88
0AE9:49 50 9D 00 50 BD 18 50 64
0AF1:18 6D 4A 50 9D 18 50 BD 67
0AF9:08 50 6D 4B 50 9D 08 50 E1
0B01:20 B8 0C CA CE 64 50 D0 FC
0B09:D1 AD 5D 50 18 6D 01 50 EC
0B11:69 FF 8D 00 50 AD 5E 50 D3
0B19:18 6D 09 50 69 FA 8D 08 17
0B21:50 A2 00 20 B8 0C 4C 31 C9
0B29:EA 00 00 80 80 00 00 00 C0
0B31:FF AA 55 00 00 00 FF 00 9C
0B39:00 18 18 18 18 DA DB D7 95
0B41:DA DE DB DE D8 DE DE DC C2
0B49:DD D9 DE DC DE DD DE D9 74
0B51:DE 00 00 FF 01 FF 01 00 E0
0B59:00 14 20 2C 38 44 50 5C 0B
0B61:68 74 80 8C 98 42 52 62 76
0B69:72 82 92 A2 B2 C2 D2 78 94
0B71:A9 31 8D 14 03 A9 EA 8D BD
0B79:15 03 58 A9 01 20 65 0D E0
0B81:20 E4 FF C9 4E F0 07 C9 8B
0B89:59 D0 F5 4C 11 08 20 81 6E
0B91:FF 4C 86 E3 20 49 0C BD C5
0B99:E5 14 99 3D 13 20 F0 12 BB
0BA1:AD 15 D0 29 F1 8D 15 D0 41
0BA9:AE 58 50 AD 55 50 18 7D AB
0BB1:11 15 C9 0C B0 B9 8D 55 6C
0BB9:50 AD 56 50 18 7D 3D 15 79
0BC1:C9 0A B0 AB 8D 56 50 BD 34
0BC9:69 15 8D 57 50 20 49 0C A2
0BD1:BD C5 13 30 9A A8 B9 1D A5
0BD9:14 85 FB B9 2B 14 85 FC 28
0BE1:A0 00 B1 FB 8D F0 15 85 1E
0BE9:02 C8 B1 FB 99 F0 15 C6 AA
0BF1:02 D0 F6 BD F1 13 A8 B9 DE
0BF9:1D 14 85 FB B9 2B 14 85 3C
0C01:FC A0 00 B1 FB 8D 04 16 0F
0C09:85 02 C8 B1 FB 99 04 16 FC
0C11:C6 02 D0 F6 BD 95 15 20 25
0C19:DE 0C BD C1 15 8D FA 07 53
0C21:A2 03 AC 55 50 B9 5A 0B 5F
0C29:9D 00 50 AC 56 50 B9 66 B2
0C31:0B 9D 08 50 20 B8 0C CA 03
0C39:D0 E8 AD 15 D0 09 0E 8D 4F
0C41:15 D0 A9 80 8D 5C 50 60 34
0C49:AD 55 50 AC 56 50 18 79 FF
0C51:33 13 A8 AD 57 50 18 79 5D
0C59:3D 13 8D 58 50 AA 60 0E 08
0C61:5B 50 90 03 20 95 0B 0E F8
0C69:54 50 90 03 4C 14 0D 60 2F
0C71:48 A9 77 20 4A 0E AA BD A6
0C79:3D 13 D0 F5 68 9D 3D 13 B5
0C81:88 10 ED 60 A9 C0 85 FD FE
0C89:A9 33 85 FE 20 ED 0D EE A5
0C91:5D 50 20 ED 0D EE 5E 50 80
0C99:20 ED 0D CE 5D 50 20 ED 26
0CA1:0D CE 5E 50 60 AC 4E 50 67
0CA9:B9 5A 0B 9D 00 50 AC 4F 5A
0CB1:50 B9 66 0B 9D 08 50 08 93
0CB9:78 8A 0A A8 BD 10 50 0A 55
0CC1:BD 00 50 2A 99 00 D0 BD 91
0CC9:08 50 99 01 D0 AD 10 D0 6B
0CD1:3D BD 13 90 03 1D B5 13 6E
0CD9:8D 10 D0 28 60 4A 66 FB 4E
0CE1:4A 66 FB 85 FC A5 FB 29 30
0CE9:C0 85 FB A0 3F B1 FB 99 9F
0CF1:C0 33 88 10 F8 60 BD 20 2E
0CF9:50 9D F8 07 BD 30 50 9D 1E
0D01:40 50 BD 28 50 9D 38 50 43
0D09:60 A0 02 20 5F 0D A2 04 36
0D11:20 74 0D A0 08 20 5F 0D 90
0D19:AD 51 50 AC 52 50 20 2D 74
0D21:0D A0 21 20 5F 0D AD ED 88
0D29:15 AC EE 15 85 63 84 62 4D
0D31:A2 90 38 20 49 BC 20 DD 25
0D39:BD A2 FF E8 BD 02 01 D0 32
0D41:FA F0 11 A9 30 8D 00 01 8A
0D49:A0 05 B9 00 01 99 01 01 9D
0D51:88 10 F7 E8 E0 04 D0 EB E5
0D59:A9 01 A8 4C 1E AB A2 17 5E
0D61:18 4C F0 FF 48 AA BC 7C 9B
0D69:0D BD 7F 0D AA 18 20 F0 21
0D71:FF 68 AA BD 82 0D BC 86 1F
0D79:0D 4C 1E AB 0C 0F 0C 01 61
0D81:01 01 8B 9D A9 BB 0D 0D 0B
0D89:0D 0D 05 54 52 59 20 41 CC
0D91:47 41 49 4E 3F 20 28 59 D1
0D99:2F 4E 29 00 05 50 52 45 57
0DA1:53 53 20 46 49 52 45 00 C0
0DA9:09 20 20 20 20 20 20 20 38
0DB1:20 20 20 20 20 20 20 20 CB
0DB9:20 00 05 53 43 4F 52 45 FA
0DC1:3A 1D 1D 1D 1D 1D 20 20 73
0DC9:20 20 20 20 20 20 20 48 0C
0DD1:49 47 48 20 53 43 4F 52 06
0DD9:45 3A 00 AD 00 DC 0A 0A 91
0DE1:0A 0A A0 04 0A 90 03 88 F8
0DE9:D0 FA 98 60 A0 00 8C 5F C1
0DF1:50 AC 5F 50 B9 46 0E 48 9B
0DF9:AC 5D 50 B9 1D 0E AC 5E 40
0E01:50 18 79 29 0E A8 AD 5D D8
0E09:50 29 03 AA 68 3D 3E 0E 65
0E11:85 06 B1 FD 3D 42 0E 05 9B
0E19:06 91 FD 60 00 00 00 00 62
0E21:01 01 01 01 02 02 02 02 4C
0E29:00 03 06 09 0C 0F 12 15 2D
0E31:18 1B 1E 21 24 27 2A 2D 35
0E39:30 33 36 39 3C C0 30 0C E5
0E41:03 3F CF F3 FC 00 55 AA 25
0E49:FF 8D 75 0E A9 81 8D 0F D5
0E51:D4 8D 12 D4 A9 FF 8D 74 A7
0E59:0E AD 75 0E D0 04 60 4E 1D
0E61:74 0E 0A 90 FA AD 1B D4 1F
0E69:2D 74 0E CD 75 0E F0 02 9F
0E71:B0 F3 60 00 00 AD 61 50 B8
0E79:18 69 02 8D C4 0E AD 60 2F
0E81:50 18 69 03 8D BF 0E BD 6E
0E89:E1 0E 8D B5 0E BD EC 0E 76
0E91:8D B6 0E A9 00 85 03 AE 49
0E99:61 50 AC 60 50 BD F0 EC 5E
0EA1:85 FB BD C8 0E 85 FC 86 CA
0EA9:02 E0 19 B0 0D C0 28 B0 99
0EB1:09 A6 03 BD FF FF 91 FB 57
0EB9:A6 02 E6 03 C8 C0 00 D0 D0
0EC1:E6 E8 E0 00 D0 D4 60 04 46
0EC9:04 04 04 04 04 04 05 05 E8
0ED1:05 05 05 05 06 06 06 06 FC
0ED9:06 06 06 07 07 07 07 07 15
0EE1:F7 FD 03 09 0F 15 1B 21 8E
0EE9:27 2D 33 0E 0E 0F 0F 0F 06
0EF1:0F 0F 0F 0F 0F 0F F9 F8 CD
0EF9:FF FA F7 F6 F5 FD FB FE E1
0F01:FC F4 F5 F3 FF FA F2 F4 9F
0F09:F9 F8 F0 FA EF F1 EE EE 44
0F11:FF EF F7 F6 EE FD FB EF F0
0F19:EF F4 F5 EE F0 FE FC F1 89
0F21:EE ED F0 EF EC F1 F5 F5 60
0F29:FF FA FA F4 EE EE F0 EF B9
0F31:EF F1 20 20 20 20 20 20 AB
0F39:78 A9 33 85 01 A9 D0 8D 9A
0F41:4E 0F A9 38 8D 51 0F A0 73
```

```
0F49:08 A2 00 BD 00 D0 9D 00 6E
0F51:38 E8 D0 F7 EE 4E 0F EE 1D
0F59:51 0F 88 D0 EE A9 37 85 14
0F61:01 58 A2 00 BD 6F 0F 9D D1
0F69:60 3F E8 D0 F7 60 7D 7D 6B
0F71:7D 7D 7D 7D 7D BE 7D 7D 94
0F79:7D 7D 7D 7D 7D 7D 55 55 1F
0F81:55 55 55 55 55 55 55 55 9F
0F89:55 55 55 55 AA 56 56 FF
0F91:56 56 56 56 56 56 56 56 AF
0F99:56 56 56 56 56 AA FF 55 5B
0FA1:7D 7D 7D 7D 7D BE 7D 7D C4
0FA9:7D 7D 7D 7D 55 FF FF 56 6E
0FB1:56 56 56 56 56 AA 55 55 1E
0FB9:55 55 55 55 55 FF FF D6 59
0FC1:56 56 56 56 56 AA 57 5F 3C
0FC9:7F 7D 7D 7D 7D BE 7D 7D ED
0FD1:7D 7D 7D FD F5 D5 55 55 A4
0FD9:55 55 55 55 57 FF FF 55 08
0FE1:55 55 55 55 55 AA 56 56 58
0FE9:56 56 56 56 D6 FF D5 F5 51
0FF1:FD 7D 7D 7D 7D BE 7D 7D 55
0FF9:7D 7D 7D 7F 5F 57 FF 57 8D
1001:55 55 55 55 55 AA 56 56 79
1009:56 56 56 56 56 FF A9 34 54
1011:8D 25 10 8D 36 10 A9 10 71
1019:8D 33 10 A0 02 84 02 A2 A1
1021:00 8A 9D 00 34 E8 D0 FA 79
1029:EE 25 10 88 D0 F4 A0 00 30
1031:BD 4F 10 99 00 34 C8 C8 CA
1039:C8 E8 8A 29 07 D0 F1 98 D3
1041:18 69 28 A8 90 EA EE 36 9B
1049:10 C6 02 D0 E3 60 10 08 39
1051:2A 52 35 5B 7E 3C 00 00 5C
1059:08 32 DC 59 3E 3C 04 89 AF
1061:59 16 99 35 2E 3C 04 20 C4
1069:10 1A 2E 59 74 3C 80 00 09
1071:4A 5C 3A 7B 36 3C 40 48 38
1079:52 69 17 76 6C 3C 22 12 12
1081:94 34 B6 1C 58 3C 44 12 DF
1089:06 4E BA 2B BC 3C A9 35 A9
1091:8D A2 10 A9 10 8D 9F 10 C3
1099:A0 03 A2 00 BD B0 10 9D 8D
10A1:C0 35 E8 D0 F7 EE 9F 10 64
10A9:EE A2 10 88 D0 EE 60 00 77
10B1:3C 00 00 3C 00 00 3C 00 2C
10B9:00 3C 00 00 3C 00 00 3C 07
10C1:00 00 00 00 00 00 00 00 E1
10C9:00 00 00 00 00 00 3C 00 62
10D1:00 3C 00 00 3C 00 00 3C 1F
10D9:00 00 3C 00 00 3C 00 00 72
10E1:00 00 00 00 00 00 00 00 02
10E9:00 00 00 00 00 00 00 00 0A
10F1:3C 00 00 3C 00 00 3C 00 6C
10F9:00 3C 00 00 3C 00 00 3C 47
1101:00 00 3C 00 00 3C 00 00 9B
1109:3C 00 00 3C 00 00 3C 00 85
1111:00 3C 00 00 3C 00 00 3C 60
1119:00 00 3C 00 00 3C 00 00 B3
1121:00 00 00 00 00 00 00 00 43
1129:00 00 00 00 00 00 00 00 4B
1131:00 00 00 00 00 00 00 00 53
1139:00 00 00 00 00 00 00 00 5B
1141:00 00 00 00 FF FF FF FF 63
1149:FF FF 00 00 00 00 00 00 6B
1151:00 00 00 00 00 00 00 00 73
1159:00 00 00 00 00 00 00 00 7B
1161:00 00 00 00 00 00 00 00 83
1169:00 00 00 00 00 00 00 00 8B
1171:3C 00 00 3C 00 00 3C 00 ED
1179:00 3C 00 00 3C 00 00 FC 89
1181:00 03 F0 00 FF C0 00 FF 85
1189:00 00 00 00 00 00 00 00 AB
1191:00 00 00 00 00 00 00 00 B3
1199:00 00 00 00 00 00 00 00 BB
11A1:00 00 00 00 00 00 00 00 C3
11A9:00 00 00 00 00 00 00 00 CB
11B1:3C 00 00 3C 00 00 3C 00 2E
11B9:00 3C 00 00 3C 00 00 3F 0C
11C1:00 00 0F C0 00 03 FF 00 DD
11C9:00 FF 00 00 00 00 00 00 EB
11D1:00 00 00 00 00 00 00 00 F3
11D9:00 00 00 00 00 00 00 00 FB
11E1:00 00 00 00 00 00 00 00 04
11E9:00 00 00 00 00 00 00 00 0C
11F1:00 00 00 00 00 00 00 00 14
11F9:00 00 00 00 00 00 00 00 1C
1201:00 00 00 00 00 00 FF 00 25
1209:03 FF 00 0F C0 00 3F 00 24
1211:00 3C 00 00 3C 00 00 3C 62
1219:00 00 3C 00 00 3C 00 00 B5
1221:00 00 00 00 00 00 00 00 45
1229:00 00 00 00 00 00 00 00 4D
1231:00 00 00 00 00 00 00 00 55
1239:00 00 00 00 00 00 00 00 5D
1241:00 00 00 00 FF 00 00 FF 65
1249:C0 00 03 F0 00 00 FC 00 37
1251:00 3C 00 00 3C 00 00 3C A2
1259:00 00 3C 00 00 3C 00 00 F5
1261:00 00 00 00 00 00 00 00 85
1269:00 00 00 00 00 00 00 00 8D
1271:00 00 00 00 00 00 00 00 95
1279:00 00 00 00 00 00 00 00 9D
1281:00 00 00 00 00 00 00 00 A5
1289:00 00 00 00 00 00 00 00 AD
1291:00 00 00 00 00 00 00 00 B5
1299:00 00 00 00 00 00 00 00 BD
12A1:00 00 00 00 00 00 00 00 C5
12A9:00 00 00 00 00 00 00 55 23
12B1:55 56 55 55 56 55 55 56 1F
12B9:55 55 56 55 55 56 55 55 02
12C1:56 55 55 56 55 55 56 55 78
12C9:55 56 55 55 56 55 55 56 37
12D1:55 55 56 55 55 56 55 55 1A
12D9:56 55 55 56 AA AA AA 00 E3
12E1:00 00 00 00 00 00 00 00 06
12E9:00 00 00 00 00 00 00 A0 AE
12F1:09 A2 0B B9 29 13 8D 61 52
12F9:50 BD 1D 13 8D 60 50 8E A7
1301:13 13 8C 15 13 8A 18 79 C4
1309:33 13 A8 BE 3D 13 20 76 7B
1311:0E A2 00 A0 00 CA 10 E1 1E
1319:88 10 D6 60 02 05 08 0B A7
1321:0E 11 14 17 1A 1D 20 23 2F
1329:02 04 06 08 0A 0C 0E 10 3F
1331:12 14 00 0C 18 24 30 3C 14
1339:48 54 60 6C 20 50 20 43 31
1341:4D 44 2E 20 20 52 3D 52 FD
1349:45 43 23 2C 20 4C 3D 4F 06
1351:46 46 53 45 54 00 8B 13 B7
1359:7A 17 41 24 B2 22 50 22 CD
1361:AA C7 28 39 36 AA 38 29 5D
1369:AA C7 28 52 4C 29 AA C7 25
1371:28 52 48 29 AA C7 28 4C EC
1379:29 3A 20 98 31 34 2C 41 44
1381:24 3A 20 98 31 34 2C 41 C9
1389:24 00 C2 13 84 17 3A 20 60
1391:55 B2 53 43 3A 20 89 38 4B
1399:30 30 30 20 20 20 20 20 CD
13A1:20 20 20 20 20 3A 8F 20 0F
13A9:47 45 54 20 44 49 53 4B 8A
13B1:20 53 54 41 01 02 04 08 7B
13B9:10 20 40 80 FE FD FB F7 DF
13C1:EF DF BF 7F 06 05 0C 80 A4
13C9:06 80 05 0C 80 80 80 05 80
13D1:06 0C 05 80 06 80 0C 80 71
13D9:80 80 09 09 02 80 09 09 3F
13E1:80 80 02 80 80 03 03 00 C6
13E9:03 80 80 03 80 00 80 80 77
13F1:0A 0A 0D 80 0A 80 0A 0D BC
13F9:80 80 80 04 04 0B 04 80 A5
1401:04 80 0B 80 80 80 08 07 D1
1409:01 80 08 07 80 80 01 80 CB
1411:80 07 08 01 07 80 80 08 8F
1419:80 01 80 80 39 45 51 5D B8
1421:68 73 7E 89 94 9F AA B5 F0
1429:C5 D5 14 14 14 14 14 14 9A
1431:14 14 14 14 14 14 14 14 59
1439:0B 00 01 02 03 04 05 06 5F
1441:07 08 09 0A 0B 07 07 07 3A
1449:07 07 07 07 07 07 07 07 71
1451:0B 0A 09 08 07 06 05 04 81
1459:03 02 01 00 0A 00 01 02 F7
1461:03 04 05 05 05 05 05 0A 4D
1469:00 01 02 03 04 05 06 07 89
1471:07 07 0A 05 05 05 05 05 BB
1479:04 03 02 01 00 0A 05 05 EB
1481:05 05 05 06 07 08 09 0A E2
1489:0A 07 07 07 06 05 04 03 19
1491:02 01 00 0A 07 07 07 08 06
1499:09 0A 0B 0C 0D 0E 0A 0A A9
14A1:09 08 07 06 05 05 05 05 DC
14A9:05 0A 0E 0D 0C 0B 0A 09 13
14B1:08 07 07 07 0F 00 01 02 6D
14B9:03 04 05 06 07 08 09 0A D9
14C1:0B 0C 0D 0E 0F 05 05 05 90
14C9:05 05 05 05 05 05 05 05 F1
14D1:05 05 05 05 0F 0E 0D 0C 85
14D9:0B 0A 09 08 07 06 05 04 0A
14E1:03 02 01 00 03 05 08 80 E8
14E9:09 80 09 09 80 80 80 04 73
14F1:06 08 09 80 09 80 09 80 25
14F9:80 80 03 06 07 80 09 09 98
1501:80 80 09 80 80 04 05 07 D9
1509:09 80 80 09 80 09 80 80 22
1511:01 FF 00 80 01 80 FF 00 CD
1519:80 80 80 FF 01 00 FF 80 3C
1521:01 80 00 80 80 80 00 00 F9
1529:FF 80 00 00 80 80 FF 80 F9
1531:80 00 00 01 00 80 80 00 AE
1539:80 01 80 80 00 00 FF 80 7C
1541:00 80 00 FF 80 80 80 00 92
1549:00 01 00 80 00 80 01 80 40
1551:80 80 01 FF 00 80 01 FF FF
1559:80 80 00 80 80 FF 01 00 F1
1561:FF 80 80 01 80 00 80 80 51
1569:21 16 00 80 21 80 16 00 E8
1571:80 80 80 16 21 0B 16 80 4F
1579:21 80 0B 80 80 80 0B 00 D9
1581:16 80 0B 00 80 80 16 80 EA
1589:80 00 0B 21 00 80 80 0B 75
1591:50 21 80 80 DC DD D7 DE 31
1599:DC DE DD D8 DE DE DE DA 3E
15A1:DB D7 DA DE DB DE D8 DE E3
15A9:DE DE DC DB D9 DE DC DB 34
15B1:DE DE D9 DE DE DA DD D9 24
15B9:DA DE DE DD DE D9 DE DE BD
15C1:DA DB D9 DA DE DB DE DE 3C
15C9:D9 DE DE DC DD D9 DE DC 33
15D1:DE DD DE D9 DE DE DA DD 62
15D9:D7 DA DE DE DD D8 DE DE 5F
15E1:DE DC DB D7 DE DC DB DE AC
15E9:D8 DE DE DE 00 00 0A 00 16
```

⊡

COMING NEXT MONTH . . .

