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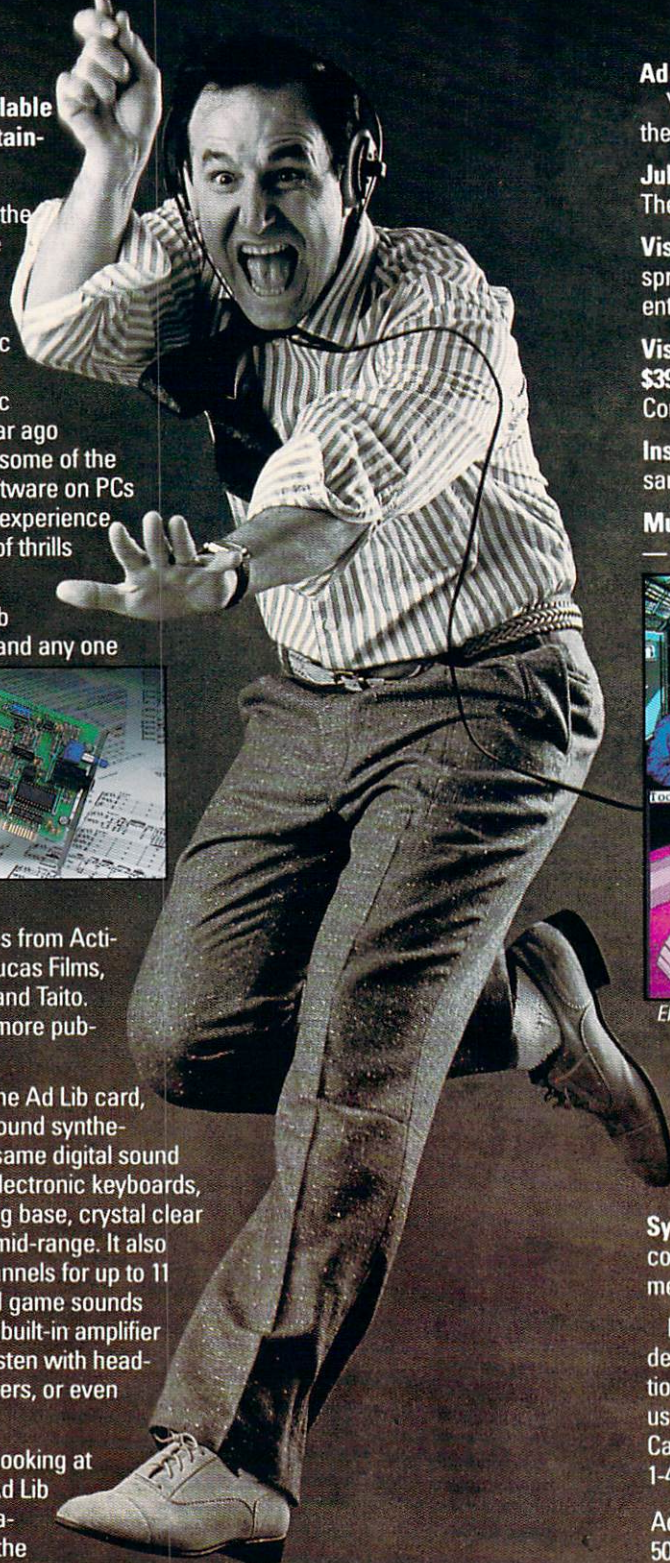
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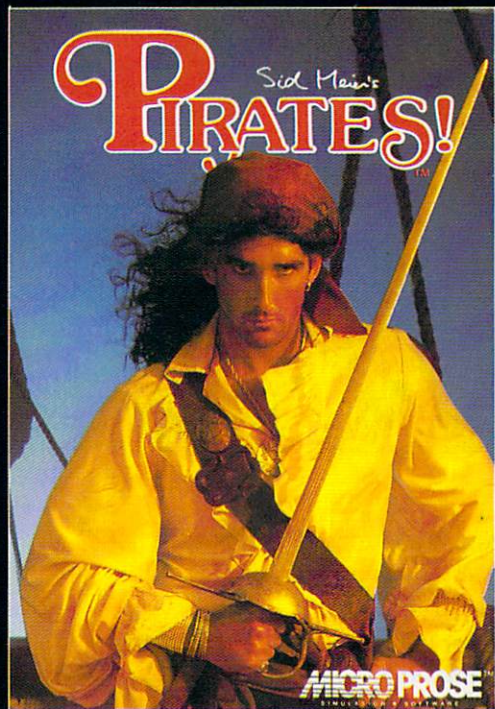
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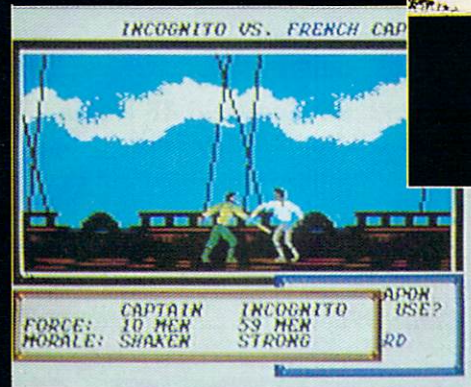