So what were the best games to hit the Commodore 8-bit market last year? I'm sure you have your favorites, but in next month's Gazette we'll ask our veteran software reviewers to talk about their favorite programs. Since they probably get to play and test more games in a year than most of us, if they like a program, it must be an outstanding one.

PROGRAMS

PETER M. L. LOTTRUP

HIGH VOLTAGE!

CHALLENGE A FRIEND TO THIS SHOCKING TWO-PLAYER GAME FOR THE 64

Here's a challenging and entertaining game that pits you and another player against each other. The object is to see who can be the first to move across a number of squares to the opposing side of the board first without getting electrocuted. The problem is, which squares are wired for you, which for your opponent, and which have no power at all? Play *High Voltage!* and find out.

Typing It In

High Voltage! is written entirely in BASIC. To avoid typing mistakes, use *The Automatic Proofreader* to type it in. See "Typing Aids" elsewhere in this section. When you've finished, save the program to disk.

High Voltage! may be played from the keyboard or with a joystick plugged into port 2. After you've loaded and run the program, a presentation screen will appear. Press any key to start the game or press the fire button on the joystick. The computer will take a few seconds to "wire" the board (the board is different every time), and then the game will begin.

Playing the Game

The object of *High Voltage!* is easy: Get to the opposing side of the board before your opponent does. The red player (player 1) moves from the top of the board to the bottom. The green player (player 2) moves from the bottom to the top.

The starting player is chosen at random by the computer. The player's turn is displayed on the bottom right of the screen. You may start from any of the squares along the top or bottom row, but you may move only on squares that are your color. The problem is that you can't tell what color a square is until you select it by pressing the fire button or hitting Return.

If you accidentally move onto a square with your opponent's color, you get zapped and are returned to your end of the board. You lose control of the game, and it becomes the other player's turn. If you fall on a square that's black (not wired at all), you'll be returned to your previous position and may try again. You may land on up to three black squares, after which control passes to the other player. When you're zapped back to the start, you'll have to retrace your steps. Observation and a good memory will help, as you'll have to remember your steps along the board to be able to retrace them later.

Movement is limited to one position in any of eight directions and is controlled by the cursor keys on the keyboard or the joystick. To move to a square, put the cursor on it and press the fire button or press Return. If it's an invalid move, nothing will happen. Otherwise, you'll see what hides in that position.

The game ends when either player has reached the other side of the board. The computer will reveal the board and announce the winner; you may then play again by pressing any key or the fire button.

If play gets to be too frustrating, you can press f7 at any time to end the current game without there being any winners. The game board and all the squares will then be displayed with the correct path revealed. Play can then be resumed.

Strategy

High Voltage! requires good memory and careful observation as well as luck. There will always be at least one correct path to the other side of the board, sometimes more. Pay attention to your own moves and try to memorize the moves you're making. Also watch what your opponent reveals. His or her mistakes may help you know the ending positions of your own path on the board.

Watch out for booby traps. Some paths may seem correct for two or three moves, but there will be no way out, making you lose valuable time backtracking.

High Voltage

```
GA 1 REM COPYRIGHT 1990, COMPU
     TE PUBLICATIONS INT'L, LT
     D. ALL RIGHTS RESERVED.
QK 10 V=53248:POKEV,0:POKEV+1,
      0:POKEV+21,3:POKEV+23,0:
      POKEV+29,0:POKE53287,1
KJ 20 POKE2040,13:X=RND(-TI)
PX 30 FORI=832TOI+63:POKEI,0:N
      EXT
PJ 40 FORI=836TO886STEP3:POKEI
      ,28:NEXT
RF 50 FORI=859TO864:POKEI,255:
      NEXT
HA 60 X=11:PRINT"{CLR}";:POKE5
      3280,0:POKE53281,0
QG 70 DIMV$(25),T(X,X)
AR 80 V$(0)="{HOME}":FORI=1TO2
      4:V$(I)=V$(I-1)+"{DOWN}"
      :NEXT
RQ 90 GOSUB1170:GOSUB1380:PRIN
      TV$(17)TAB(26)"{CYN}WIRI
      NG BOARD"
KH 100 PRINTTAB(26)"PLEASE WAI
       T..."
HE 110 Y1=1:Y2=X
KQ 120 X1=INT(RND(1)*X)+1
GJ 130 T(Y1,X1)=2:O1=X1:U1=Y1
QM 140 XX=INT(RND(1)*5)+4
JQ 150 IFXX=4THENX1=X1-1
KR 160 IFXX=5THENX1=X1+1
MF 170 IFXX=6THENX1=X1-1:Y1=Y1
       +1
DA 180 IFXX=7THENY1=Y1+1
GF 190 IFXX=8THENY1=Y1+1:X1=X1
       +1
FA 200 IFX1>XORX1<1ORY1>XORY1<
       1THENX1=O1:Y1=U1:GOTO14
       0
```

PROGRAMS

```
FR 210 IFT(Y1,X1)=0ORT(Y1,X1)=
       2THENT(Y1,X1)=2:GOTO230
CE 220 X1=O1:Y1=U1:GOTO140
QF 230 IFY1<>XTHEN130
GJ 240 X2=INT(RND(1)*X)+1:IFT(
       Y2,X2)THEN240
DS 245 WW=0:T(Y2,X2)=5
ME 250 O1=X2:U1=Y2
JC 260 XX=INT(RND(1)*5)+4
RM 270 IFXX=4THENX2=X2-1
QP 280 IFXX=5THENX2=X2+1
GC 290 IFXX=6THENX2=X2-1:Y2=Y2
       -1
AR 300 IFXX=7THENY2=Y2-1
BH 310 IFXX=8THENY2=Y2-1:X2=X2
       +1
BP 320 IFX2>XORX2<1ORY2>XORY2<
       1THENX2=O1:Y2=U1:GOTO26
       0
QX 330 IFT(Y2,X2)=0THENT(Y2,X2
       )=5:GOTO370
GK 340 IFT(Y2,X2)=2THENWW=WW+1
CC 350 IFWW>5THENY2=X:X2=INT(R
       ND(1)*X)+1:GOTO240
FM 360 X2=O1:Y2=U1:GOTO260
GS 370 IFY2<>1THEN250
FB 380 FORI=1TOX:FORJ=1TOX:IFT
       (I,J)=2ORT(I,J)=5THEN42
       0
QF 390 UX=RND(1):IFUX<.2THENT(
       I,J)=2:GOTO420
AF 400 IFUX>.8THENT(I,J)=5:GOT
       O420
MX 410 T(I,J)=0
XH 420 NEXTJ,I
AB 430 S1=1:S2=1:T1=X:T2=X
KE 440 POKE198,0:PL=INT(RND(1)
       *2)+1
BA 450 C=0:GOSUB1330
QM 460 IFPL=2THEN710
GQ 470 U1=S1:U2=S2
RE 480 A=S1:B=S2:POKE53287,2:I
       FC>2THEN700
KF 490 POKEV,B*2*8+20:POKEV+1,
       A*2*8+48:OA=A:OB=B
HG 500 GETA$
BP 510 IFA$="{RIGHT}"THENB=B+1
       :GOTO590
RG 520 IFA$="{LEFT}"THENB=B-1:
       GOTO590
SB 530 IFA$="{UP}"THENA=A-1:GO
       TO590
XD 540 IFA$="{DOWN}"THENA=A+1:
       GOTO590
FX 550 IFA$=CHR$(13)THEN610
BX 560 IFA$="{F7}"THENPL=0:GOT
       O1040
GX 570 U=PEEK(56320):GOSUB1580
       :IFA$<>""THEN510
GH 580 GOTO500
KK 590 IFA<1ORB<1ORA>XORB>XTHE
       NA=OA:B=OB:GOTO490
JQ 600 GOTO490
PX 610 IF(S1=1ANDA>1)OR(S1<>1)
       THEN630
HR 620 S1=A:S2=B:GOTO650
QF 630 IFABS(S1-A)>1ORABS(S2-B
       )>1THEN490
XK 640 S1=A:S2=B
JG 650 POKEV,0:POKEV+1,0
HB 660 I=S1:J=S2:GOSUB980:IFT(
       I,J)=5THEN700
FS 670 IFT(I,J)=0THENGOSUB1520
       :GOSUB950:S1=U1:S2=U2:C
       =C+1:GOTO470
EF 680 GOSUB1500:GOSUB950:IFS1
       <XTHEN470
XP 690 WW=1:GOTO1040
RR 700 PL=2:S1=1:S2=1:FL=1:GOS
       UB1540:GOSUB950:GOTO450
MX 710 V1=T1:V2=T2
BF 720 A=T1:B=T2:POKE53287,5:I
       FC>2THEN940
RH 730 POKEV,B*2*8+20:POKEV+1,
       A*2*8+48:OA=A:OB=B
QG 740 GETA$
QB 750 IFA$="{RIGHT}"THENB=B+1
       :GOTO830
DQ 760 IFA$="{LEFT}"THENB=B-1:
       GOTO830
FK 770 IFA$="{DOWN}"THENA=A+1:
       GOTO830
BE 780 IFA$="{UP}"THENA=A-1:GO
       TO830
DH 790 IFA$=CHR$(13)THEN850
KS 800 IFA$="{F7}"THENPL=0:GOT
       O1040
JC 810 U=PEEK(56320):GOSUB1580
       :IFA$<>""THEN750
EJ 820 GOTO740
SX 830 IFA<1ORB<1ORA>XORB>XTHE
       NA=OA:B=OB:GOTO730
DP 840 GOTO730
XH 850 IF(T1=XANDA<X)OR(T1<>X)
       THEN870
AG 860 T1=A:T2=B:GOTO890
SA 870 IFABS(T1-A)>1ORABS(T2-B
       )>1THEN730
HJ 880 T1=A:T2=B
BG 890 POKEV,0:POKEV+1,0
PJ 900 I=T1:J=T2:GOSUB980:IFT(
       I,J)=2THEN940
JQ 910 IFT(I,J)=0THENGOSUB1520
       :GOSUB950:T1=V1:T2=V2:C
       =C+1:GOTO710
DM 920 GOSUB1500:GOSUB950:IFT1
       <>1THEN710
SM 930 WW=2:GOTO1040
GG 940 PL=1:T1=X:T2=X:FL=1:GOS
       UB1540:GOSUB950:GOTO450
ED 950 IFI=7THENPRINTV$(I*2-1)
       TAB(40+J*2)"{BLU}{RVS}
       {A}{S}{DOWN}{2 LEFT}{Z}
       {X}{HOME}":GOTO970
RD 960 PRINTV$(I*2)TAB(J*2)"
       {BLU}{RVS}{A}{S}{DOWN}
       {2 LEFT}{Z}{X}{HOME}";
MC 970 RETURN
QJ 980 IFT(I,J)=2THENPRINT"
       {RED}";
SG 990 IFT(I,J)=5THENPRINT"
       {GRN}";
PS 1000 IFT(I,J)=0THENPRINT"
       {BLK}";
FM 1010 IFI=7THENPRINTV$(I*2-1
       )TAB(40+J*2)"{RVS}UI
       {DOWN}{2 LEFT}JK{HOME}
       ";:GOTO1030
JS 1020 PRINTV$(I*2)TAB(J*2)"
       {RVS}UI{DOWN}{2 LEFT}J
       K{HOME}";
SB 1030 RETURN
CQ 1040 POKEV+21,0:FORI=1TOX:F
       ORJ=1TOX:GOSUB980:NEXT
       J,I
SF 1050 GOSUB1540:IFPL=0THEN11
       20
XA 1060 PRINTV$(10)TAB(5)"
       {WHT}{OFF}{A}*********
       ******{S}"
EQ 1070 PRINTTAB(5)"{WHT}-
       {15 SPACES}-"
PD 1080 PRINTTAB(5)"- {YEL}THE
        WINNER IS -"
CG 1090 PRINTTAB(5)"{WHT}-
       {YEL}PLAYER #"PL:PRINT
       V$(13)TAB(17)" !
       {2 SPACES}{WHT}-"
PQ 1100 PRINTTAB(5)"{WHT}-
       {15 SPACES}-"
JA 1110 PRINTTAB(5)"{WHT}{Z}**
       ************{X}"
FB 1120 PRINTV$(17)TAB(26)"
       {OFF}{CYN}PRESS ANY KE
       Y"
GB 1130 PRINTTAB(26)"
       {2 SPACES}OR <FIRE> "
GR 1140 PRINTV$(19)TAB(66)"TO
       {SPACE}PLAY AGAIN"
PR 1150 GETA$:U=PEEK(56320):IF
       A$<>""ORU=111THENRUN
SP 1160 GOTO1150
FD 1170 A1$="{RVS}{RIGHT}{4}
       {BLU}":A2$=A1$
RH 1180 TA(1)=0:TA(2)=2:TA(3)=
       5
JF 1190 FORI=1TO11:A1$=A1$+"
       {A}{S}":NEXT
KC 1200 AA$=AA$+"{4} "+CHR$(13
       )+"{RIGHT}{RVS} {7}"
FP 1210 FORI=1TO11:A2$=A2$+"
       {Z}{X}":NEXT
KG 1220 GOSUB1290:GOSUB1380:GO
       SUB1540
AS 1230 PRINTV$(17)TAB(26)"
       {CYN}PRESS ANY KEY"
HA 1240 PRINTTAB(26)"TO BEGIN.
       .."
CX 1250 I=INT(RND(1)*11)+1:J=I
       NT(RND(1)*11)+1:T(I,J)
       =TA(INT(RND(1)*3)+1)
MH 1260 GOSUB980:T(I,J)=0:GETA
       $:U=PEEK(56320):IFA$<>
       ""ORU=111THEN1280
CD 1270 GOTO1250
FK 1280 GOSUB1290:RETURN
QJ 1290 PRINT"{CLR}{RIGHT}
       {DOWN}{RVS}{4}";
FX 1300 FORI=1TO12:PRINT"
       {2 SPACES}";:NEXT:PRIN
       T
JC 1310 FORI=1TO11:PRINTA1$"
       {4} ":PRINTA2$"{4} ":N
       EXT
BF 1320 PRINT"{RIGHT}{RVS}{4}"
       ;:FORI=1TO12:PRINT"
       {2 SPACES}";:NEXT:RETU
       RN
QC 1330 PRINTV$(17)TAB(26)"
       {BLU}{OFF}{A}*********
       *{S}"
XM 1340 PRINTTAB(26)"-";:PRINT
       "{RED}";:IFPL=2THENPRI
       NT"{GRN}";
QA 1350 PRINT" PLAYER"PL:PRINT
       V$(18)TAB(36)"{BLU} -
       {2 SPACES}"
PJ 1360 PRINTV$(19)TAB(66)"
       {BLU}{OFF}{Z}*********
       *{X}":RETURN
BH 1370 PRINTV$(3)TAB(28)"
       {OFF}{RED} {RVS}£
```

```
        {5 SPACES}{*}"
SG 1380 H=26:PRINTV$(3)TAB(H)"
        {OFF}{6 SPACES}{RVS}
        {YEL}£{3 SPACES}{OFF}
        £"
BQ 1390 PRINTTAB(H)"{5 SPACES}
        {RVS}£{3 SPACES}{OFF}
        £"
FS 1400 PRINTTAB(H)"{4 SPACES}
        {RVS}£{3 SPACES}{OFF}
        £"
QH 1410 PRINTTAB(H)"{5 SPACES}
        {RVS}£{2 SPACES}{OFF}
        £"
SE 1420 PRINTTAB(H)"{4 SPACES}
        {RVS}£{2 SPACES}{OFF}
        £"
JD 1430 PRINTTAB(H)"{3 SPACES}
        {RVS}£{2 SPACES}{OFF}
        £"
AJ 1440 PRINTTAB(H)"{4 SPACES}
        {RVS}£ {OFF}£"
HG 1450 PRINTTAB(H)"{3 SPACES}
        {RVS}£ {OFF}£"
HX 1460 PRINTTAB(H)"{2 SPACES}
        {RVS}£ {OFF}£"
PS 1470 PRINTTAB(H)"{2 SPACES}
        {RVS}£{OFF}£"
AC 1480 PRINTTAB(H)" {RVS}£
        {OFF}£"
CD 1490 PRINTV$(9)TAB(26)"
        {YEL}{OFF}HIGH{RVS}£
        {OFF}VOLTAGE!":RETURN
BP 1500 POKE54273,70:POKE54278
        ,249:POKE54296,15:POKE
        54276,17:POKE54276,16
QX 1510 FORDY=1TO500:NEXT:POKE
        54273,0:RETURN
RB 1520 FORP=1TO15:POKE54296,1
        5:POKE54296,0:NEXT:RET
        URN
DP 1530 FORB=1TO250STEP3:POKE5
        4273,B:NEXT:POKE54296,
        0:FL=0:RETURN
RS 1540 FORP=54272TO54295:POKE
        P,0:NEXT:POKE54296,15
MD 1550 POKE54277,8:POKE54278,
        255:POKE54276,23:A=6:P
        OKE54287,A:IFFLTHEN153
        0
CQ 1560 FORB=1TO150:POKE54273,
        B:A=A-.01:NEXT
KJ 1570 GOSUB1500:POKE54296,0:
        RETURN
MC 1580 A$="":IFU=111THENA$=CH
        R$(13)
HR 1590 IFU=119THENA$="{RIGHT}
        "
JR 1600 IFU=123THENA$="{LEFT}"
HK 1610 IFU=126THENA$="{UP}"
XS 1620 IFU=125THENA$="{DOWN}"
JH 1630 RETURN
```

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.

KEITH M. GROCE

TEXT FITTER

PRINT TEXT IN COLUMNS OR HAVE IT FLOW IN WHATEVER SHAPE YOU DESIRE WITH THIS HANDY PRINTING UTILITY FOR THE 64

There are times when it would be nice to print a word processor file in something other than the box you get from setting margins. For example, you might want to print on letterhead or stationery without running into the preprinted matter, leave space for photos or hand-drawn illustrations, turn your notes into 3 × 5 cards, or print the text of your annual Christmas letter in the shape of a Christmas tree.

This program is a convenient way for anyone who doesn't own a desktop publishing program yet may want to publish a simple newsletter and have text fit around a graphic or photograph. You can place text in columns, rectangles, or any other shape that fits your requirements, preview it on your monitor, and then have the finished product roll off your printer.

Text Fitter lets you set text boundaries for each line and then fill these areas from standard Commodore-ASCII sequential files. The boundaries, or text-limit lines, are drawn anywhere on an 80-column × 55-line page. Word-wrapped text is placed between limit lines. You may also save any text which has not been placed in a "leftover" file. *Text Fitter* prints only one page at a time. The program pours text in, filling your custom-designed page or shape. If you have more text in the file than is needed to fill the page, then the leftovers are saved and can be printed in another custom page or printed normally with your word processor.

Getting Started

Text Fitter consists of a BASIC program and machine language subroutines. The BASIC program should be entered with *The Automatic Proofreader;* the machine language program, with *MLX*. See "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: C000
Ending address: C808

Once you've finished entering the data, save a copy to disk. The BASIC program loads the machine language program, so be sure to save the ML program as FITTER.ML.

Using the Program

Before using *Text Fitter,* you must create a source file. Any Commodore-ASCII sequential file (like those produced by *Easy Script* or by printing a file to disk with *SpeedScript*) is acceptable. Don't include control characters for underlining, italics, or the

like in your text file because the results will be unsatisfactory.

When you load and run *Text Fitter*, a menu/help screen will be displayed. This screen lists all the commands to manipulate the text-limit lines. Press a key as indicated to move to the layout screen. Mark text-limit lines by moving the red and green cursors to the endpoints of the line you want to mark and pressing the M key. Marked lines will appear as a series of dashes on the layout screen. Connect lines to block out areas of text and non-text. (Note that the printing area edges are also text limits.) The layout screen displays the cursor positions in terms of column/line count and inches as measured from the upper left corner of the printing area. This is helpful when you need to lay out your text accurately.

When you've finished marking limit lines, return to the menu/help screen and press the T key. You'll be asked to enter the name of your source file and, optionally, leftover filenames for the text.

After these have been entered, the source file will be opened, and a second menu/help screen will be displayed. Press a key and move to the layout screen as before. Position the cursor where the first character is to be placed and press the T key. (Don't place the cursor directly on a dashed line.) Text will fill down the area marked, following the leftmost limit until no open spaces are detected beneath the line last placed.

Text characters are marked with dots on the layout screen page. Move the cursor and fill any open areas desired. Note that text will only fill downward from the starting point, since that's the way text is read. (If you want an open area in the middle of the page, divide the page into two or more columns to give each area of text a leftmost limit to follow.)

You can start a new source file from the menu/help screen by pressing the F key. The leftover file (if any) will be saved, and the new filename will be entered as before.

To print or save your page, press the S key at the menu/help screen. The source file will be closed and the leftover file saved before a third menu screen appears. From this menu you can print the page or save the formatted page to disk. The saved disk file may be loaded into your word processor for enhancements or printing. Adjust the printer OPEN statement in Line 550 to match the secondary address for your printer. Also note the REM satement in line 540 that provides for carriage returns to be added at the end of each line should your printer require them.

TEXT FITTER

```
PM 10 REM COPYRIGHT 1990, COMP
      UTE PUBLICATIONS INT'L,
      {SPACE}LTD. ALL RIGHTS R
      ESERVED.
AP 20 POKE55,192:POKE56,91
PM 30 IFA=0THENA=1:LOAD"FITTER
      .ML",8,1
PX 40 SYS49252:REM INIT
MA 50 POKE53280,0:POKE53281,0
RJ 60 PRINT"{CLR}{7}TEXT FITTE
      R - MARK TEXT LIMIT LINE
      S{CYN}"
EE 70 PRINT"{2 DOWN}SELECT CUR
      SOR: [R]=RED [G]=GREEN"
RH 80 PRINT"{DOWN}MOVE SELECTE
      D CURSOR WITH [CRSR] KEY
      S"
SH 90 PRINT"{DOWN}[M]=MARK LIN
      E BETWEEN CURSORS"
GA 100 PRINT"{DOWN}[U]=UNMARK
      {SPACE}LINE"
AH 110 PRINT"{DOWN}[CLR]=REMOV
      E ALL LINES"
GD 120 PRINT"{DOWN}[<]=RETURN
      {SPACE}TO THIS SCREEN"
HB 130 PRINT"{2 DOWN}{8}PRESS
      {SPACE}[T] AT THIS SCRE
      EN TO BEGIN"
AQ 140 PRINT"{DOWN}PLACING TEX
      T. {6}PRESS ANY OTHER K
      EY TO"
HP 150 PRINT"{DOWN}CONTINUE MA
      RKING LINES."
RM 160 GETK$:IFK$=""THEN160
KP 170 IFK$="T"THEN200
DG 180 SYS50450:REM MARKL
KA 190 GOTO160
GR 200 PRINT"{CLR}{7}TEXT FITT
      ER - PLACE TEXT{CYN}"
QB 210 PRINT"{DOWN}INSERT DISK
       AND ENTER FILENAME"
XH 220 PRINT"(PRESS [RETURN] A
      LONE TO GO BACK.)"
SG 230 SF$="":INPUTSF$:IFSF$="
      "THEN60
JF 240 PRINT"{DOWN}ENTER FILEN
      AME FOR LEFTOVER TEXT"
DH 250 PRINT"(PRESS [RETURN] A
      LONE FOR NO FILE.)"
JA 260 LF$="":INPUTLF$
QR 270 OPEN2,8,2,"0:"+SF$+",S,
      R"
GP 280 PRINT"{CLR}{7}TEXT FITT
      ER - PLACE TEXT{CYN}"
EF 290 PRINT"{DOWN}MOVE CURSOR
       WITH [CRSR] KEYS"
QH 300 PRINT"{DOWN}[T]=FILL WI
      TH TEXT AT CURSOR LOCAT
      ION"
HG 310 PRINT"{DOWN}[<]=RETURN
      {SPACE}TO THIS SCREEN."
XD 320 PRINT"{2 DOWN}{8}PRESS
      {SPACE}[S] AT THIS SCRE
      EN TO SAVE OR"
EQ 330 PRINT"{DOWN}PRINT THE P
      AGE, [F] TO START A NEW
      "
SR 340 PRINT"{DOWN}SOURCE FILE
      . {6}PRESS ANY OTHER KE
      Y TO"
HD 350 PRINT"{DOWN}CONTINUE PL
      ACING TEXT."
AM 360 GETK$:IFK$=""THEN360
AA 370 IFK$="S"ORK$="F"THEN420
CE 380 SYS50683:IFPEEK(49249)=
      0THEN360:REM MARKTX, SA
      VEST
RP 390 CLOSE2:PRINT"{CLR}END O
      F ";SF$:PRINT"{DOWN}PRE
      SS ANY KEY"
SQ 400 GETK$:IFK$=""THEN400
GM 410 GOTO200
PB 420 IFLF$<>""THENOPEN3,8,3,
      "0:"+LF$+",S,W":SYS5115
      3:CLOSE3:REM LFTOVR
EG 430 CLOSE2
KD 440 IFK$="F"THEN200
HD 450 PRINT"{CLR}{7}TEXT FITT
      ER - SAVE/PRINT{CYN}"
BF 460 PRINT"{DOWN}[D]=SAVE TO
       DISK."
BD 470 PRINT"{DOWN}[P]=PRINT (
      BE SURE PRINTER IS READ
      Y)."
AJ 480 PRINT"{DOWN}[X]=EXIT."
AB 490 GETK$:IFK$<>"D"THEN530
FA 500 INPUT"FILENAME";SF$
DM 510 OPEN2,8,2,"0:"+SF$+",S,
      W"
AJ 520 SYS51098:CLOSE2:GOTO450
      :REM OUTPGE
KQ 530 IFK$<>"P"THEN560
SM 540 REM POKE51133,13:REM TO
       ADD RETURN TO EACH LIN
      E
FC 550 OPEN2,4,7:SYS51098:PRIN
      T#2:CLOSE2:GOTO450:REM
      {SPACE}OUTPGE
HM 560 IFK$<>"X"THEN490
JK 570 END
```

FITTER.ML

```
C000:70 D8 88 D8 70 00 00 00 12
C008:00 01 03 05 06 08 00 06 D0
C010:03 00 06 03 FD 7F DF F7 A9
C018:05 00 03 06 01 04 07 02 05
C020:06 01 04 07 02 05 00 03 FC
C028:03 0F 0C 20 30 30 20 28 1D
C030:30 2E 30 30 29 20 00 0C 34
C038:09 0E 05 20 30 30 20 28 0F
C040:30 2E 30 30 29 00 1F 20 16
C048:3D 20 0D 05 0E 15 00 00 27
C050:00 00 00 00 00 00 00 00 D1
C058:00 00 00 00 00 00 00 00 D9
C060:00 00 00 00 A9 00 8D 62 AC
C068:C0 A9 7F 8D 0D DC A5 01 A5
C070:29 FB 85 01 A0 00 B9 00 BE
C078:D0 99 00 80 B9 00 D1 99 DB
C080:00 81 C8 D0 F1 A5 01 09 B9
C088:04 85 01 A9 81 8D 0D DC 61
C090:A9 00 A2 12 A0 00 84 FB 66
C098:A0 82 84 FC A0 00 91 FB 8F
C0A0:C8 D0 FB E6 FC CA 10 F6 D2
C0A8:A0 00 8C 53 C0 A2 00 8E 60
```

PROGRAMS

```
C0B0:52 C0 20 D5 C1 AE 52 C0 1B
C0B8:A9 00 E0 16 B0 0E A9 F0 8E
C0C0:E0 15 F0 08 A9 1F E0 00 22
C0C8:F0 02 A9 FF A0 07 91 FD BA
C0D0:88 10 FB E8 E0 28 D0 D7 C9
C0D8:AC 53 C0 C8 8C 53 C0 C0 1E
C0E0:19 D0 CA A9 0A 8D 27 D0 BC
C0E8:A9 0D 8D 28 D0 A0 00 A9 69
C0F0:F0 99 00 5C 99 00 5D 99 38
C0F8:00 5E 99 00 5F C8 D0 F1 F6
C100:A9 00 8D 20 D0 A9 6F 8D A5
C108:F8 5F 8D F9 5F A9 19 8D 92
C110:52 C0 A9 03 8D 53 C0 20 AD
C118:44 C2 20 0F C2 A9 19 8D DF
C120:52 C0 A9 05 8D 53 C0 20 DD
C128:44 C2 20 29 C2 A9 19 8D 91
C130:52 C0 A9 09 8D 53 C0 20 2E
C138:49 C2 20 0F C2 A9 19 8D 82
C140:52 C0 A9 0B 8D 53 C0 20 5E
C148:49 C2 20 29 C2 A9 1C 8D 3A
C150:52 C0 A9 16 8D 53 C0 A2 A1
C158:00 8E 50 C0 BD 46 C0 F0 0F
C160:0D 20 71 C2 EE 52 C0 AE BD
C168:50 C0 E8 4C 59 C1 A0 3F 78
C170:A9 00 99 C0 5B 88 10 FA 20
C178:A0 15 A2 07 BD 00 C0 99 5F
C180:C0 5B 88 88 88 CA 10 F4 59
C188:A9 01 8D 56 C0 8D 58 C0 E5
C190:8D 57 C0 8D 59 C0 20 AD 5D
C198:C2 4C DA C2 A9 03 2C A9 73
C1A0:01 8D 15 D0 AD 00 DD 29 0A
C1A8:FE 8D 00 DD A9 79 8D 18 53
C1B0:D0 AD 11 D0 09 20 8D 11 2C
C1B8:D0 60 A9 00 8D 15 D0 AD 02
C1C0:11 D0 29 DF 8D 11 D0 A9 20
C1C8:15 8D 18 D0 AD 00 DD 09 7C
C1D0:03 8D 00 DD 60 A9 00 85 46
C1D8:FD A9 60 85 FE A9 40 85 CE
C1E0:FB AE 53 C0 86 FC 20 9A 87
C1E8:C2 20 01 C2 A9 00 85 FB 76
C1F0:86 FC 20 01 C2 A9 08 85 5D
C1F8:FB AD 52 C0 85 FC 20 9A 37
C200:C2 18 A5 FD 65 FB 85 FD A5
C208:A5 FE 65 FC 85 FE 60 A2 28
C210:00 8E 50 C0 BD 28 C0 F0 50
C218:2A 20 71 C2 EE 52 C0 AE 06
C220:50 C0 E8 8E 50 C0 4C 14 36
C228:C2 A2 00 8E 50 C0 BD 37 D8
C230:C0 F0 10 20 71 C2 EE 52 1D
C238:C0 AE 50 C0 E8 8E 50 C0 C2
C240:4C 2E C2 60 A2 A0 4C 4B 51
C248:C2 A2 D0 A9 00 85 FD A9 48
C250:5C 85 FE AD 53 C0 85 FB C4
C258:A9 28 85 FC 20 9A C2 20 4E
C260:01 C2 8A AC 52 C0 A2 0E 1C
C268:91 FD C8 CA 10 FA 60 09 32
C270:30 8D 51 C0 20 D5 C1 AD 31
C278:51 C0 85 FB A9 08 85 FC BC
C280:20 9A C2 18 A9 00 65 FB AA
C288:85 FB A9 80 65 FC 85 FC 34
C290:A0 07 B1 FB 91 FD 88 10 C3
C298:F9 60 18 A9 00 A0 08 6A CD
C2A0:66 FB 90 03 18 65 FC 88 73
C2A8:10 F5 85 FC 60 AD 57 C0 5D
C2B0:0A 18 6D 57 C0 69 3D 8D 18
C2B8:01 D0 AD 56 C0 0A 18 69 D5
C2C0:1C 8D 00 D0 A9 03 8D 53 8C
C2C8:C0 AD 56 C0 20 45 C3 A9 38
C2D0:05 8D 53 C0 AD 57 C0 4C 4B
C2D8:04 C3 AD 59 C0 0A 18 6D 68
C2E0:59 C0 69 3D 8D 03 D0 AD 0C
C2E8:58 C0 0A 18 69 1C 8D 02 66
C2F0:D0 A9 09 8D 53 C0 AD 58 94
C2F8:C0 20 45 C3 A9 0B 8D 53 B3
C300:C0 AD 59 C0 8D 4F C0 A2 58
C308:1E 8E 52 C0 A2 0A 20 6F 85
C310:C3 20 6F C2 EE 52 C0 A5 83
C318:FA 20 6F C2 A9 22 8D 52 82
C320:C0 AD 4F C0 A2 06 20 6F 46
C328:C3 20 6F C2 EE 52 C0 EE E4
C330:52 C0 A4 FA B9 08 C0 20 E4
C338:6F C2 EE 52 C0 A4 FA B9 73
C340:0E C0 4C 6F C2 A2 1D 8E E8
C348:52 C0 A2 0A 20 6F C3 20 84
C350:6F C2 EE 52 C0 A5 FA 20 F5
C358:6F C2 A9 21 8D 52 C0 A5 6C
C360:F9 20 6F C2 EE 52 C0 EE 38
C368:52 C0 A5 FA 4C 6F C2 86 D9
C370:F9 A2 00 38 85 FA E5 F9 FE
C378:90 03 E8 B0 F7 86 F9 8A 89
C380:60 20 EA C3 A0 00 A9 20 52
C388:AE 5D C0 D0 02 A9 00 91 2C
C390:FD EE BA C3 A9 08 8D CA B9
C398:C3 20 A4 C3 CE BA C3 A9 6D
C3A0:00 8D CA C3 AD 54 C0 0A 6B
C3A8:18 69 06 4A 4A 4A 8D 52 E4
C3B0:C0 AD 55 C0 0A 18 6D 55 9B
C3B8:C0 69 0D 4A 4A 4A 8D 53 2B
C3C0:C0 20 D5 C1 AD 55 C0 29 F4
C3C8:07 09 00 A8 B9 18 C0 A8 F8
C3D0:AD 54 C0 29 03 AA BD 14 41
C3D8:C0 AE 5D C0 F0 05 31 FD 20
C3E0:4C E7 C3 49 FF 11 FD 91 67
C3E8:FD 60 A9 00 85 FD A9 82 B6
C3F0:85 FE A9 50 85 FB AD 55 02
C3F8:C0 85 FC 20 9A C2 20 01 05
C400:C2 18 A5 FD 6D 54 C0 85 49
C408:FD 90 02 E6 FE 60 AE 56 90
C410:C0 8E 54 C0 EC 58 C0 90 0F
C418:15 A2 CA 8E 9A C4 8E FC 19
C420:C4 38 AD 56 C0 ED 58 C0 64
C428:8D 5A C0 4C 40 C4 A2 E8 2F
C430:8E 9A C4 8E FC C4 38 AD 42
C438:58 C0 ED 56 C0 8D 5A C0 F2
C440:AC 57 C0 8C 55 C0 CC 59 77
C448:C0 90 15 A0 88 8C B9 C4 B1
C450:8C DD C4 38 AD 57 C0 ED ED
C458:59 C0 8D 5B C0 4C 72 C4 07
C460:A0 C8 8C B9 C4 8C DD C4 72
C468:38 AD 59 C0 ED 57 C0 8D 8C
C470:5B C0 AD 5B C0 CD 5A C0 F5
C478:90 03 4C C0 C4 AD 5A C0 F2
C480:4A 49 FF 8D 5C C0 EE 5C 7A
C488:C0 AE 54 C0 EC 58 C0 D0 CF
C490:03 4C 03 C5 20 81 C3 AE A8
C498:54 C0 EA 8E 54 C0 18 AD 46
C4A0:5C C0 6D 5B C0 8D 5C C0 A1
C4A8:30 DF F0 DD 38 AD 5C C0 30
C4B0:ED 5A C0 8D 5C C0 AC 55 4D
C4B8:C0 EA 8C 55 C0 4C 89 C4 53
C4C0:AD 5B C0 4A 49 FF 8D 5C 76
C4C8:C0 EE 5C C0 AC 55 C0 CC 0F
C4D0:59 C0 D0 03 4C 03 C5 20 9B
C4D8:81 C3 AC 55 C0 EA 8C 55 1F
C4E0:C0 18 AD 5C C0 6D 5A C0 7D
C4E8:8D 5C C0 30 DF F0 DD 38 22
C4F0:AD 5C C0 ED 5B C0 8D 5C B4
C4F8:C0 AE 54 C0 EA 8E 54 C0 20
C500:4C CC C4 AE 58 C0 8E 54 9F
C508:C0 AC 59 C0 8C 55 C0 4C DD
C510:81 C3 20 9C C1 20 E4 FF 73
C518:C9 52 D0 04 A9 00 F0 06 AC
C520:C9 47 D0 08 A9 01 8D 5E C7
C528:C0 4C 12 C5 C9 55 D0 04 0F
C530:A9 00 F0 06 C9 4D D0 0B 3F
C538:A9 01 8D 5D C0 20 0E C4 C7
C540:4C 12 C5 C9 93 D0 06 20 D7
C548:90 C0 4C 12 C5 C9 5F D0 DB
C550:03 4C BA C1 AE 5E C0 D0 25
C558:06 20 AE C5 4C 12 C5 C9 21
C560:1D D0 10 AE 58 C0 E8 E0 14
C568:51 D0 02 A2 01 8E 58 C0 EE
C570:4C A8 C5 C9 9D D0 0E AE 9C
C578:58 C0 CA D0 02 A2 50 8E 90
C580:58 C0 4C A8 C5 C9 91 D0 C5
C588:0E AE 59 C0 CA D0 02 A2 3E
C590:37 8E 59 C0 4C A8 C5 C9 EC
C598:11 D0 0D AE 59 C0 E8 E0 ED
C5A0:38 D0 02 A2 01 8E 59 C0 9C
C5A8:20 DA C2 4C 12 C5 C9 1D 70
C5B0:D0 10 AE 56 C0 E8 E0 51 A0
C5B8:D0 02 A2 01 8E 56 C0 4C 2D
C5C0:F7 C5 C9 9D D0 0E AE 56 3F
C5C8:C0 CA D0 02 A2 50 8E 56 6B
C5D0:C0 4C F7 C5 C9 91 D0 0E 6F
C5D8:AE 57 C0 CA D0 02 A2 37 61
C5E0:8E 57 C0 4C F7 C5 C9 11 E1
C5E8:D0 0D AE 57 C0 E8 E0 38 0F
C5F0:D0 02 A2 01 8E 57 C0 20 3D
C5F8:AD C2 60 20 9F C1 A9 01 72
C600:8D 5D C0 20 E4 FF C9 54 D4
C608:F0 0D C9 5F D0 03 4C BA 66
C610:C1 20 AE C5 4C 03 C6 20 D4
C618:72 C7 AD 5F C0 F0 E4 A2 B2
C620:02 20 C6 FF 4C 38 C6 20 80
C628:26 C7 AD 5F C0 D0 09 20 E1
C630:CC FF 20 AD C2 4C 03 C6 17
C638:20 CF FF 8D 60 C0 A6 90 86
C640:8E 61 C0 C9 0D F0 18 AC 2B
C648:62 C0 C8 99 00 94 8C 62 B7
C650:C0 E0 00 D0 0A AC 62 C0 0C
C658:CC 5F C0 90 DB F0 D9 A9 45
C660:20 AC 62 C0 CC 5F C0 F0 D7
C668:02 B0 07 C8 99 00 94 4C D2
C670:64 C6 8C 62 C0 B9 00 94 1B
C678:C9 20 F0 03 88 10 F6 CC 80
C680:5F C0 B0 31 C0 00 F0 2D 2C
C688:8C 63 C0 A2 01 AC 56 C0 9F
C690:BD 00 94 91 FD E8 C8 EC BA
C698:63 C0 90 F4 E8 A0 01 BD F2
C6A0:00 94 99 00 94 E8 C8 EC 4D
C6A8:62 C0 F0 F3 90 F1 88 8C DE
C6B0:62 C0 4C E4 C6 AE 62 C0 ED
C6B8:BD 00 94 8D 63 C0 A2 00 F3
C6C0:CC 62 C0 F0 01 E8 8E 62 9F
C6C8:C0 A2 01 AC 56 C0 BD 00 7B
C6D0:94 91 FD E8 C8 EC 5F C0 D4
C6D8:F0 F4 90 F2 A2 01 AD 63 35
C6E0:C0 9D 00 94 18 AD 56 C0 64
C6E8:6D 5F C0 8D 63 C0 AC 57 C4
C6F0:C0 8C 55 C0 AC 56 C0 8C 85
C6F8:54 C0 20 EA C3 A0 00 B1 E5
C700:FD F0 07 C9 20 F0 03 20 33
C708:A4 C3 AC 54 C0 C8 CC 63 DB
C710:C0 90 E4 AD 61 C0 C9 00 3D
C718:F0 09 20 CC FF 20 AD C2 D1
C720:4C BA C1 4C 27 C6 AC 57 86
C728:C0 C8 C0 38 90 03 4C 6C 7B
C730:C7 8C 55 C0 A0 00 8C 54 EF
C738:C0 20 EA C3 18 AD 56 C0 AE
C740:6D 5F C0 8D 63 C0 AC 56 1D
C748:C0 B1 FD F0 09 C8 CC 63 DB
C750:C0 90 F6 4C 6C C7 8C 56 F9
C758:C0 88 F0 04 B1 FD F0 F6 27
C760:AD 55 C0 8D 57 C0 AC 56 7A
C768:C0 4C 87 C7 A9 00 8D 5F A0
C770:C0 60 AC 57 C0 8C 55 C0 27
C778:A0 00 8C 54 C0 20 EA C3 4F
C780:AC 56 C0 B1 FD D0 E5 A2 D0
C788:01 C8 C0 51 B0 08 B1 FD FE
C790:D0 04 E8 4C 89 C7 8E 5F 53
C798:C0 60 A2 02 20 C9 FF A0 DD
C7A0:01 8C 55 C0 A2 00 8E 54 11
C7A8:C0 20 EA C3 A0 01 B1 FD A4
C7B0:D0 02 A9 20 20 D2 FF C8 75
C7B8:C0 51 90 F2 A9 00 F0 03 70
C7C0:20 D2 FF AC 55 C0 C8 8C AB
C7C8:55 C0 C0 38 90 D6 4C CC 14
C7D0:FF AC 62 C0 F0 17 A2 03 10
C7D8:20 C9 FF A2 01 AC 62 C0 55
C7E0:BD 00 94 20 D2 FF E8 88 D4
C7E8:D0 F6 8C 62 C0 A2 02 20 0B
C7F0:C6 FF 20 CF FF 48 A4 90 DF
C7F8:A2 03 20 C9 FF 68 20 D2 EF
C800:FF C0 00 F0 E8 4C CC FF E2
```

MAC VIEW

DAVID ENGLISH

Don Lancaster is a man with a mission. Through his PostScript RoundTable on GEnie, he preaches the doctrine of *book-on-demand publishing.* Lancaster argues that today's low-cost laser printers make it cheaper to produce books in smaller quantities than in larger ones. He also claims that this method is faster and more flexible than old-style publishing.