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COMPUTER

MARCH
1989

VOLUME 11
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The Leading Magazine
of Home, Educational, and
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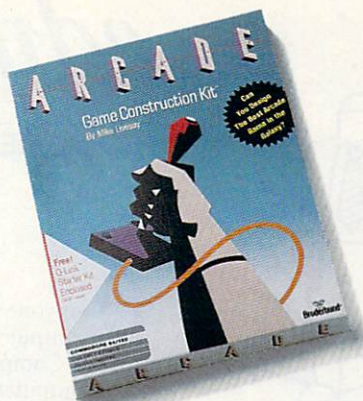
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Faces That Can Sell a Thousand Computers

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GREGG KEIZER

Everyone wants to sell you a personal computer.

Computer makers exist not to make computers, but to sell them. The machines don't do anyone any good stuck in a warehouse, so computer companies use every stratagem, every clever sales technique, to get their products out of those warehouses and onto your desk.

That's especially true at this time of year. I'm writing this just days before the end of 1988, during the traditional season of the hard sell. To make themselves heard and seen above the crowd, computer sellers pull out the stops with lower prices, special offers, and easy credit during the holidays.

One way that computer manufacturers sell their wares is to prop up a celebrity before the camera. This famous person then extols the benefits of owning (and thus buying) a particular computer. Years ago, when the home computer industry was younger and a bit more unpredictable, such spokesmen (they were always men) were common. Alan Alda was a huckster for Atari. William Shatner, formerly a starship captain, piped up for Commodore's PET computer. Dick Cavet, talk show talker, talked about the great things Apple II computers could do. The ghost of Charlie Chaplin, as personified by his character the Little Tramp, strutted and twirled for the IBM PC. Isaac Asimov, prolific science and science fiction writer, showed up in ads for the Radio Shack TRS-80.

What do we have today? The aging crew of "M*A*S*H" shills for IBM's PS/2 line. John Dvorak, a columnist who regularly vents his spleen in PC and Macintosh magazines, stands on a ladder for Everex. Nameless business sharks inhabit Macintosh ads and look for the edge that will let them lead the next corporate takeover.

Slim pickings for those of us who grew up with television and watched Dustin Hoffman peddle Volkswagens, Willard Scott push McDonald hamburgers, and Bill Cosby promote Jello pudding. The personal computer industry needs a human touch to make its selling less serious, less threatening, and less mechanical. Every computer maker should go out and find itself a spokesperson.

I'd like to help out. No, not by staring into the camera and professing my love for a computer. I'd like to throw a few names into the ring—names appropriate to each computer maker.

I've got two for the Macintosh spot. What about Robin Leach, host of the ever-

popular, ever-pandering "Life Styles of the Rich and Famous?" Since September, when Apple hiked its Macintosh prices by as much as 20 percent, it seems that only the rich can afford a new Mac. Or how about Donald Trump? He's put his name on everything from airlines to hotels. Why not a computer? But if Trump sells computers, will the Mac then become simply the T?

Another easy pick is Max Headroom for the Amiga. Max has been out of circulation since ABC pulled his plug last year, and I haven't seen him on Coke commercials lately, so he should be eager for work. The Amiga is a dynamite desktop video production machine, which, after all, is what Max is all about. Besides, if the scuttleb-b-butt was true, Max was getting some help from an Amiga during his second s-s-s-season.

IBM is, as we all know, the giant of the personal computer industry. Give them a mouthpiece as big as their business: Make André the Giant the official celebrity for the PS/2 line. Wrestling precedent was set, of course, when King Kong Bundy represented Vendex, a PC-compatible manufacturer, so it's not like this is way out in left field. Anyway, if they let André speak in rhyme, as his character did all the time (in *The Princess Bride*), he might convince me to see that MCA is here to stay.