Recent developments in the book industry have created the need for book-on-demand publishing. First, the chain bookstores have driven out most of the traditional mom-and-pop operations. While a typical mom-and-pop store stocks 60,000 titles, a typical chain store may stock ten copies each of only 6,000 titles. And because of the chain stores' collective buying power, they've bargained for the right to return any books that haven't sold within a short period of time.

Second, the IRS is, in effect, paying publishers to destroy their books. The IRS now requires publishers to carry the full value of an unsold book rather than its actual scrap value. A book returned because it's no longer popular has the same tax value as the new best-seller about to be shipped. Not surprisingly, publishers are shredding books by the millions and eliminating their backlists to keep their costs down.

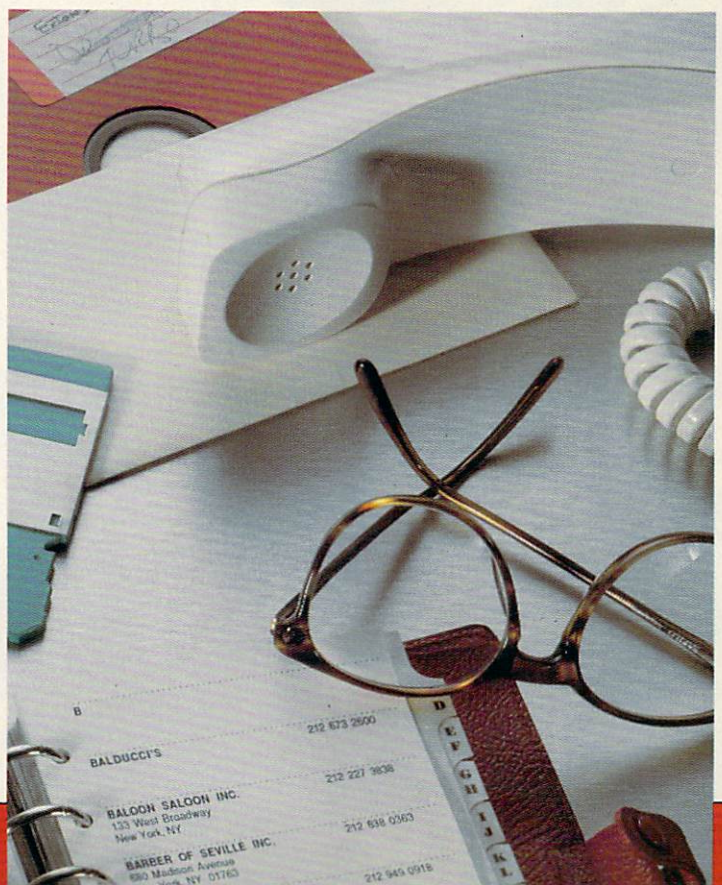
Finally, the big publishing houses are commissioning fewer books as they pay increasingly larger advances to a handful of megahit authors. There's only so much money around, so for every $25 million advance for a blockbuster sequel, 100 less-commercial books never see the light of day.

Tired of swimming against the stream, Lancaster decided to self-publish several of his own computer books—printing the books one at a time with his PostScript laser printer. Using a typical jiffy print shop, he figured he could produce a thousand copies of his book for $7,000. But with his laser printer, he could produce the same thousand copies for just $5,000, including the amortized cost of his printer.

More importantly, if he were to sell only a third of the books, his jiffy print shop costs would rise to a staggering $21 a book. But with book-on-demand publishing, his costs remain constant because he prints each book as it's needed. The book is stored electronically, so there's no actual inventory—and no tax penalty. Each book is on a permanent backlist that can be called up whenever it's needed. And the author can make changes at any time without the additional costs of printing a new edition.

To keep his costs down, Lancaster refills his own toner cartridges (lowering his toner costs to less than 0.3 cent per page), uses a duplex (double-sided) printer, and does his own maintenance and minor repair work.

Lancaster is a pioneer, but he isn't alone. In a number of disciplines, the dedicated enthusiast can now own the tools of the trade that used to be available only to the professional or the wealthy. Thousands of musicians are using their Macs with MIDI synthesizers, computer-controlled mixers, and cards that let them make CD-quality recordings direct to their hard drives. Computer-literate investors are using computer-based technical tools that rival the sophisticated stock-market programs used by the big brokerage houses. And programs such as *MacroMind Director* and *MacRenderMan* let individual artists create life-like animation that goes well beyond the quality of Saturday-morning cartoons.



We often hear that computers are widening the gap between the haves and the have-nots, that parents and small businesses in poor neighborhoods can't afford the technology and will slip farther behind. While that's a legitimate concern, the flip side is also true. With these powerful tools now available to a much larger group, there's a more broadly based opportunity for creativity and the possibility for a wider range of opinions.

If Lancaster is right, we may soon see a small army of one-person publishing houses producing custom books for a small but eager audience. Come to think of it, that's how publishing began nearly 600 years ago. ⊡

MAC MACINTOSH, APPLE II

PHOTO BY TERRY NIEFIELD

GETTING ORGANIZED

STEVEN ANZOVIN

FIVE PERSONAL DATABASE PROGRAMS THAT COST UNDER $100

How many times have you looked for that scrap of paper with the crucial phone number on it or searched in every jacket pocket for an important contact's business card? If the answer is *too often,* you need to get organized, and your Macintosh can help you do it—along with the right personal database program.

Personal databases manage your personal and business information—the names, numbers, addresses, dates, and lists that you refer to every day. They're not designed to provide the heavy-duty data massaging of a full-fledged relational database, such as *4th Dimension,* but they're quick, small, convenient, and much easier to use. Yet within these limitations, there's a wide range of capabilities.

In this article, I'll compare five popular personal databases for the Mac: *Address Book Plus* from Power Up Software, *Dynodex* from Portfolio Systems, *QuickDex* from Casady & Greene, *Retriever* from Exodus Software, and Apple's venerable *HyperCard.* I looked at how each program displays data on the screen, searches for and sorts records, imports and exports data, prints, and autodials.

See How They Run

Since a personal database (DB) is really an everyday tool, you've got to be comfortable with how it presents data on the screen—what I call the *data view.* Most likely, you'll want to choose a DB that corresponds to an information format you're already familiar with. If you're used to looking at real estate listings in list form, for example, you might want to choose one of the DBs with a list-type data view. If you plan to use your DB primarily as an address book, choose one that looks like a FiloFax.

Address Book Plus has the most data-view flexibility, offering list, address book, and envelope and label views, among others. *Dynodex* lets you see an address book view and a list view at the same time. *Retriever* shows a list view only, but it has the best features for manipulating the view, with resizable and collapsible columns. *QuickDex* is freeform—you have a single 512-character card that accepts any information in any order you choose—and you can see cards from up to eight different *QuickDex* files at the same time. *HyperCard* has the most customizable data view; you

can arrange fields, buttons, and pictures in any order within the size limits of a single card, but you have to acquire the skills to do so.

Hide and Seek

The one thing you'll do most often with a database is search for a specific name or address. All of these programs let you enter a text string and search for it in every field; the more structured databases also let you search only the specific fields that you name or have previously marked. *Dynodex* has the most search options—find, find next, find previous, match case, find and change to, find in marked field(s), and show a list of frequently searched for strings.

Unless you like to waste time, fast and efficient searching is a must. To test search speed, I created a 500-record text document (57K in size) and imported it into each database. On my Mac IIcx, I did a series of five timed searches through all fields for a single four-character word in the last record and then averaged the results. If it's fast access you're looking for, *QuickDex* is the speed champ. It found the key word in a fraction of a second, faster than my stopwatch reaction time. *HyperCard* is nearly as fast, and *Address Book Plus* is acceptably quick at a little over a second. The tortoise of the bunch is *Retriever,* which took at least 16 times longer than *QuickDex* to find the key word.

Sorting your records in a specified order, usually by alphabet, is also a useful feature. All the programs, except *QuickDex,* let you do this on-screen, and *QuickDex* can do it as part of its printing utility, PrintDex. You can choose which field to sort by—the last-name field or the company field, for example—and whether to sort in ascending, descending, alphabetic, or integer (by number) order. Also, *Address Book Plus, Dynodex,* and *Retriever* let you mark fields for sorting and searching by custom categories.

Import/Export Business

How easily you can get address lists in and out of a personal database is another factor you'll want to consider. You may want to import a tickler file into your personal DB from a spreadsheet or another database, or you may want to export an address list to a word processor for mail merging with a form letter. Each personal DB has provisions for importing and exporting, though some are easier to use than others.

Address Book Plus, Dynodex, and *Retriever* all can import and export tab-delimited text files using simple menu and dialog options. If you're importing a word processing document, for example, the text to go into each field has to end with a tab, and each record has to be delimited by a carriage return. Before importing, you also have to prepare a new DB file with the proper number and order of named fields. Once you're set up, the conversion should go smoothly.

Importing and exporting to and from *QuickDex* is more of a pain, since it uses a custom file format delimited by carriage returns and asterisks instead of tabs that other databases can't create and no word processing mail merger will recognize. There's a workaround, which involves moving *QuickDex* files to *HyperCard* by using the conversion stack included with *QuickDex* (*Dynodex* and *Retriever* have similar stacks) and then converting the address stack you've just made to a tab-delimited text file using *HyperCard*'s own Export button on the *HyperCard* Ideas disk. This is so cumbersome, however, that you'd be better off using *HyperCard* alone, moving address data with the Import and Export buttons or writing your own scripts. *HyperCard* is also the only one of these programs that accepts graphics.

The Right Connections

If you need a personal database, you're already likely to be using a paper-based personal organizer like a Filofax or Day-Timer. At least that's the thinking behind *Address Book Plus, QuickDex,* and *Dynodex,* which can print pages that fit these and other popular address books; *Dynodex* can also print double-sided pages. *QuickDex* requires a separate printing utility, PrintDex, which comes in the *QuickDex* package. *Retriever* can only print a WYSIWYG version of its datasheet screen display, while *HyperCard* can print list and column reports, labels, and pictures of cards, but not organizer pages. Interestingly, none of these programs are set up to feed data to the latest incarnation of the personal organizer, the palmtop computers such as Sharp's Wizard and Casio's B.O.S.S.

One thing no paper organizer can do is dial the phone for you, but most of these programs can. Select a phone number, click on the dial button or choose the Dial menu option, and your call will go through—assuming you've got a phone and/or modem hooked up to your computer and have set up the right dialing protocols. *Address Book Plus* has its dialer available as a DA, *Dynodex* and *QuickDex* have dialing integrated into the program, in *HyperCard* you have to install a Dial button or write a script for that function, and *Retriever* doesn't offer dialing at all.

People's Choice

If all you're looking for is a place to store names and numbers with the least fuss, *QuickDex* can't be beat. If you need a more structured environment, however, *Address Book Plus* and *Retriever* offer many of the features of bigger flat-file databases, but at less cost.

The fact that *Retriever* is a DA, and thus is accessible from any program, is a big advantage over *Address Book Plus,* unless you have enough RAM to run MultiFinder. It's also easy to modify the appearance of *Retriever*'s list display. On the other hand, I like *Address Book Plus*'s wider choice of data views, and it has a quicker, more responsive feel.

Dynodex is also fast, and with its flexible printing options, it's well suited to people who live by a Filofax or Day-Timer.

And *HyperCard,* despite its much larger application size and relatively inefficient data view, can do much more than any of the others—if you're willing to take the time to learn the necessary programming skills.

No matter which program you choose, though, putting your personal data on your Mac will save you time, effort, and lost opportunities.

Steven Anzovin is a freelance writer and consultant based in Amherst, Massachusetts. He's the author of *Exploring HyperCard* and *Macintosh Desktop Presentations,* both from COMPUTE Books. ⊡

For more information about the products mentioned in this feature, contact the software companies listed below.

Address Book Plus 1.0—$89.95
Power Up Software
P.O. Box 7600
San Mateo, CA 94403
(415) 345-2662

Dynodex 1.2—$99.95
Portfolio Systems
21 E. Market St.
Rhinebeck, NY 12572
(800) 729-3966

HyperCard 1.2.5—$49.95
(Free with purchase of Mac)
Apple Computer
20525 Mariani Ave.
Cupertino, CA 95014
(408) 974-6144

QuickDex 1.4d—$60.00
Casady & Greene
P.O. Box 223779
Carmel, CA 93922
(408) 624-8716

Retriever 1.01—$89.95
Exodus Software
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Cincinnati, OH 45231
(513) 522-0011

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HOMECARD

ROGER WOOD

The Macintosh changed the nature of word processing by bringing multiple fonts and styles to the computer screen. So when *HyperCard* allowed only a single font and style in any field, many dyed-in-the-wool Mac users cried foul. What's so great about a Mac application with only one text style per field?

HyperCard 2.0 finally remedies the situation. Now you can mix fonts, sizes, and styles in any combination in any field. These text attributes can be assigned through the normal *HyperCard* Text Style dialog box, under script control, or via two familiar menus, Font and Style.

Another big complaint came from those who hoped that the *hyper* in *HyperCard* stood for hypertext capabilities but found the application short on real hypertext features.

In its simplest form, hypertext can let you click on a word—a scientific term, for example—and be whisked away to a glossary that defines and illustrates the word. In hypertext parlance, we say that the word in the field is *hot.*

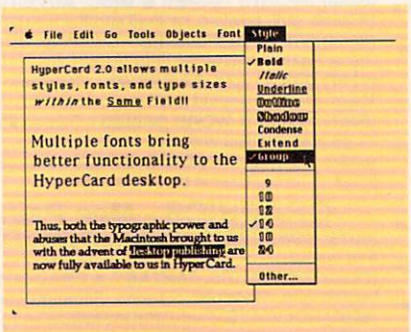
As simple as this seems, *HyperCard* didn't have a device to tie script actions directly to a single word in a field. You could paste buttons over words and thus easily find where the mouse was clicked. But if a word had been moved within the field during editing, the button wouldn't stick to the word, and the button could even end up over the wrong word.

Enter three new functions in *HyperCard* 2.0: clickText, clickChunk, and clickLine. To use any of these functions, you just lock the field that contains the text with the hypertext capabilities. Then you can use these new functions in the field's mouseUp script to cause some hypertext action.

For example, let's say you're writing a *HyperCard* stack about astronomy and want use the term *azimuth* without having to define it within the field. Lock the field and put the following in the field script.

```
on mouseUp
   if the clickText is "azimuth" then
      go to card "azimuth definition"
end mouseUp
```

Then create a card called *azimuth definition* that defines it and has an illustrative drawing, and your main discussion won't be cluttered with duplicate definitions.



***HyperCard* 2.0 allows multiple fonts.**

The clickChunk function is a bit more obscure if you're not well versed in HyperTalk terminology. A *chunk* is a HyperTalk expression that describes a particular segment of text—both within a field or within a HyperTalk variable. It can be defined in terms of characters (chars), words, or lines.

For example, if card field 1 begins "HyperCard 2.0 allows multiple styles, fonts, and type sizes within the same field," *HyperCard* would be described as "char 1 to 9 of card field 1." Similarly, a word is defined as a number of characters separated by spaces, thus *HyperCard* is "word 1 of card field 1."

These chunk expressions provide the key to altering the font, size, or style of part of the text within a field. For example, if you wish to change the style of the word *HyperCard* in the above example to italic, you would use "set the textStyle of char 1 to 9 of card field 1 to italic." You could also refer to "word 1" in place of "chars 1 to 9" to accomplish the same thing.

The concept of the line can be a relatively elusive chunk expression. It doesn't matter how many physical lines appear in a field on the screen; a line is any number of characters with a carriage return (ASCII 13) at the end. It can be several physical lines.

In our example, even though the text wraps after the word *multiple,* line 1 would be the entire sentence because there's no carriage return until the end of the third physical line. The clickLine function simply returns the number of the line that was clicked in a locked field. It returns "line 1 of card field 1" no matter which word in the sentence you click on.

The new style, *group,* is another great feature for those doing hypertext applications. Using our example, let's say you want both *desktop* and *desktop publishing* to be hot. If you use only the three functions I described above, when the user clicks on desktop, you would have no way of knowing whether the selected word was next to *publishing.*

The group text style solves that. By selecting both *desktop* and *publishing* together and choosing group from the Style menu, the clickText function returns both words together if either is clicked on—thus making it easy to distinguish which *desktop* was selected.

The major drawback to these new hypertext enabling functions is that they don't provide a standard device for users to identify a word that's hot.

That is, a word can be hot and look just like every other word. One HyperTalk programmer might use bold text to identify a hot word, while another might use italic, and another might use underlining. *ToolBook,* an application from Asymetrix for PCs and compatibles that runs under *Windows* 3.0, has standardized hot text by drawing a box around every hot word—a device not available in *HyperCard.*

With this one caveat, *HyperCard* 2.0 has come a long way toward being the hypertext application that many educators have been looking for.

Roger Wood has worked as editor of *HyperLink Magazine* and managing editor of *Home Computer Magazine.* ⊡

APPLE PICKS

GREGG KEIZER

CREATE YOUR OWN CHRISTMAS NEWSLETTER

Christmas already? That means my cards and letters need to go out—now! Wait, I don't have time to write a hundred letters and still make a living and have a life.

The solution? Mass mailings. I've taken a page out of my Congressman's playbook—his slick newsletter regularly hits my mail slot to remind me what a great guy he is. I've gone high-tech in order to keep in touch with far-flung friends and distant relatives.

I know, I know. You're dead set against anything that reminds you of those gruesome mimeographed holiday letters you got years ago. Don't worry. Everyone will love your message if the medium is nicely designed and attractively illustrated.

I've been designing, writing, and mailing a holiday newsletter for years. Maybe it's the only written communication some people get from my family all year, but it hits the family highlights, it's fun to read, and best of all, it looks good.

Until this year, I've created our family newsletter on a Macintosh. No more. This year, I switched to *Graphic Writer III* (Seven Hills Software, 1310 Oxford Road, Tallahassee, Florida 32304; $149.95), a great desktop publishing program for the IIGS. Like most other desktop publishing programs, *Graphic Writer* works with frames, which are boxes you build to hold text or graphics.

Designing a four-page newsletter with *Graphic Writer* took less than 30 minutes. The process is easy because of features like color-coded column and snap-to guides and master pages you define to set up margins and page numbers. Onscreen rulers ensure you've got things lined up right, and the program quickly sets up a multi-column format.

Other topnotch features include frame linking, which automatically flows text from one column to another, and text wrapping, which allows words to cunningly wind around illustrations.

Though typing text in *Graphic Writer* isn't as unbearably slow as in some other Apple IIGS programs, I still prefer to write with something faster, like *AppleWorks*. *Graphic Writer* really shines here, for its translation capabilities are most impressive. I wrote with *AppleWorks* 3.0 at blitzkrieg speed, then poured the copy into a *Graphic Writer* layout with bold-facing and underlining intact. Nice.

A desktop publishing program on the IIGS wouldn't be much without graphics or color. *Graphic Writer* doesn't let you down here, either. The built-in graphics tools are nothing special—the typical pencil, brush, eraser, magnifying glass, and geometric shape-makers—but the program makes it as easy to import graphics as it does text.

Print Shop (both the classic and the IIGS versions) and single-, double-, and super-hi-res images can all be grabbed and placed within *Graphic Writer* documents. Because *Print Shop* graphics are so easy to find, I scattered several throughout my newsletter.

Color is often vastly overrated in Apple IIGS software, and, though I still think it has limited application, I did find a way to put *Graphic Writer*'s color capabilities to work for me. I spotted the first page of the newsletter with color, primarily in the masthead (the name of the newsletter) and a great graphic, and then printed it out on an ImageWriter II.

For a moment, I was stumped—my printer would be tied up past Christmas printing 100 originals. Then I remembered that a local copy shop—a Kinko's outlet—had a color copier. Down to the copy shop I went, and in a half hour I had a four-color newsletter (all right, just the first page, but at those prices, I couldn't afford more).

Graphic Writer comes packed with extras, such as a disk full of new fonts and two disks of clip art. I didn't have much use for the fonts—I like to stick with classic font families such as Times and Helvetica—but the clip art was terrific. I used the map of the U.S. to show the family's 1990 travels.

Printing is slow, really slow. There's not much you can do about that. I didn't think much of the program's dot-matrix output anyway, so I headed to the local Apple dealer to make master copies of my newsletter's remaining three pages on a LaserWriter NT. Everything worked flawlessly, and the output was super.

Graphic Writer III is fast and feature-heavy, yet friendly. It's the first Apple IIGS-specific desktop publishing package I've been willing to recommend, and it made my annual newsletter creation chore as much fun for me as I hope its reading is for my friends and relatives.

If you're launching your first-ever holiday newsletter, here are some things to keep in mind.

- Use at least ten-point type. Twelve-point is better, especially if you're sending the newsletter to anyone over 35. No one likes to squint.
- To personalize each newsletter, create an empty frame on the last page of your newsletter and save the file as MASTER. Write short, individual notes to each recipient; then import them into the empty frame. Remember that you'll have to save each newsletter as a separate file and print out that page for each newsletter.
- If you have access to a scanner, digitize a family photo and place the resulting graphic on the second page, above a frame labeled *Staff*. Even if the picture is crude, your readers will get a kick out of it. ⊡

NEWS & NOTES

New Nitpicker

If you're one of the 20,000 Mac users who purchased *Grammatik Mac,* you're in luck. Reference Software is offering a free upgrade to version 2.0, which features a new interface and expanded word processor support. If you haven't registered your copy of version 1.0, you can call the company on its toll-free line and provide the serial number from the distribution disk.

Commie Network Exposed

Old-style communism has undergone radical changes in the last two years. Now the Soviets are linking their computers in a way that would have made Karl Marx proud. Currently, five deputies in the Soviet Parliament have their Macs networked together, and seven other Macs are being used by the Parliament's technical staff.

In order to increase the Parliament's efficiency, the government has commissioned the Moscow-based Interproject to create a Mac-based "information system." It will use a Russian version of the Macintosh System software that was developed by Interproject and Apple programmers.

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New Math

The most recent version of the Mac operating system has been System 6.0.5, and the new low-cost Macs are shipping with System 6.0.7. So what happened to 6.0.6?

Apple had planned to release System 6.0.6 with the changes needed for the three new Macs—including a new Sound Manager—but it discovered two nasty bugs at the last minute. The first can cause a Mac to act as though it's no longer connected to a printer or AppleShare server. The second can cause a Mac LC to ignore the keyboard until the mouse is moved.

The bugs have been fixed in System 6.0.7, and Apple has "reworked" its inventory to include the newer system. The company is shipping 6.0.6 to Europe with an INIT that fixes the bugs while it works to complete a European version of 6.0.7.

Running Late

Apple finally admitted what most industry watchers have suspected for months—System 7.0 won't ship until 1991 or, as Apple put it, "the first half of calendar 1991." Alpha versions have been available to developers since May, but the first beta version wasn't expected to be ready before October—a full year behind schedule.

While some developers will have to delay their new products once again, Apple insists the new system software will be worth it. According to Roger Heinen, Apple's vice president of software engineering, "With the additional feedback from our developers, we are confident that System 7.0 will shatter traditional notions of what personal computers can do."

Talk Is Cheap

How can owners of older Macs add the sound-input capabilities of the new Macintosh LC and Macintosh IIsi? Premier Technology offers an inexpensive solution.

The MacMic, pronounced *mac mike,* consists of a 2 × 2 × .75 inch digitizing microphone, a 6-foot cable, and a Velcro fastener that lets you attach the microphone to your computer or monitor. It plugs into either of the two serial ports and comes with software that lets your Mac recognize the unit as a standard sound-input device.

The MacMic is available for $59.95 from Premier Technology, 2040 Polk Street, Suite 288, San Francisco, California 94109; (415) 424-1963.

News & Notes by David English

REDISCOVER A CLASSIC • CREATE PRESENTATIONS
UNLEASH ARTISTIC TALENTS • FIND THE RIGHT WORD

WORDSTAR 6.0

Big but not unwieldy, powerful but not too complex, packed with desktop publishing features and advanced integration capabilities for power users—*WordStar* 6.0 is all these things and more. If you know the *WordStar* interface but haven't taken a look at the program in a few years, you'll welcome its new power and versatility. If you're unfamiliar with this word processing classic, fasten your seatbelt.

Over the years, *WordStar* has grown from a friendly little CP/M program occupying part of a disk to an MS-DOS power package that comes on 21 floppy disks. What keeps *WordStar* fast, sleek, and manageable—rather than lumbering and forbidding, as you might expect—is a sensible set of strategies, including selective installation of features, numerous default settings, clever memory management, selective help levels, and nesting and chaining capabilities.

WordStar's tower of powerful disks contains all you'd expect in a first-rate word processor: spelling checker, thesaurus, cut and paste, find and replace, undelete, macros, mail merge, page preview, footnotes, endnotes, word counting, and a multitude of formatting options. Numerous additional features enhance and simplify your routine word processing, such as vertical centering (no more counting lines to center your correspondence), printing from the keyboard (no more going to typewriters to address envelopes), and one I particularly like, the definitions dictionary, which helps you pick just the right word from the thesaurus. An extra-window capability lets you compare documents or passages in the same document and cut and paste with ease. Then there are *WordStar*'s dot commands, which control everything from headers and footers to page numbering and sheet feeding. In short, you have tremendous control over the writing process and product.

More advanced features make this a program you can grow into. *WordStar* lets you insert work sheets from *Lotus 1-2-3, Symphony,* or *Quattro,* as well as files from *DBase.* The Inset program included with the package puts graphics anywhere in your text. You can use a variety of fonts if you have a printer that supports them. *WordStar* supports scalable fonts on the HP LaserJet III, Canon LBP-4, and PostScript printers; and you can kern if you have PostScript or certain HP LaserJet printers. Save time with *WordStar* paragraph styles, which let

Check graphics, fonts, and more in *WordStar*'s Advanced Page Preview.

you preset print attributes, margins, tabs, line height, fonts, and more. Instead of starting over with every document, just choose an appropriate paragraph style. *WordStar*'s page preview lets you see how fonts, graphics, and other features of a document will look before you go to the trouble of printing. As you can see, these are features that people in business can take advantage of to create highly polished, professional documents that get results.

As if all this weren't enough, you also get several companion programs. With MailList, you create form letters and print envelopes, labels, Rolodex cards, and reports (for example, a phone list). PC-Outline helps you plan writing and keep track of your work; ProFinder is a handy DOS shell; Star Exchange allows file conversions between *WordStar* and several other word processors; and TelMerge is a sophisticated telecommunications package that allows file transfers, E-mail, and script files for easy access to online services.

Obviously, everyone won't take advantage of every feature of the program, and that's why you shouldn't let all the disks disconcert you. Seven of the disks contain printer information, and you'll use only a small part of it. What's more, the straightforward installation program lets you install only what you need. There's even a way to set up a bare-bones version of the program to run on a two-floppy system in 384K (Run README.COM), although the program is really optimized for use with a hard disk.

A mere novice can take advantage of this full-featured program, thanks to a great tutorial disk, a choice of interfaces, built-in defaults, and excellent help and documentation. Beginners will want to install the program to use the pull-down menus, which allow you to highlight and choose instead of using the old control-key combinations. *WordStar* comes with default settings for nearly every feature—even several paragraph styles—so that beginners won't have to change or customize settings till they're ready.

Context-sensitive online help is always available, and *WordStar* provides four excellent manuals. I particularly like the step-by-step examples of applications, which showed me how to easily create a newsletter.

The classic menus are still there to give you the touch-typing speed and convenience for which *WordStar* is famous, and you can still set your help level to include or exclude particular menus. You can also use your function keys to execute oft-used

MS-DOS

commands. Throughout the program, *WordStar* offers a tremendous degree of flexibility, allowing you to customize it according to your likes and needs.

Clever memory management keeps *WordStar* fast, despite its great size. It resides in memory, and if you have enough memory, the spelling checker and text files can run RAM resident. With enough memory, you can print one file while editing another. A RAM usage display helps you make the best use of the program.

If you work with long documents and dread navigating long files and waiting for saves or finds, you'll love the nesting and chaining feature. It ties together several small files and provides continuous pagination; this feature has saved me untold time and effort. *WordStar* also lets you place markers in files and specify a particular page to move to so that you won't waste time creeping paragraph by paragraph through your document. Need an index? *WordStar* can index selected words or every word in a document. The program can also simplify your creation of a table of contents.

Of all the versions of the program I've used, this is the fastest and easiest. If there's any significant shortcoming, it's the lack of better mouse support; only a Logitech mouse driver comes with the program, and you can use the mouse only with menus. This may discourage some users, but not the touch-typists who've enjoyed and remained faithful to this program for years. This latest version of *WordStar* makes it a contender among high-end word processors. It might very well attract new converts.

MIKE HUDNALL

Ease of Use	★★★★
Documentation	★★★★★
Features	★★★★
Innovation	★★★★★

IBM and compatibles, 384K (512K to use Advanced Page Preview, outliner, or graphics), graphics card for Advanced Page Preview, two floppy drives or one floppy and one hard drive—$495

WORDSTAR INTERNATIONAL
201 Almeda del Prado
Novato, CA 94949
(800) 227-5609
(415) 382-8000

MIRROR III 2.0

Softklone's original *Mirror* was designed to be a clone of *Crosstalk*, a popular business communications program. The latest version of *Mirror*, although completely compatible with *Crosstalk XVI*, offers a number of substantial improvements: additional file-transfer protocols, MNP support, a built-in text editor, a background mode, mouse support, and much more. Best of all, *Mirror III* costs less than *Crosstalk XVI* ($149 rather than $195).

Mirror III's status screen lets you view parameter settings and includes a command line for entering two-letter mnemonic commands, such as NU (NUmber), CA (CApture), RX (Receive XMODEM), and EM (EMulate).

***Mirror III*'s Dialing Directory features easy-to-use pull-down menus.**

The dialing directory provides easy access to a list of phone numbers and can indicate system names, transfer rates (such as 1200 or 2400 bits per second), formats (parity, data bits, duplex, and stop bits), and scripts (if you're using them). *Mirror* provides an unlimited number of directories and entries within directories and lets you chain-dial as many as 30 entries at a time. You can access the commands necessary for just about any online session with the easy-to-use pull-down menus.

Beginners will especially like the *newuser* option, which will write a script to get you online with databases you're currently using, such as CompuServe, NewsNet, Delphi, MCI Mail, and Dow Jones. For systems not listed, you can use the learn command, which watches you log on to a system and writes a log-on script.

Experienced users will appreciate the variety of file-transfer protocols, including XMODEM, YMODEM, Kermit, Crosstalk, Hayes, CompuServe-B, and CommPressor. Support for ZMODEM is included through a shareware program ($20 to register) that's provided with the package.

Mirror's PRISM script language is an expanded version of *Crosstalk XVI*'s script language and is upwardly compatible. PRISM's most significant improvement over *Crosstalk*'s language is its ability to run script programs in the background.

There are many other features, including the ability to capture all or part of an online session to memory, disk, or printer. A backscroll command lets you recall text that has scrolled off the screen. A host mode lets other computers call your computer, leave messages, and down- and upload files. You can also redefine your computer's function keys.

Mirror III is well supported with frequent software upgrades and an excellent BBS. It has a 60-day money-back guarantee, and it gives you a lot for your money. You're not likely to outgrow this program.

DAVID ENGLISH

Ease of Use	★★★★
Documentation	★★★★
Features	★★★★
Innovation	★★★

IBM PC and compatibles, 256K (640K recommended for optimum background operation), DOS 2.0 or higher, modem—$149

SOFTKLONE
327 Office Plaza Dr.
Suite #100
Tallahassee, FL 32301
(800) 634-8670

BAD BLOOD

Origin's *Bad Blood* presents a barren postapocalyptic wasteland in which the mutes (mutants) and humes (humans) maintain a dangerously delicate balance of power. Because an all-out war would be disastrous for the mutes, you're sent on a mission to find out just what's got the humes so "wadded up."

MS-DOS

To accomplish this, you have a choice of three characters: Varrigg, a powerful mute who reportedly once slagged a whole band of Kejeks single-handedly; Jakka, a shivvy slicer who can down a buzzar at 40 paces with a blast from her eye beam; or Dekker, the only human ever born to the mutes. Set out from the village of Mardok and travel throughout the plains, interacting with mutes from surrounding villages and battling the numerous beasts of the Plains along the way. Fortunately, there are plenty of weapons and ammo available on the Plains, including nades, sodoffs, buzooks, oozees, clubs, and vibrablades.

As you play *Bad Blood,* a detailed overhead view of your character appears on the screen of an ancient television set abandoned on the Plains.

Use an ancient television in *Bad Blood* to make choices for your character.

The TV's knobs describe your choices—Talk, Inventory, Examine, Use, and Options (Pause, Save, Load, and so on). To the right of the TV is a green bottle filled with water. The water level serves as a visual indicator of your state of health. Finally, message windows below the television set contain important text and dialogue. *Bad Blood* uses a menu-driven conversation system that lets you choose from a range of topics appropriate to your progress in the game.

The game comes with a 20-page manual that includes a map of the Plains and a list of Mutant Chat terms, a reference card, and a copy of *Thale's Comprehensive Guide to the Beasts & Savages of the Plains.* This foldout not only describes the beasts you'll encounter on the plains, but it also serves as copy protection for the program. Before starting, for instance, you must answer a question such as *Where does a Bushbug usually hide?*

Bad Blood is a first-rate role-playing game with appealing graphics and a terrific musical soundtrack (which can be toggled off once you've had enough of a good thing). Up to three games can be saved in progress, but unfortunately, beginning a new game erases all of your previously saved games. This is the only fault in an otherwise very playable RPG.

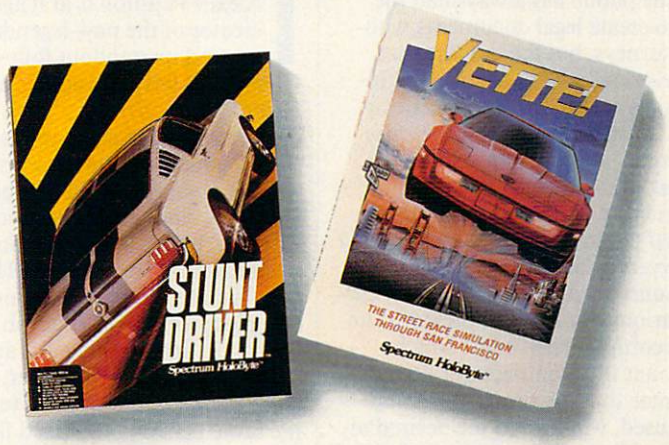
BOB GUERRA

Playability	★★★★
Documentation	★★★
Originality	★★★
Graphics	★★★★
Sound	★★★★

IBM PC and compatibles; 512K RAM (640K for VGA); CGA, EGA, MCGA, VGA (256-color), Tandy 16-color; joystick optional; supports Tandy 3-voice, Roland, Ad Lib, GameBlaster (CMS), Innovation, and Covox sound boards—$49.95

ORIGIN SYSTEMS
P.O. Box 161750
Austin, TX 78716
(800) 999-4939

DRIVE IT



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HOME LAWYER

Many of the most important decisions you'll make require expert legal assistance. Unfortunately, legal advice can be expensive and hard to understand. To the rescue comes *Home Lawyer* from Meca Ventures, a user-friendly expert program that helps you create simple legal documents and special letters.

Home Lawyer generates documents in plain English from your responses to simple questions. You can respond directly onscreen or first print a paper work sheet and then transfer information from the work sheet to the screen. To help you out, the program offers response choices (sometimes samples); these appear on the screen and in the very clear and complete manual provided with the program.

With *Home Lawyer,* you can create simple legal documents, including wills, powers of attorney, residential leases, promissory notes, bills of sale, and independent contractor agree-

MS-DOS

ments. Special letters the program helps you write include demands for money owed, bad-check notices, and requests for credit reports.

The public has always had the right to create legal documents without attorneys; but the legalese that comprises most laws, forms, and instructions makes writing legal documents an arduous—and sometimes dangerous—task. *Home Lawyer's* greatest strength is the fact that it's user friendly. It allows you to do for yourself much of what you once relied on lawyers to do for you.

Consequently, *Home Lawyer* carries various disclaimers, including an initial comprehensive one which states that the manufacturer does not guarantee that the program is valid when used, will lead to the desired result, or will carry out the intentions of the user. It also includes a directory of State Bar Associations and notes when to consult an attorney.

Home Lawyer allows no customizing of documents other than in response to its questions. I found this particularly frustrating because its durable power of attorney provides consent for medical *and* personal care. Powers of attorney for medical care are valuable documents that should be left for babysitters, neighbors, and schools responsible for children when the parents are unavailable. However, *Home Lawyer's* version incorporates the right to make decisions regarding personal care, support, maintenance, and living arrangements, as well—virtually giving custody to the caretaker.

At a list price of $119, I would've expected more choices or more ability to customize. Perhaps future versions will correct these problems by expanding the types of documents which can be created. Then you could truly say that you had a lawyer in your PC.

SUSAN PARATO

Ease of Use	★★★★
Documentation	★★★★
Features	★★
Innovation	★★

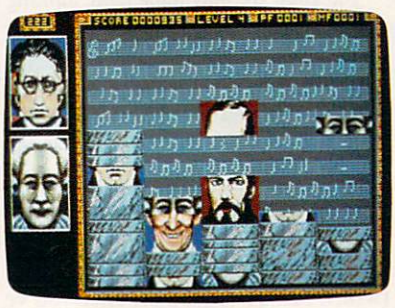
IBM PC and compatibles, 256K RAM, DOS 2.0 or higher—$119

MECA VENTURES
327 Riverside Ave.
Westport, CT 06880
(203) 226-2400

FACES . . . TRIS III

The Russian game-making master Alexey Pajitnov is at it again. The creator of the now-legendary *Tetris* and its standout follow-up *Welltris* has written another one—*Faces . . . Tris III.*

Having exhausted, in his two earlier games, the dimensions in which to manipulate falling blocks, Pajitnov brings forth a new concept. In *Faces,* blocks still fall against a graphic mural background. The difference is that each block contains one of five pieces of a face. Your job is to pile up a chin, lips, a nose, eyes, and a top of the head in the right order. You get more points if they happen to be from the same person, but mixed faces are OK, too. A face constructed out of order turns into a marble block, which obstructs further progress.



See how your skills stack up in *Faces*.

It sounds simple—and it is. Simplicity and elegance are Pajitnov's trademarks. But whereas his two earlier hits resembled interactive creative puzzles, *Faces* too often resembles an animated jigsaw puzzle without the interactive variety of *Tetris* or *Welltris.*

The 60 faces themselves are a delightful mix of historical figures (Napoleon), whimsical monsters, holiday faces (Santa Claus, Uncle Sam), and a variety of cultural images (Mona Lisa, Shakespeare). Only 16 of the faces are identified in the manual as part of the documentation-based copy protection.

Watch for some amusing touches in the faces. Gorbachev's eyes shift back and forth as they fall down the screen, for example, and there are other small, unexpected bits of animation in the faces.

The graphic mural backdrops are intricate gray-scaled American scenes and patterns matching the set of faces used in each of the ten levels. The vanity board and several sign-on screens use the full VGA color palette, as do the faces themselves.

Faces is a good game with excellent and entertaining graphics and enough challenge to make it worth playing. It faces an uphill battle, however, in its unenviable position as the third in the Tetris series. What may be more compelling than the game itself is anticipating what Pajitnov will accomplish the next time around—especially if he abandons falling blocks.

RICHARD O. MANN

Playability	★★★
Documentation	★★★
Originality	★★★★
Graphics	★★★★

IBM PC and compatibles; 512K RAM (640K for VGA); CGA, EGA, MCGA, VGA, Hercules, or Tandy 1000; supports Ad Lib and SoundBlaster boards and Tandy 1000 sound; joystick optional—$39.95

SPECTRUM HOLOBYTE
2061 Challenger Dr.
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(415) 522-3584

CIRCUIT'S EDGE

In the Budayeen, a quasi–Middle Eastern environment surrounded by walls, rough trade flourishes in alleys, on back streets, and along the main thoroughfare, known only as The Street. This is a criminal neighborhood, seamy and dangerous. This is the setting of Infocom's *Circuit's Edge.*

Based on the Audran stories of George Alec Effinger, the game is played from the perspective of Audran, an addictive, not really likable sort, whose talents and inclinations continually bring him to the edge of disaster. The most successful players will learn how to see the world through Audran's jaundiced eyes.