I'd suggest that Commodore look up William Shatner again. Put him in his "Star Trek" costume on the bridge of the Enterprise, with a Commodore 64 in his lap. The camera should pan from the 64 to Shatner's face. He should look into the camera and say, "Yesterday's technology tomorrow. The computer of the twenty-third century. The Commodore 64." A nice 30-second spot.

Jack Tramiel should be his company's own spokesperson. The Atari ST isn't doing all that well here in the U.S., and putting an earnest company head in front of the camera might be just the ticket. Computer companies have a lot to learn from car (think Lee Iacocca) and razor (Victor Kiam) makers.

The Apple II? It's the machine of choice for school kids, right? Animate Calvin, from the comic strip "Calvin and Hobbes," and put him in front of an Apple II. If the computer survives, teachers will believe it can stand up to classroom punishment.

Those are my recommendations. Keep your eyes glued to your TV set—maybe you'll see one of these celebrities soon. Or maybe you'll see me pitching computers from a ladder. □

A CATAclySMIC STRUGGLE BETWEEN GOOD AND EVIL

For the first time, Tolkien's panoramic vision of the cataclysmic struggle between good and evil has been skillfully crafted into a single computer game of epic proportions.

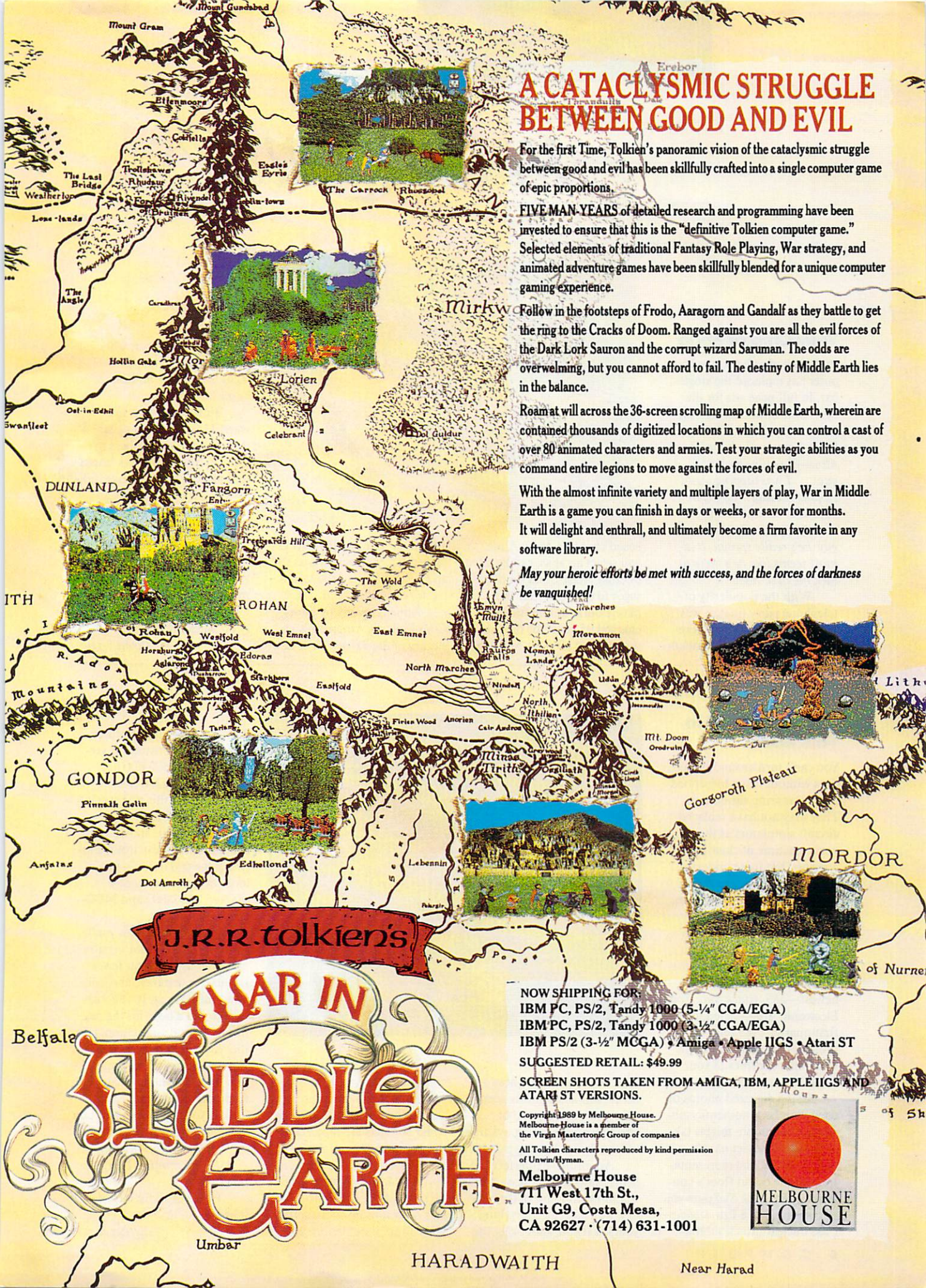
FIVE MAN-YEARS of detailed research and programming have been invested to ensure that this is the "definitive Tolkien computer game." Selected elements of traditional Fantasy Role Playing, War strategy, and animated adventure games have been skillfully blended for a unique computer gaming experience.