Infocom has done a fine job of making the Budayeen, the game's centerpiece, come alive. More than any of its earlier attempts at graphic adventures, this one communicates a real sense of place. You can stroll along the garish Street, dropping into vari-

MS-DOS

ous places of business, or skulk through darkened alleys where anything can happen. Onscreen mapping helps you get a feel for the game's locale. The Budayeen *is* the story, in many ways, although there's naturally a problem-solving plot to navigate through.

The game's manual includes a map of the Budayeen, complete with a directory and addresses of various businesses and establishments. Three pages of hints help you through the tougher problems. Lists of characters and a glossary also contain hints and tips that can be exploited during play.

In the seamy setting of Infocom's *Circuit's Edge*, there are many dangers.

While *Circuit's Edge* can be played via the keyboard, the program works best with a mouse. Effinger's characters can use technology to alter or enhance personality by way of "moddies"—modules inserted into sockets in the skull. "Daddies" are modules that extend characters' powers and abilities. Audran can use daddies to dampen pain, fatigue, and so on. There is, as players discover, a price to be paid for using modules.

Circuit's Edge is more adult than most software, and parents might want to consider this before passing the program to preadolescent kids. The Street is populated with drug dealers and prostitutes, among others, and it's possible to interact with them. Admittedly, taking drugs or engaging in illicit sex results in losing points, but the distinction may be too fine for younger players. I'd rate this game at least PG-13, perhaps even R.

While *Circuit's Edge* suffers from some of the problems typical to adventure games—repetitive dialogue loops, scenes that rest on puzzles rather than on plot—the game also represents an attempt to extend the materials on which adventures are based. There's little that's smutty about the game's adult scenarios; rather, they represent the context of the Budayeen, and do so well. *Circuit's Edge* is the most sophisticated of Infocom's recent crop of games and a good indication that the company may make the transition from text-based adventures to graphical storytelling.

KEITH FERRELL

Playability	★★★★
Documentation	★★★★
Originality	★★★★
Graphics	★★★★

IBM PC and compatibles; 512K RAM; DOS 2.11 or higher; CGA, EGA, VGA, or Tandy 16-color graphics; supports AdLib, Roland, and MT-32 sound cards and Microsoft and compatible mice—$49.95

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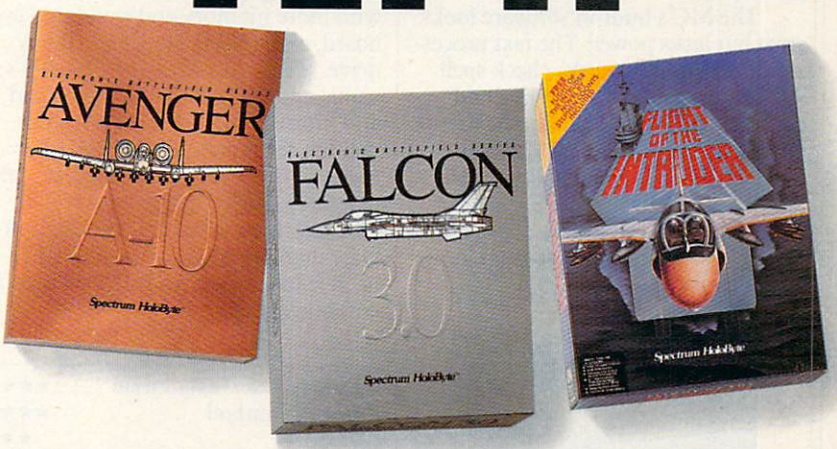

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PSION MC-400 MOBILE COMPUTER

The MC-400 Mobile Computer makes a great first impression with its Macintosh-like graphic user interface (GUI), multitasking operating system, and nifty touch pad.

Weighing only 4.3 pounds and measuring about 2 × 12.5 × 9 inches, the MC offers an acceptable 640 × 400 LCD screen (black letters, no backlight). It has 256K EPROM and 256K RAM, with connectors for options: Fast Serial Link, microphone and speaker, and 12V adapter.

The MC offers great battery life—60 hours of continuous use with eight AA alkalines and 8 hours with NiCads. When the computer is inactive for five minutes, it turns off to save power.

To be valuable, though, a noncompatible must offer distinct advantages outweighing the benefits of

compatibility. It must be friendly with PCs without undue additional effort and expense.

The MC's built-in software looks great but lacks power. The text processor doesn't count words, check spelling, or display the current line and character position. The diary is useful, but the monthly calendar displays Monday through Sunday (instead of Sunday through Saturday). The alarm function works but lacks a snooze feature. The free-form database is simple but not very powerful.

The Psion MC-400 accepts up to four solid-state disks at one time.

The MC is hurt by a general lack of standardization. Although it includes a standard parallel port, you have to provide the instructions that let your printer take advantage of special capabilities, such as bold or italic print. (A company spokesman says that a word processor to be sold separately will contain printer drivers. —*Ed.*) It includes an RS-232 serial port and file-transfer software for sending files to a PC, but you must use a noncompatible cable with a round, miniature serial plug (not included).

The MC uses solid-state disks (SSDs), which are really just memory but which emulate disks. The MC accepts up to four SSDs at once, available in several styles and sizes: Flash EPROM and RAM (each up to 512K) and ROM (2MB). Psion offers an SSD drive for a PC.

The full-sized keyboard has a good feel and layout but isn't exactly like a PC keyboard; some of the symbol keys are swapped. A numeric keypad is part of the alphabet keys.

At first the touch pad is fun, but it can be difficult. It's easy to move the pointer but hard to be accurate.

The MC-400 is unique, but for about the same amount of money you can get a lightweight PC compatible with more memory and standard keyboard, connectors, keys, and floppy drive. It may not have the MC-400's visual appeal, battery life, touch pad, and futuristic memory disks, but it will run far more software and offer easier data exchange via floppies. Add a desktop tools package, and you'll have more powerful and flexible software than the MC-400's—and you'll be able to get help from PC users and computer dealers.

J. BLAKE LAMBERT

Ease of Use/Installation	★★★
Documentation	★★★
Features	★★
Compatibility	★

Psion MC-400—$1,795
Optional SSD drive for a PC or compatible—$300

PSION
118 Echo Lake Rd.
Watertown, CT 06795
(203) 274-7521

PERSONAL TRAINER FOR THE SAT

We expect athletes to hone their talents through practice, yet we throw our kids to the wolves when it comes to helping them prepare for the Scholastic Aptitude Test (SAT). Davidson's *Your Personal Trainer for the SAT* package offers students a way to prepare for this all-important exam.

The program builds vocabulary and reading skills as well as areas of math covered in the SAT. If students adhere to the 6–7 hour weekly training schedule suggested in the manual, they should be able to tackle SAT problems and considerably increase their chances for success.

Since I'm not planning to take the SAT anytime soon but my 15-year-old son will take it this year, I let him use the program to help in his preparation for the test. After running through a few practice sessions in the Visitor mode, he felt less threatened by the types of questions asked on the SAT.

The Visitor mode allows you to browse through the questions asked on the SAT without actually taking a test. It's a nonthreatening way to develop a feel for the kinds of questions asked, and learning how to approach certain kinds of questions is as valuable as mastering the content areas of an exam. If you choose the wrong answer, you're told why the answer is wrong. Picking the right answer prompts an explanation of why the answer is right.

Included with the program is a companion book called *How to Take the SAT,* which includes several practice exams. After every practice exercise, you can look at the answers and explanations in the book. The Assessment option in the program lets you evaluate your progress. You'll get a score and a personalized analysis of each test. Then you can get a personalized training schedule based on your strengths and weaknesses.

The training schedule recommends several methods for building strengths and minimizing weaknesses, methods such as making flash cards for vocabulary words or math problems missed. Your training may include reviewing a specific topic on a page in the book, or you may need to work through one of the training activities using the program's onscreen hints and the glossary.

I won't know for sure whether this training has helped my son until he takes the SAT later in the year, but I plan to make sure he completes the entire training schedule. I'll keep reminding him of what a football coach tells his players: Games are won or lost on the practice field.

JOYCE SIDES

Ease of Use	★★½
Documentation	★★★★
Features	★★★
Innovation	★★★

IBM PC and compatibles; 512K; CGA, EGA, MCGA, VGA, Tandy 16-color, or Hercules; hard disk optional—$49.95

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Amiga

AMIGAVISION

Commodore stepped out in 1984 when it bought a little company with a revolutionary personal computer. It saw in this machine a price/performance potential offered by no other PC and successfully brought it to market in 1985. The Amiga has since made interesting inroads in video production, but it has really stayed alive thanks to the enthusiasm of evangelists and a couple of zingers like *DeluxePaint* and *DigiView*—splendid products but not quite strong enough to push the Amiga ahead.

Commodore just made another innovative move, this time in software. *AmigaVision,* which has been two years in the making, may well do for the Amiga what desktop publishing did for Apple's Macintosh—put it on the map.

AmigaVision is an authoring system. It's designed to help people with no programming experience put together interactive audiovisual presentations, the component parts of which have been produced with other tools. It helps you put together things like touchscreen information systems, corporate business presentations, educational reports, quizzes and documentaries, and even animated Christmas cards with MIDI-produced background music. It does this by combining data stored on floppy and hard disks, videocassettes, and videodiscs.

This technique is called *multimedia* (the industry's latest buzzword) and involves melding components from various sources into a single presentation. You'll need paint and animation programs, digitizers, and music composition and word processing software in order to create those presentations. You can also include prerecorded sounds and images from videodiscs, videocassettes, and MIDI synthesizers. *AmigaVision* helps mold these elements into a unified presentation by tying them together; organizing their sequence, flow, and timing; and adding mouse-selectable hit boxes so that users of your presentation can control it interactively. *AmigaVision* presentations can also accept input from the keyboard.

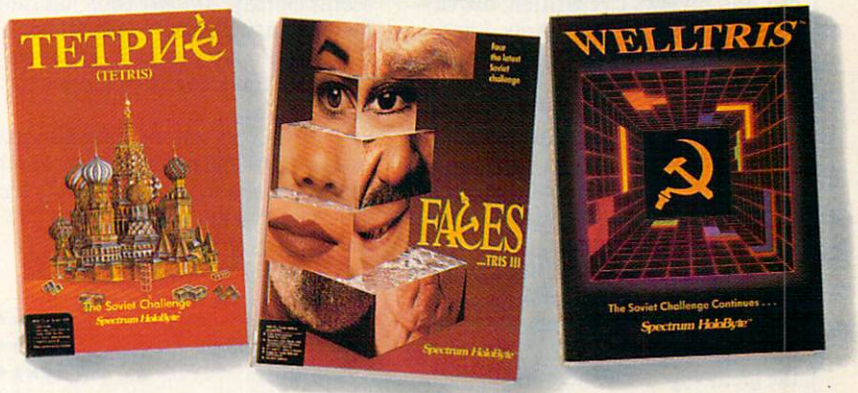
AmigaVision helps you do all this with surprising ease. In general, after you've created your components and decided how you want to present them, you select appropriate *AmigaVision* icons by dragging them from a box at the bottom of the screen to a large, scrollable grid above. It's on this grid that you arrange the icons in logical groups (called *parent* and *child*), tying them to your components with specific parameters entered through requesters and pull-down menus. You must know what you want to do and which icons do what, but *AmigaVision* comes with one of the best manuals I've ever seen and two tutorial disks.

I made an interactive presentation incorporating things I found lying around my house and hard drive. I used *AmigaVision* on my A2000 with 3MB of RAM, the new SuperAgnus, WorkBench 2.0, a VCR and genlock, and a MIDI music synthesizer. My presentation consisted of three primary parts: a home video of the kids, a database of text-based articles and screen shots, and a slide show with background music.

I superimposed stationary and animated captions over the video with flashy color fonts. *AmigaVision* will put ANIM5-format animations (but not ANIM brushes) over video

Commodore's point-of-sale system uses *AmigaVision* and a videodisc player to show off the Amiga to potential buyers.

PLAY IT



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and will synchronize internally produced sound effects as well.

I made a database to call up articles and reviews I've written, displaying the text with screen shots. I had planned on using a variety of fonts for the text, but that became tedious, as special codes for both fonts and screen format must be inserted into the text by hand. You can move up or down through the text by a line or screen at a time, but *AmigaVision* won't automatically scroll your text.

Then I fashioned a slide show that included digitized photographs of the kids in HAM overscan. I moved between the pictures using several of the great wipes and fades available in *AmigaVision.* I added SMUS background music using sampled 8SVX-format instruments. When I turned to add MIDI, I found that *AmigaVision* plays a MIDI-connected synthesizer by sending a SMUS score out the serial port, which works but isn't entirely satisfactory. And it plays only four voices at once—MIDI or internal but not both. Shortcomings such as these could be overcome by launching external programs, such as the *Sonix* music player, through *AmigaVision*'s CLI or *ARexx* interfaces.

I made my presentation interactive through use of a main screen (made with *DPaint*) of images representing each section. Using *AmigaVision,* I easily made hit boxes out of these irregular-shaped images so that the corresponding section would be activated when the mouse was clicked anywhere on it. I also made my sections available on a pull-down menu.

I had little trouble making my presentation perform the way I had envisioned it. The problems I encountered were sins of omission—things *AmigaVision* cannot do. My *AmigaVision* wish list includes a freestanding runtime module so others can enjoy presentations without owning *AmigaVision,* ANIM brush support, smooth-scrolling text, a compatible WYSIWYG word processor for fonts and text formatting, true MIDI support, and joystick support.

These wishes may come true. Commodore is working on *AmigaVision* 2.0 now. It should be available in 1991, and I'm told that the company is considering adding these features and more. Even as it stands, the variety of media *AmigaVision* can incorporate and its extraordinary ease of use make it truly innovative. By comparison, *HyperCard* on the Macintosh seems clumsy. *AmigaVision* has more features than *Deluxe Video III* or *CanDo,* and after using it, I find using *UltraCard* and *The Director* downright painful.

By its very nature, the multitasking Amiga is the perfect platform for multimedia, and *AmigaVision* is the easiest-to-use authoring system I've seen for any personal computer.

PEGGY HERRINGTON

Ease of Use	★★★★★
Documentation	★★★★★
Features	★★★★
Innovation	★★★★★

Amiga with 1MB (3MB and hard drive recommended for development systems)—$149.95
(Bundled free with new Amiga 500P, 2000, 2500, and 3000 models)

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A-MAX II

Last year ReadySoft released A-Max, a Macintosh emulator for the Amiga. After plugging a set of used Macintosh ROM chips into the A-Max cartridge, you plugged the cartridge into your disk drive port, loaded the A-Max software, and could run almost all non-copy-protected Macintosh software on your Amiga. Unfortunately, the emulator lacked the ability to use Amiga hard drives and to play Mac sounds. A Macintosh with no hard drive is no more fun to use than an Amiga with no hard drive, so ReadySoft addressed these shortcomings with the A-Max II.

The A-Max II now allows you to create Macintosh-format partitions on Amiga hard drives, as well as allowing access to Macintosh-specific SCSI devices attached to an Amiga SCSI controller. Your Amiga hard disk controller must, however, be supported with an A-Max II–compatible device driver. Drivers are shipped with the A-Max II for Commodore's 2090, 2090A, 2091, and A590; GVP controllers; the IVS Trumpcard; the Xetec FastCard; and the Preferred Technologies multifunction board. Drivers for Supra hard drives and the ICD AdSCSI board are now available from the respective controller manufacturers. If your controller isn't on this list, you should contact the manufacturer to determine if it is developing an A-Max II driver.

The second major addition is support for Mac-digitized sounds. The Macintosh operating system includes several system sounds that can now be played through the Amiga's sound system. Some older Macintosh software accesses the Mac's hardware to create sounds and won't provide sound using the A-Max II. Most newer Mac programs use digitized sound files and work well under the A-Max II.

The A-Max II makes transferring files between Amiga format and A-Max– or Mac-formatted disks much easier. With the A-Max II's file-transfer utility, you can transfer files from a standard AmigaDOS disk in DF0: to a Macintosh disk or from any Mac file to the Amiga disk. The file-transfer utility will translate text files, convert pictures between MacPaint and Amiga IFF format, transfer binary files between the systems, and convert PostScript files to Amiga format.

Like its predecessor, the A-Max II uses the standard Amiga drives to create 800K A-Max–format disks that can be used while emulating the Macintosh. Also included are utilities to transfer files from a real Macintosh using a 272K disk that can be created on the Mac and read by the Amiga. The Full Disk Transfer utility is supposed to transfer a complete Macintosh disk by creating several transfer disks that are reassembled under the A-Max. However, I was never able to successfully reassemble a disk on the A-Max side. I recommend that you invest in a Macintosh drive.

As if these improvements weren't enough, the A-Max II also has added support for Amigas with Memory Management Units (MMUs), allowing increased compatibility during emulation. Finally, the A-Max II looks at your system preferences to determine how to center the Macintosh screen on your monitor. The emulator supports the new screen modes available with the Enhanced Chip Set and 2024 high-resolution monitor. ▷

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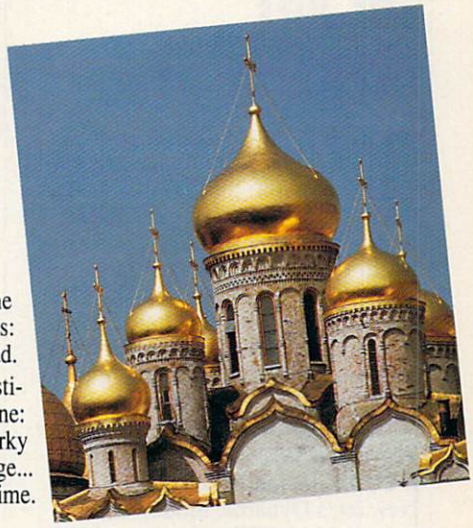

HOW TO ENTER

Official entry forms with complete contest rules can be found at your nearest participating software dealer and in specially marked Spectrum HoloByte packages.
Contest runs from 11/1/90 to 2/28/91, and you must be 18 or older to enter. No purchase necessary.

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AMIGA

If you have an Amiga and need to use Macintosh software, the A-Max II is a wise investment. I've found that all the Mac software I need to use (*Aldus PageMaker* 4.0, *Microsoft Excel* and *Word,* and Silicon Beach's *SuperPaint*) runs perfectly. With the added use of my Amiga hard disk and the sounds emanating from my monitor, the only clue that I'm not using a real Mac is the larger Amiga screen—and the money I saved by not buying a second computer.

BOB ELLER

Ease of Use/Installation	★★★★
Documentation	★★★
Features	★★★★★
Compatibility	★★★★★

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THE ART DEPARTMENT

ASDG's *The Art Department (TAD)* is a 24-bit image-processing program for the Amiga. This means that each screen pixel is represented by three bytes (24 bits) of memory, allowing a palette of 16 million colors instead of just 4096. *TAD* can use this extra information when converting pictures from other computers or when choosing colors to display the best possible Amiga picture.

The Art Department loads *Sculpt 4D, Turbo Silver, DigiView,* and all IFF files, including Sliced Ham and NewTek's Dynamic modes. It can save in 24-bit IFF and standard IFF modes (including Dynamic, but not Sliced Ham). Separately available disks allow you to import GIF, *DeluxePaint IIe* for the IBM PC, PCX, TIFF, Targa, and *Rendition* image files. Unfortunately, while you can load images in these formats, you can't save them in these formats. You can't use *TAD* as a image processor for VGA or Targa screens.

TAD is related to ASDG's software for the Sharp scanner. As such, it performs many of the same image-processing functions as NewTek's *DigiView* software. Unfortunately, *TAD* is missing a few of *DigiView's* bells and whistles. I especially missed control over color saturation. On the plus side, *TAD* has a new control, Gamma, and a variety of dithering algorithms. The Gamma control allows you to compensate for the fact that the visual intensity of the Amiga's 16 brightness levels are not linear. Using Gamma can help you bring out hidden detail in your images.

TAD does a very nice job of converting screens from one Amiga screen resolution to another. It does an especially nice job converting to colorful images in HAM and EHB into high-resolution 16-color screens.

Match palettes using *The Art Department* and combine pictures on one screen.

The user interface is attractive but difficult. I found a few procedures tortuous. One advantage of *TAD* over *DigiView* is that you can reserve part of the palette and let *TAD* automatically make the best selection for the rest of the palette. *TAD* makes the task difficult, though. Converting a picture from HAM to EHB with a reserved palette of 20 colors took a friend and me the better part of an afternoon. Though we now have the procedure memorized, it's a laborous process that takes numerous mouse clicks and even a bit of typing.

Although many of *TAD's* features have been seen before, it has one that's been missing from Amiga programs for a long time: the ability to scale an image to any size. This is especially handy for importing GIF and Targa files that were created on screens with a higher resolution. This makes *TAD* worth its price.

The documentation is adequate, but only so. Although its descriptions are reasonable, it lacks step-by-step tutorials.

Although I am happy with *The Art Department,* I'd like to see an upgrade that allows you to save in any format you can load. I'd also like to see saturation control and genuine image-processing capabilities such as those in Progressive Peripherals' *PIXMate.* Unfortunately, the memory requirements for this program make it unusable for the great majority of Amiga owners. I would not recommend *The Art Department* to an Amiga owner with less than two megabytes of memory and a hard drive. ASDG recommends four megabytes. *(Editor's note: ASDG recently announced* The Art Department Professional, *which adds the capability to save in non-IFF formats, full* ARexx *support, external effects modules, 8-bit rendering, and multiple palette sizes. The upgrade should be available this fall; contact ASDG for details.)*

RHETT ANDERSON

Ease of Use	★★
Features	★★★★
Value	★★★
Documentation	★★★

Amiga with 2MB, 4MB recommended—$89.85
Art Department Loader disks are available for $19.95–$39.95

ASDG
925 Stewart St.
Madison, WI 53713
(608) 273-6585

PIRATES

MicroProse's *Pirates* puts you in the boots of a pirate captain. In this combination adventure game and simulation, you amass your ill-gotten fortune by sailing around the Caribbean, trading with merchants, plundering cities, and attacking treasure-laden vessels.

Using the detailed paper map provided as a guide, you sail your fleet from city to city, taking advantage of the wind currents and avoiding shoals that could sink your ships. Using a crude astrolabe, you can approximate

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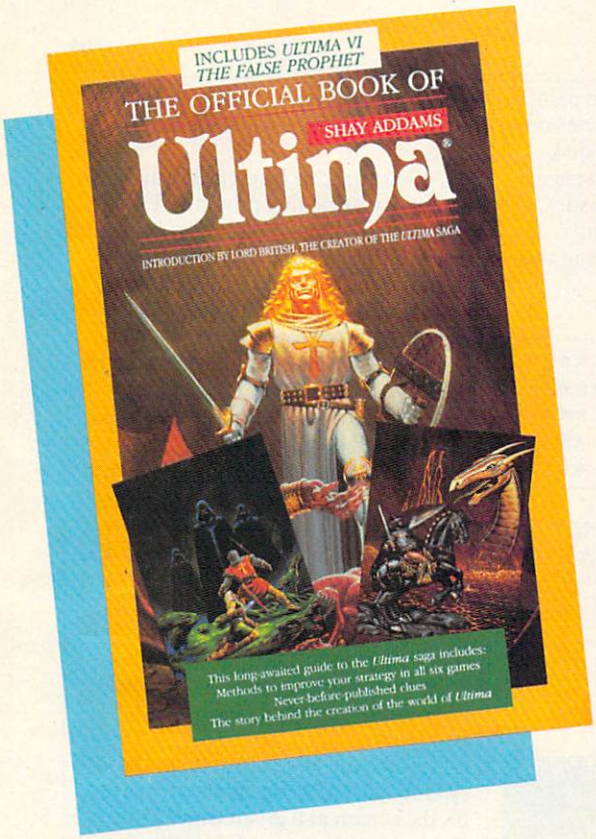

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Follow the news closely and you can capture the Treasure Fleet in *Pirates*.

When you approach a port city, you can sail into port or attack and plunder the town. If you choose to attack, you can bombard the city and storm the fortress or land near the town and proceed over land to fight the local army.

You may decide to sail peacefully into the harbor. Once in town, you can visit the merchant to buy and sell goods (whose prices vary from port to port) and repair your vessels. You can also visit the tavern to recruit rowdy crew members and buy important information. Finally, you should visit the governor; he can make you special offers and bestow awards upon you. He might even introduce you to his beautiful daughter. You continue your travels until you're captured or you decide to divide the booty, disband your crew, and start over.

Microprose did an excellent job porting this game to the Amiga. The 64-color HalfBrite graphics are plentiful and detailed. The game comes on two non-copy-protected, hard disk–installable disks and has an 80-page manual chock-full of tips, statistics, history and folklore. *Pirates* will please both the arcade gamer and the simulation lover.

STEVE KING

Playability	★★★★
Documentation	★★★★★
Originality	★★★★
Graphics	★★★★
Sound	★★★★

Amiga with 512K, 1MB recommended—$44.95

MICROPROSE
180 Lakefront Dr.
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64/128

DIGITAL ARTIST

Does anyone need a powerful drawing program for the 64 or 128? *Digital Artist* is a fast, powerful, easy-to-use, menu-driven draw package designed specifically for your computer.

Digital Artist has many great features that let you produce a wide variety of images and artwork using a mouse or joystick. You have 18 drawing tools from the tool palette, along with eight graphics-editing functions.

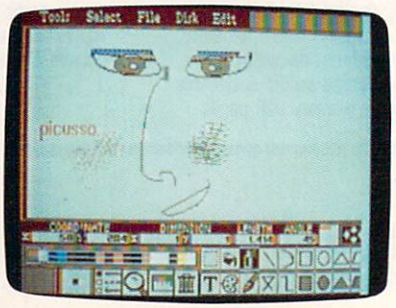
The tool palette's 18 drawing tools include the capture box, fillet, spray can, line, arc, text, color, brush, polylines, and right-angle lines. Shapes, such as triangles, rectangles, ellipses, or parallelograms, can also be created and either filled or not filled with colors or patterns.

The eight graphics-editing functions work with the capture box, which selects the graphic area for the graphics-editing function to be performed. These functions include cut, paste, copy, move, clear, inverse, mirror, and rotate. *Digital Artist* has an alarm clock as well as a 22-function scientific calculator, which can be displayed at any time from the Tool menu.

Text can also be created quickly and easily using this program. First, you select the font, style, size, alignment, and line spacing. Next, use the WYSIWYG text editor in a selected area on the screen, called the *text box*. *Digital Artist* automatically wraps the last word on a line to the beginning of the next line. You can use the arrow, Insert/Delete, and Clear/Home keys to edit your text.

Many program features help you view images in detail on the drawing page. Several levels of magnification let you perform detailed graphic editing. Except for text, color, and spray can, you can use all graphic tools under magnification. Scrolling up or down the page is accomplished manually by using the page-scrolling arrows or automatically by using the page guide.

Since the 64 is limited in memory, only part of a file can be displayed on the screen at a given time. Thus, the page guide is a useful feature, since it allows you to quickly go to and work on other parts of a file. Drawings are available in three different sizes, depending on whether you plan to view graphics on the screen only, print on a low-resolution graphic printer, or print on a high-resolution graphic printer.



***Digital Artist* is a fast and powerful drawing and painting program.**

As mentioned earlier, you cannot see the whole file on the screen at once because of the 64's memory limitations. However, the preview function lets you view the placement of images on the full page before printing it out. The images appear as shadows on the screen. While you cannot view the exact appearance of the file, this func-

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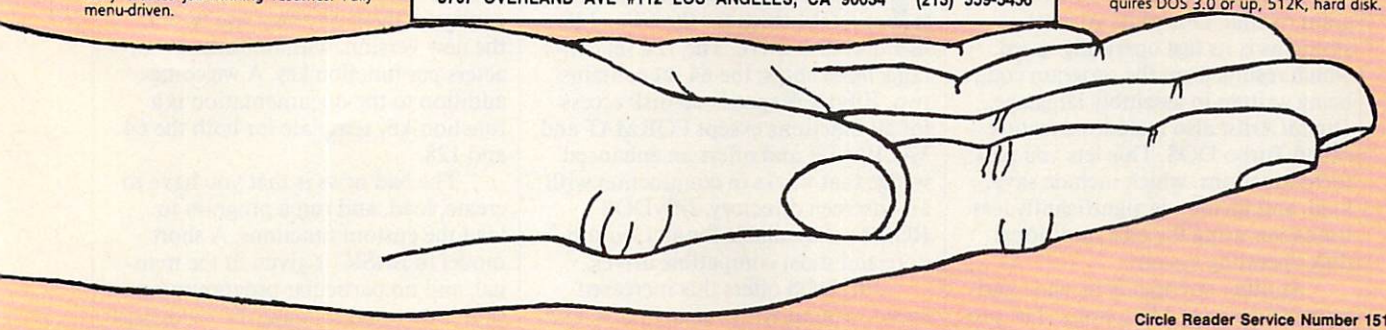

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tion does let you see how the images are placed on the page in relation to each other.

Digital Artist also gives you a choice of 16 colors, 23 predefined patterns, 14 predefined brush shapes, and three styles of lines. You can even create your own patterns or brush shapes. Another special feature of the program is the Digital Parameter Display (DPD). This feature updates your drawing parameters right on the screen. Coordinate, dimension, length, and angle parameters are displayed in near-accurate measurements.

You can build your own clip-art library with *Digital Artist*. Once you've created a graphic image, use the capture box to select it. A dialog box appears after you've selected CUT from the EDIT menu. Just type in a filename and save the image to a disk for future use. When you need the clip-art image, select PASTE from the EDIT menu and paste the image anywhere on the page. It's that easy!

Graphic creations can be printed on several Commodore and non-Commodore dot-matrix graphic printers. The program provides you with 17 printer drivers. Four of the printer drivers are designed for low-resolution printers (480 dots horizontal resolution). This means images will not print in their proper shapes. There are also 10 drivers for high-resolution printers (640 dots horizontal resolution), as well as three that work with color printers. These printers present a much higher quality of output. At first, I experienced some difficulties in printing because of an incompatible printer. However, I did print with an Epson printer without a problem. If your printer is not listed, experiment with the diffferent drivers. If you have any questions concerning printers and compatibility, I'd advise you to call Digital Technology.

Digital Artist is a powerful program overall. One of its greatest strengths is its fast operating speed, which results from the program code's being written in assembly language. *Digital Artist* also includes a feature called Turbo DOS. This lets you perform functions, which include save, load, and format, in significantly less time than using the 64's traditional disk operating system.

Another strength is its wide variety of features and functions. The program does not include online help; however, its well-documented, easy-to-understand manual and its menu system make it user friendly. Most of the onscreen icons, which represent functions, are also self-explanatory.

Another advantage is its error handling. It's nearly impossible to make a fatal error with this program. If you do make a mistake, you will get an error message that tells you what to do. For example, I had the wrong disk in the drive, and an error message alerted me to insert the correct one.

One major drawback of this program is its inability to display the full page of images. First, you can't view a full page of images exactly as they're supposed to appear. Second, it's hard to draw a full-page image if you can't see the full image on the screen as you draw. However, as mentioned earlier, this is due to the 64's memory limitations and is not a flaw in the software program.

Overall, I rate this program highly. It has enough features to make it useful and productive. If you're looking for a great drawing program for the 64, why not consider *Digital Artist?*

CHRIS STAWASZ

Ease of Use	★★★★
Documentation	★★★★
Features	★★★★
Innovation	★★★

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JIFFYDOS 6.0

JiffyDOS 6.0, a worthy successor to an excellent version 5.0, is a set of ROM chips for the 64 or 128 and disk drive. The 128 set contains three chips; the 64 set contains two. JiffyDOS speeds up disk access for all functions except FORMAT and VALIDATE and offers an enhanced wedge that works in conjunction with an onscreen directory. JiffyDOS ROMs are available for all Commodore and most compatible drives.

JiffyDOS offers this increased speed without tying up any ports, and it doesn't require additional cables. One can switch easily between JiffyDOS and the computer's standard configuration, and its price is reasonable.

JiffyDOS is particularly useful when using music synthesizers where the cartridge port is occupied with a MIDI interface. It's also ideal when used with cartridge word processors and modems that tie up the parallel port.

Installation is quite simple. It is aided by the clearest and most comprehensive set of instructions that I've seen, and its manual is a model of clarity. The installation process took me 90 minutes. This included testing and installing defeat switches for both the 64 and 1541 disk drives. The most challenging task was drilling holes for the two switches. I actually used my soldering iron to burn the holes through the plastic case.

One note of caution! Check first before buying JiffyDOS to see if your ROM chips are soldered into their sockets. If this is the case, do not attempt the conversion. I haven't encountered this situation, but it is a good idea to open your 64 and check first.

As with JiffyDOS 5.0, version 6.0 includes programmed function keys, a listing freeze, and an OLD command. Major enhancements with 6.0 are user-programmable function keys, an enhanced list freezer/stepper, a built-in two-drive file/disk copier, and the ability to set sector interleaves. This last feature permits you to achieve through experimentation the ultimate disk access drive speed for a particular program on your model disk drive.

Two of these features require comment. Very rarely do the function keys come programmed the way I like them. JiffyDOS is probably the exception. (The keys are configured differently in versions 5.0 and 6.0.) You can configure them any way you wish in the new version, with unlimited characters per function key. A welcome addition to the documentation is a function-key template for both the 64 and 128.

The bad news is that you have to create, load, and run a program to load the custom functions. A short model in BASIC is given in the manual, and no particular programming skill is required to make the modifica-

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64/128

tion. But the fact remains that you can't change a few crucial function key definitions in direct mode whenever you wish.

JiffyDOS supports Commodore RAM expansion units (REU), allowing you to access an REU just like a disk drive. For two-drive systems, the flexible dual copier should prove useful. You can easily specify source and destination drives and freely mix drive types, including those not modified with JiffyDOS.

Several other features common to JiffyDOS 5.0 and 6.0 are noteworthy. Onscreen directories are never overwritten by the computer, and all JiffyDOS wedge commands may be used from within BASIC programs. In version 6.0, these commands include the expanded copier commands. You can even write your own custom copy programs. Text and program files can be read from disk directly without corrupting memory. These files and the screen can be dumped directly to a printer, also without affecting memory. This process is much easier, however, with version 6.0.

I do have one small bone to pick. Although JiffyDOS offers a purportedly bug-free, save-with-replace routine, you cannot use it from the onscreen directory. You must first scratch a file and then resave. Unfortunately, it is quite inconvenient to do both of these things from a single directory.

If you are looking for a moderately priced, full-featured ROM replacement, JiffyDOS is for you. Creative Micro Design supports its products well, and it is one of the few companies still actively developing accessories for the 64 and 128. This innovative company deserves the support of Commodore users.

ART HUNKINS

Ease of Use	★★★★
Documentation	★★★★★
Features	★★★★
Innovation	★★★★

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field goals, or safeties. Although plays have strange names, Capture Daflag, for example, they all appear to be quite conventional.

Other features are available from user-friendly menus. Choose the length of quarters, a computer or human opponent, computer or human selection of various options, and whether to play or to create a new team, field, or playbook.

You make your play selections between downs, but loading each play takes about 30 seconds. This adds approximately 20 minutes of waiting time to an 8-minute game and nearly two hours to a 40-minute one. Imagine an NFL game taking ten hours and you'll have some idea of how long that is.

The program's graphics make only moderate use of the 64's capabilities. The fields and moving figures are colorful and individualized, yet they and the text especially appear unclear and indistinct.

Sound effects are somewhat disappointing. We do hear the slashing of swords, the cannon's roar, and a variety of other bells and whistles. Missing, however, are the cheering of the crowd, the grunting of players, and the sound of bodies crunching.

The instruction manual is geared toward the MS-DOS version, but an insert lists the specifics for the 64. Though not error free, the documentation is concise and easy to follow.

The rules of the sport have been so simplified that most strategy-oriented football fans will find that the game lacks challenge. Likewise, because the hacking and slashing techniques are so basic, Dungeons & Dragons fans may lose interest quickly. Those who like their football down and dirty, however, will want to bury themselves in *Grave Yardage* for hours.

LEN POGGIALI

Playability	★★★
Documentation	★★★★
Originality	★★★
Graphics/Sound	★★

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Employing an updated version of its classic Battlefront play system, Australia's Strategic Studies Group presents *MacArthur's War,* a war game that depicts eight battles in the Korean Conflict.

Termed a *police action,* this three-year struggle that pitted American-led U.N. forces against North Korean and Red Chinese armies ended in a stalemate. Its early battles, however, were dramatic and decisive. By focusing on the first ten months of the hostilities (June 1950 to April 1951), SSG extracts exciting military encounters from what many historians have called "The Forgotten War."

To be successful, however, combat simulations need more than entertaining and historically accurate scenarios. The game system must be complex enough to control the many facets of the program, yet simple enough to be mastered quickly. Action should move along at a reasonable pace, and the documentation should be clear yet thorough. Finally, a construction set should be available so scenarios can be modified or new battles created. *MacArthur's War* scores high in all of these areas.

The entire game is menu driven. Your first choices, via keyboard, include whether to play an existing scenario or to create your own, how much of a handicap to give yourself or your opponent, and which army to control against the computer or another human. Once inside the game, branching menus allow you to issue orders and gather vital information about the armies, objectives, and other elements. With the help of the instruction booklet and the handy menu cards, in a short time you'll become skillful in manipulating this system.

Scenarios vary in length, allowing for contests lasting from 30 minutes to 3–4 hours of realtime. As a corps commander, you control up to three divisions, each consisting of up to four regiments, which in turn are comprised of a number of battalions.

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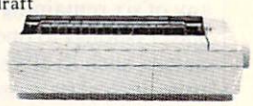

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64/128

issue orders to your regiments, and battalions move out to best carry out your directives. As a result, your orders are quickly carried out. Combat is also resolved speedily, without lengthy disk access.

In addition to detailed game instructions and descriptions of each menu, the easy-to-read, 56-page player's manual has other worthwhile elements. These include a tutorial to help you get quickly into the game, informative essays dealing with the various battles, and directions for revising existing scenarios or fashioning new ones. Also, an attractive, colorful poster containing all eight battle maps and a terrain key is included as part of the documentation.

With WarPlan, SSG's war game construction set, modifying any of the scenarios is a snap. Creating unique situations, however, can be a chore, despite a menu-driven interface, extensive explanatory notes, and blank forms, rosters, charts, and layout grids. These last items may be photocopied and used to store statistics and graphic designs.

Constructing maps, defining terrain, forging armies, and editing shapes with the game's construction set all require a great deal of time and patience—and a certain amount of artistry. Map making is complicated somewhat by confusing keyboard commands. A joystick or mouse option would simplify and speed up this process; it also would be welcome within the graphics editor and throughout gameplay as well.

Simulations of this sort rarely boast impressive visuals and audio. *MacArthur's War* is no exception. Its graphics are bland and two-dimensional; its sound, merely functional. By way of compensation, all Battlefront play system programs are compatible, so you can use any scenario with any master disk in the series.

Original scenarios and games in progress may be stored on a separate disk. Saving as often as possible is particularly important because of a nasty glitch. If you accidentally hit the Restore key instead of Return, the program will lock up and you'll be forced to reboot.

Minor reservations aside, *MacArthur's War* provides just the right mixture of historical perspective, stimulating gameplay, and creative opportunities. Compared to some arcade games costing as much, the price you pay for this program is money well spent.

LEN POGGIALI

Playability	★★★★
Documentation	★★★
Originality	★★★
Graphics	★★

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INSIDE INFORMATION

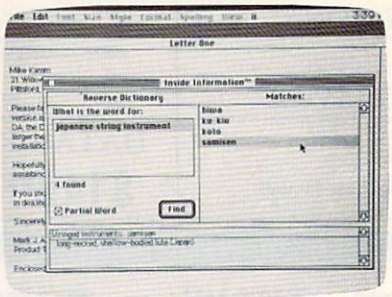
According to Microlytics, *Inside Information* is the "first new classification system for language in nearly 150 years." Unlike conventional English dictionaries, which organize words alphabetically, this innovative program classifies entries hierarchically by categories.

The application's seven major categories are Nature, Science and Technology, Domestic Life, Institutions, Arts and Entertainment, Language, and The Human Condition. These are further subdivided into subclasses and subcategories. The subcategories contain the definitions.

Inside Information is full of surprises. First, there's the shock of having to pay $119 for an electronic reference tool when a conventional spelling checker or desktop thesaurus costs considerably less. Next, users must resign themselves to giving up a tremendous amount of valuable disk space. The five-disk package gobbles up 3½ megabytes when fully installed. Finally, the application is limited to 65,000 entries, which is small by dictionary standards.

If space is a problem, you can exclude all but the Basic Data file, which is needed to run the program and install the other menu items. But there's really no reason to purchase the product if space limitations make it impossible to install the optional Definitions (consisting of dictionary words), Reverse Dictionary (which lets you find a word by its definition), or Explicit Material (containing "sexually explicit language and insulting terms").

The program's desk accesssory lets you access the data in four ways: Outline view, Graphic view, Tree view, and Reverse Dictionary. You



Inside Information ***from Microlytics includes a unique Reverse Dictionary.***

can also choose a particular method or view with the pull-down menu.