Follow in the footsteps of Frodo, Aragorn and Gandalf as they battle to get the ring to the Cracks of Doom. Ranged against you are all the evil forces of the Dark Lord Sauron and the corrupt wizard Saruman. The odds are overwhelming, but you cannot afford to fail. The destiny of Middle Earth lies in the balance.

Roam at will across the 36-screen scrolling map of Middle Earth, wherein are contained thousands of digitized locations in which you can control a cast of over 80 animated characters and armies. Test your strategic abilities as you command entire legions to move against the forces of evil.

With the almost infinite variety and multiple layers of play, War in Middle Earth is a game you can finish in days or weeks, or savor for months. It will delight and enthrall, and ultimately become a firm favorite in any software library.

May your heroic efforts be met with success, and the forces of darkness be vanquished!



J.R.R. Tolkien's

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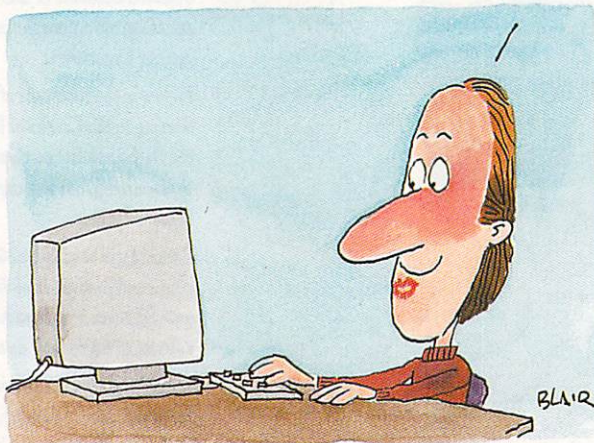
Near Harad

news & notes

Your Chip or Mine

In the age of safe sex, the computer has replaced the singles' bar. In full-page ads for the new Aline online service, an attractive young woman confides: *I met a guy last night on Aline—a really special guy. . . . I was tapping away, zipping messages off to five guys at once and having the time of my life. But this one guy, he's really special. It almost seems like he's there to tuck me in at night.*

With the popularity of telephone party lines, it was only a matter of time before someone developed a modem-



based chat line. With Aline, you select an alias, call up a list of other aliases, and send messages to anyone. Your telephone bill is automatically charged 95 cents for the first minute and 20 cents for each

additional minute. If you don't have a PC, you can rent, as the ad puts it, "a cute little terminal for only \$9.95 a month."

Aline is owned by NewCom Link, an American subsidiary of the French firm Le

Nouvel Observateur, which already supplies videotex services to over 3½ million homes in France.

With additional software, U.S. Aline users can talk to Aline subscribers in France. NewCom Link hopes to make the U.S.-France link-up available to all users and feature it as a standard menu choice.

First available only in New York, Aline can now be accessed nationwide. So no matter where you live, you have no excuse for being lonely on Saturday night.

— David English

Illustration by Harry Blair

There's a Boat in This Box!

You can't turn around these days without being torpedooed by a submarine simulation. They may not have replaced aircraft simulators as the favorite pastime of chair-happy warriors, but these undersea adventures have bred more than one new Captain Nemo.

Older programs like *Silent Service* and *Gato* have been supplanted by more realistic games such as *Red Storm Rising* and *Up Periscope!*. The newest—*688 Attack Sub*, from Electronic Arts—slated for a first-quarter 1989 release, promises even more realism within the confines of your IBM PC or compatible.

Using digitized photos of crew members, authentic submarine operation, targets taken from the Soviet navy's lineup, and actual representations of the ocean floor's contours, *688 Attack Sub* puts you in command of a *Los Angeles*-class nuclear-attack subma-



rine. No boomer business here—this shark hunts enemy subs and ships instead of creeping quietly along, waiting to launch city-busting missiles.