The Outline view presents you with the program's seven major word classes. Double-clicking on a particular class calls up its subclasses. Double-clicking on a specific subclass displays categories, and double-clicking on a category yields subcategories. Each subcategory presents a starred word list, and double-clicking on a starred entry yields a definition. For example, Science and Technology leads to Transportation, which leads to Automobiles, which leads to *woodie,* a "wood-paneled station wagon (slang)." You can bypass all the double-clicking by entering a lookup word.

The Graphic and Tree views present alternative visual perspectives on the hierarchical word flow for any currently selected word. When you select the Graphic view, the hierarchy flows from left to right. You can expand or collapse particular categories or levels to see how *Inside Information* handles classifications. In the Tree view, the hierarchy flows from top to bottom.

The Outline, Graphic, and Tree views offer Find, Show Path, and Last Word options. Find searches the dictionary for a particular word. Show

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Path traces the word through the classification hierarchy. Last Word keeps track of the last 30 words found and lets you easily reselect a particular word from the list.

Inside Information's most innovative feature is its Reverse Dictionary. This option makes it possible to find matches for words, partial words, or phrases. The desk accessory conducts a search and presents a list of possible matches. For example, if you type in *left side of ship,* you'll get back the match, *port.* You can scroll through the list (which unfortunately isn't alphabetized) and double-click on an entry to call up a definition. You can also switch to any other view to see how the word fits in a hierarchical classification.

Anyone interested in organizing the English language into categories of defined words will find *Inside Information* useful, though its definitions are often terse. The utility does a good job of showing the logical relationships among words. It can even come in handy when solving crossword puzzles. On the other hand, if you're only interested in hunting for a synonym or verifying a correct spelling, *Inside Information* takes up more disk space than it's worth.

CAROL HOLZBERG

Ease of Use	★★★★
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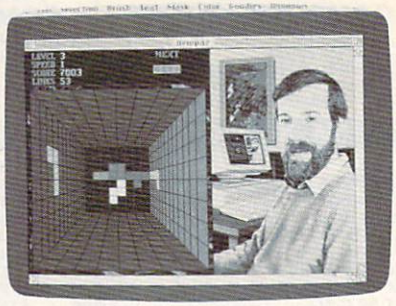
WELLTRIS

MAC

Few games are as addictive as *Tetris.* Some have called it a communist plot, tracing our country's lack of productivity to the game's initial release. Whatever the political intentions may be, the game has become a national obsession. Nintendo even includes a *Tetris* cartridge with its portable Game Boy.

Now its sequel, *Welltris,* has won the 1989 Best Action/Arcade award from the Software Publishers' Association. Created by the same Soviet programmer who designed *Tetris,* Alexey Pajitnov, *Welltris* takes the variously shaped blocks of *Tetris* and adds a three-dimensional perspective.

As in *Tetris,* your goal is to maneuver the blocks as they fall so they form complete rows. After you fill in a row, it disappears, leaving you more room—and time—to carry out your strategy. Time is especially valuable because as the game progresses, the blocks fall faster.



Welltris *adds a three-dimensional perspective to the popular* Tetris.

That's where the similarity ends. In *Welltris,* your view is from the top of a well, looking down on a grid. You slide the blocks along any of the four walls as you guide the blocks into place at the bottom. You can eliminate rows vertically or horizontally or both at the same time.

If any part of a block comes to rest on a wall, that wall is blocked for your next three moves. The game ends when any of the walls is stacked to the top or when all four walls are blocked.

As a *Tetris* devotee (that's one step short of an addict), I've taken to *Welltris* in a big way. While *Tetris* is simplier and more elegant, *Welltris*'s added complexity brings new layers of strategy: figuring out how to place the two-dimensional pieces into a three-dimensional grid, getting used to both vertical and horizontal scoring, and learning to use the well's four corners to create new shapes from old ones.

I especially like to use the corner strategy. If you wrap a block across one of the four corners and drop it, the block splits in two. When either of

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the split pieces hits an obstruction, both it and the other piece freeze in place.

The Mac version features excellent Russian folk music to put you in the *glasnost* mood (you can also turn off the music), separate black-and-white and color versions in the same package (unfortunately, there's no desk accessory version, as there is with *Tetris*), and easy-to-use pull-down menus for the various game options.

If you're one of the unsuspecting millions who fell in love with *Tetris,* you owe it to yourself to try *Welltris.* It's more than just a quickie sequel—it's an authentic chip off the old block.

DAVID ENGLISH

Playability	★★★★★
Documentation	★★★
Originality	★★★★★
Graphics	★★★★
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AMAZING PAINT

As I booted up CE Software's new $99 black-and-white paint program for the Macintosh, *Amazing Paint,* I had to ask myself why the Mac world needs yet another 1-bit paintbox. The zillions of free copies of *MacPaint* and *SuperPaint* floating around have soured the market for competitors; *NuPaint* and *Cricket Paint* bombed in that market last year, and *Studio/1* survives only on its animation capabilities. Meanwhile, many Mac artists are being lured away from 1-bit programs with ultrasexy 32-bit color paint/retouching programs such as *Pixel Paint Professional, PhotoShop, ColorStudio,* and *Studio/32*—or they're abandoning bit-mapped graphics entirely for PostScript drawing programs such as *Illustrator* and *Freehand.* So who needs a modest little program like *Amazing Paint?*

There's nothing flashy or mind-expanding about *Amazing Paint*—no integrated draw tools, animation, image processing, talking lassos, or anything like that. This is pure black-and-white paint, pretty much the way you remember it from *MacPaint.* In fact, if you've used any other Macintosh paint program, you know how to use almost everything in *Amazing Paint,* it's so easy to learn. But the program is well named: It has all of the little enhancements that you wish *MacPaint* had, as well as some amazing tools that, frankly, I fell in love with.

There's all the usual stuff, of course: a variety of selection and shape tools, the pencil, eraser, fill bucket, and so on—all available from a tear-off toolbox. However, most of the tools have new options that can be called from a panel on the right of the toolbox—which is much easier than going to the menu bar for everything.

For example, pop-up windows allow the spray can to be adjusted for spray size, spray pattern, and spray speed, making it more like a real airbrush. The spray-pattern options window offers several ways to superimpose the selected pattern on your drawing (under the existing drawing, over the drawing, blended with it, and so on), with each method shown in a test window as you select it. Instant feedback like this is a timesaving feature that's typical of this program.

Other thoughtful touches include smooth autoscrolling; multiple levels of undo and redo; rotation and scaling of selections in angles and percentages; a magic wand that selects only inside a bounded region; several ways to magnify the screen, including one that follows the movement of the cursor; and a billboard-printing feature that blows up your graphic to fill multiple pages, with crop and registration marks for taping the sheets together after printing. And the program is satisfyingly fast. Effects rarely lagged behind the cursor even on my Mac Plus; on a IIcx, everything snapped to instantly.

This program has two of the nicest gadgets I've seen in any paintbox. One customizes the shape of arrowheads for use with dimensioning lines and technical-drawing callouts. By dragging just three handles, you can make any arrowhead under the sun in about two seconds, something that can't be accomplished even on many high-end CAD programs.

The other gadget is the mouse-tracking window. It tells you, in real-time, the exact *(x,y)* screen coordinates of the cursor, in pixels, inches, or centimeters, as well everything you'd ever want to know about how you're moving a selection—size of selection, distance moved from original position, and angle moved. I'm not sure how useful mouse tracking is (if you want exact placement of selections, there's a fully adjustable grid that's a snap to use) but I sure enjoyed playing with it.

The feeling I got when I used *Amazing Paint* was, "Finally, someone took *MacPaint* and did it over right, at the right price." It makes you want to try 1-bit paint again, for the first time.

STEVEN ANZOVIN

Ease of Use	★★★★
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Wings of Fury PC	Enjoy real seat-of-the-pants flying fun with this arcade-action aerial-combat game. Flying your F6F Hellcat, you must dive-bomb, fly nearly suicidal low-altitude torpedo runs, and shake leechlike Zero fighters from your tail. You'll need practice because this game's perspective is two dimensional. *Wings of Fury* keeps your eyes on the screen, your fingers on the keyboard, and your mind on entertainment. *Gregg Keizer*	IBM PC and compatibles; 512K; CGA, EGA, VGA, Tandy 16-color, or Hercules graphics; joystick recommended	Brøderbund 17 Paul Dr. San Rafael, CA 94903-2101 (800) 521-6263 $39.95
Doctor Ami AMIGA	This unique utility for the Amiga diagnoses memory and hard disk problems. The program includes information on virtually every controller, hard drive, and memory card that you can put into an Amiga, so *Doctor Ami* does a good job of pinpointing your problems. *Doctor Ami* even lets you map out bad memory and bad drive blocks. This program is a must for cautious, paranoid, or just plain unlucky Amiga owners. *Rhett Anderson*	Amiga	Free Spirit Software P.O. Box 128 58 Noble St. Kutztown, PA 19530 (215) 683-5609 $49.95
Aldus PageMaker 4.0 MAC	Version 4.0 of this top-selling desktop publishing program adds a Story Editor (a separate text-entry and editing window with an integrated spelling checker), text rotation (in 90-degree increments), and more precise typographical controls (type sizes from 4 to 650 points in 0.1-point increments and kerning to 1/100 of an em space). Despite its many features, *PageMaker* is still relatively easy to use. Highly recommended. *David English*	Macintosh Plus, SE series, II series, or Portable with 1MB of RAM (2MB recommended); System 6.0.3 or higher; Finder 6.1 or higher; hard disk	Aldus 411 First Ave. S Seattle, WA 98104 (206) 622-5500 $795.00
Brief 3.0 PC	This is the best text editor I've ever used. In addition to the basics, it offers multiple windows, file buffers, and hooks to all the major screen languages. With *Brief*'s bookmarks, navigating multiple buffers is a breeze. A C-like language lets you write, compile, and use macros in *Brief* as if they were part of the original program. And *Brief* lets you undo as many as the last 300 editing changes of any kind. *Richard C. Leinecker*	IBM PC and compatibles, 200K (512K recommended), hard drive	Solution Systems 541 Main St. Suite 410 South Weymouth, MA 02190 (800) 821-2492 $199.00
Duck Tales: The Quest for Gold AMIGA	Join Huey, Dewey, and Louie on a worldwide adventure to help their Uncle Scrooge become Duck of the Year. Fly around the world picking up treasures Scrooge McDuck needs to regain his title. Excellent graphics and sound effects accompany you on a journey that takes you into the jungle, through caves, up mountains, and on a photo safari. Unfortunately, frequent disk accesses and unresponsive controls may frustrate kids. *Kim Horn*	Amiga with 512K	Walt Disney Computer Software 500 S. Buena Vista St. Burbank, CA 91521 (818) 841-3326 $44.95
After Dark 2.0 MAC	Who would've thought that screen blankers would become a hot software category? *After Dark* 2.0 includes 30 different displays (many with built-in sound), a randomizer mode (cycles through displays in random or sequential order), and a PICS Player (uses animation files from *MacroMind Director*, *Studio One*, or *Super3D*). A MultiModule mode runs several displays at the same time. Loads of fun and practical, too. *David English*	Macintosh 512KE, Plus, SE series, II series, or Portable; sound capability requires System 6.0.3 or higher	Berkeley Systems 1700 Shattuck Ave. Berkeley, CA 94709 (415) 540-5535 $39.95
F40 Pursuit Simulator PC	Realistic dips and curves in the road impair your vision as you race the clock. Earn points for distance traveled and bonus points for every roadblock and police car you pass, but watch out for retaining posts, telephone poles, and spinouts. *F40*'s graphics are very good. Because of this game's run-from-the-cops aspect, it isn't a good game for children too young to differentiate between fantasy and reality. *Lisa Wroble*	IBM PC and compatibles, 512K, DOS 2.0 or higher, CGA or EGA; joystick optional	Titus 20432 Corisco St. Chatsworth, CA 91311 (818) 709-3692 $44.95
Northgate OmniKey Ultra AMIGA	The OmniKey Ultra keyboard can now be used on the Amiga 2000, 2500, 3000, and, with a third-party adaptor, even the 1000. Just flip two switches and replace a few keycaps with their Amiga equivalents. It has over 120 keys, including an extra set of function keys that can be defined as normal, Shift+fkey, Alt+fkey, or Ctrl+fkey. It has a firm feel and solid feedback but isn't as loud as an IBM keyboard. A great replacement keyboard. *Denny Atkin*	Amiga 2000, 2500, or 3000	Northgate 7075 Flying Cloud Dr. Eden Prarie, MN 55344 (900) 548-1993 $149.95 (Amiga keycap set $15.00 extra)

FAST LOOKS

AstroNUMBERS PC	With the right guidance, this package will complement your children's learning and give them the edge they need. Cute graphics and sound smack of a real video-game. Then the learning sneaks in with whole-number math problems. Unfortunately, it will take an adult to wade through the manual and figure out how to play. With an educational game, I want kids to be able to put a disk in and go. *Richard C. Leinecker*	IBM PC and compatibles, 256K, CGA graphics; joystick optional	The Gradeworks, 8640M Guilford Rd. Suite 204 Columbia, MD 21046 (800) 800-MATH $49.95
Red Storm Rising AMIGA	*Red Storm Rising* shows that MicroProse has mastered the art of porting programs to the Amiga. Multitasking and hard disk–installable, the program takes advantage of all available expansion memory and has 64-color graphics, mouse support, and digitized sounds. This is modern sub combat—you'll be watching computer displays, not your periscope, but the action is still as nonstop as in Tom Clancy's book of the same name. *Denny Atkin*	Amiga with 512K; 1MB recommended	MicroProse 180 Lakefront Dr. Hunt Valley, MD 21030 (301) 771-1151 $59.95
OnTime PC	This calendar and to-do list manager is a breeze to navigate by day, month, or year. Tasks you jot down roll over if you don't delete them. The program can run memory resident (15K) and sound its appointment reminder within other applications. The daily planner screen includes a time availability box, and you can display a weekly grid with appointments blocked out or display both appointments and nonscheduled notes. *Dee Shneiderman*	IBM PC and compatibles, 320K, DOS 3.1 or higher for resident mode	Campbell Services 21700 Northwestern Hwy. Suite 1070 Southfield, MI 48075 (313) 559-5955 $69.95
HardBall II AMIGA	*Hardball II* gives you the great arcade-style gameplay of the original, plus a slew of new options. Statistics are maintained in every category, and they change from game to game. You can view the games from several different perspectives. Runners have lead control and can attempt to steal at any time—you can even get caught in a rundown. And, if you don't agree with the calls, an instant-replay feature is included. *Troy Tucker*	Amiga	Accolade 550 S. Winchester Blvd. Suite 200 San Jose, CA 95128 (408) 985-1700 $49.95
Quicken 1.5 MAC	I never thought I'd recommend a check-writing program, but this impressive personal-finance package has changed my mind. It's easy to use, can print checks to a dot-matrix or laser printer, and can export tax data to *MacInTax.* For small-business bookkeeping, *Quicken* has a surprisingly powerful selection of business reports and can perform accounts payable, accounts receivable, and payroll. Includes sample checks and an order form. *David English*	Any Macintosh with at least 512K; printer required to print checks and reports	Intuit P.O. Box 3014 Menlo Park, CA 94026 (415) 322-0573 $59.95
Bill & Ted's Excellent Adventure PC	Bill and Ted score points for bringing back "dudes" from the past and getting Ted's stepmother to drive them to school. The clock is ticking, but some characters won't come along unless they have certain items. Unfortunately, the simplicity of timing and movement would make the Mario Brothers weep. Sound and animation are disappointing, and the history books are far more interesting. *Barry Brenesal*	IBM PC and compatibles; 256K (CGA), 384K (EGA), 512K (VGA); hard drive with 2MB recommended; supports joystick and Ad Lib sound card	IntraCorp 14160 SW 139 Ct. Miami, FL 33186 (800) 468-7226 $39.95
Hoyle Official Book of Games, Volume 2: Solitaire AMIGA	With 28 game variations to choose from, *Hoyle* will hold your attention for hours at a time. The game is challenging, even on the easy level. Variations range from the easy-to-learn Scorpion, similar to standard seven-column solitaire, to Cribbage Square, where you'll need in-depth knowledge of cribbage rules to win. Cute animations add a touch of humor, and the few sounds are excellent. The Amiga makes a great solitaire partner. *Kim Horn*	Amiga with 1MB	Sierra On-Line P.O. Box 485 Coarsegold, CA 93614 (800) 326-6654 $34.95
MacRecorder 2.0 MAC	How would you like to create your own *HyperCard* and Mac system sounds? With MacRecorder 2.0, you can capture and edit sounds from outside your Mac. On the hardware side, the sound digitizer features a built-in microphone, mike jack, line-in jack, and input level control. The software lets you perform sophisticated sound editing and make *HyperCard* stacks that can record and play back sounds. Easy to use and bug free. *David English*	Macintosh 512KE, Plus, SE series, II series, or Portable	Farallon Computing 2000 Powell St. Suite 600 Emeryville, CA 94608 (415) 596-9020 $249.00

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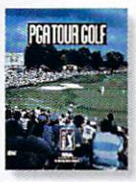

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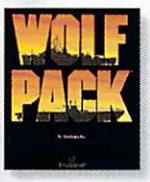

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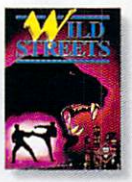

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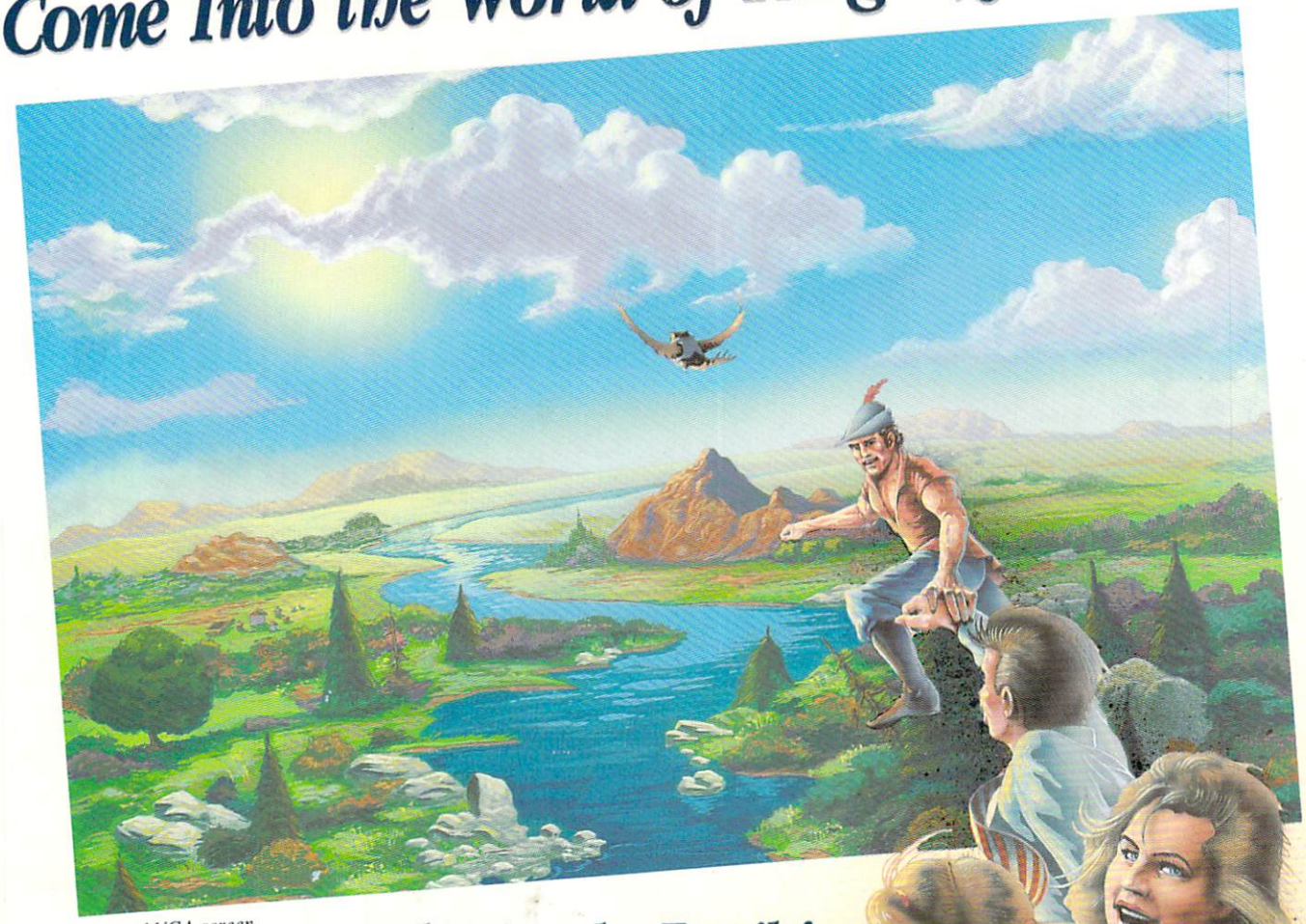

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