An intuitive interface helps manage an almost overwhelming amount of technology. You can run everything yourself if you want or let the

computerized crew handle some of it. Detailed radio messages are received and real-life sonar contacts are reported by the appropriate crewman at the click of the mouse button.

688 Attack Sub is a dead-on simulation. And with Maxwell's newest promotional effort, you can try it out before you

buy. The disk manufacturer has put a demonstration version of *688* in 500,000 boxes of its 5¼-inch blank disks. By the time you read this, the special will be in the middle of its three-month run, but you shouldn't have any trouble locating the *688* demo—just look for the prominently marked MD2-HD and MD2-D ten-pack boxes.

Inside these boxes you'll find a stripped-down version of *688 Attack Sub*: far fewer targets, for instance, and only one conflict area. It's enough to give you a taste for the real thing (the real simulation, not the real *real* thing). Then, when you've worked yourself into a combat-happy state and find you've become a sub junkie, you can go out and buy the full-blown version from EA.

Sonar contact bearing 323! Ready number 1 torpedo tube! Fire!

Heady stuff for a land-lubber.

— Gregg Keizer

Fly and Fight

Falcon, the popular F-16 combat flight simulator from Spectrum HoloByte, has made it to the real time. No longer content to be merely a game, *Falcon* is destined to become part of the Air Force's flight trainers.

Falcon developer Sphere recently signed a seven-year agreement with Perceptronics, a company that has sold antitank-missile and tank simulators to the military. Sphere will furnish the software for the Avionics Situational Awareness Trainer (ASAT) family of F-16 trainers, which Perceptronics will manufacture.

Seven different simulators, including one called the Basic Tabletop Trainer, are planned. The trainers are not full flight simulators, but concentrate on specific parts



of air combat, such as air-to-air intercept training, and heads-up display familiarity.

All the ASAT models will share features ranging from full-color displays to a high-tech joystick, and since the trainers are modular, more capabilities can be added. The hardware heart of the ASAT

will be 80386-based MS-DOS computers; depending on the ASAT, anywhere from one to three machines will drive a trainer's various displays.

As many as a dozen ASAT trainers can be connected on a network, letting fledgling pilots fly in simulated formation and against other

ground-bound pilots in imitation combat.

Low price is the main benefit gained from using nearly off-the-shelf personal computer hardware and customized software. According to Mike Adams, project manager with Perceptronics, competing flight trainers can cost from \$400,000 to \$500,000; an ASAT, however, is only \$165,000. Not in our budget perhaps, but definitely in Uncle Sam's.

After seeing *Falcon*, said Adams, Perceptronics knew it had found the company to write the ASAT software. "We've been associated with Sphere over a year now, ever since we first saw *Falcon*. They really know how to drive an AT. This [*Falcon*] is the most high-powered AT performance going."

— Gregg Keizer

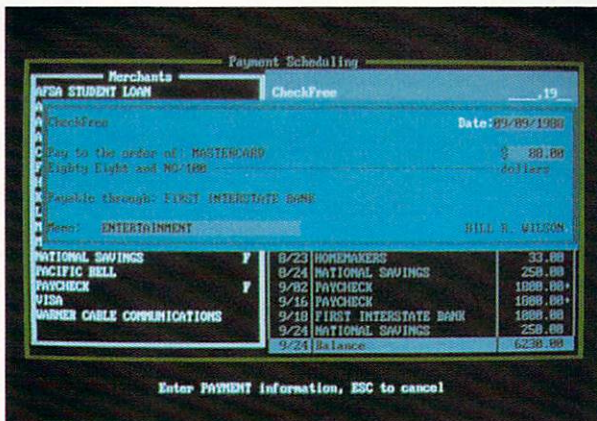
Bits in the Bank

Anyone who has considered banking by computer has probably balked at the high price. But that may change with CheckFree Technologies, a Columbus, Ohio, company that's bringing the cost of electronic banking down.

CheckFree lets you write as many as 20 checks per month from your IBM PC or compatible computer for \$9.00 with the \$29.95 *CheckFree* software program (the \$29.95 entitles you to one month of free service). If you write more than 20 checks, you pay an additional \$3.00 for every 10 (or part of 10) over the limit.

Mike Sapienza, vice president of marketing, said the company keeps the cost down by dealing in volume. The company isn't dependent on any one bank, so it's not limited to a single bank's depositors.

There are few limits to whom you may pay through the system. "You can pay the guy who mows your lawn if you want," Sapienza said. The



only exceptions are taxes and court-directed payments such as fines.

Sapienza said that the system is designed for home computer users, but that the company has gotten a lot of interest from small businesses, too. A PC-and-compatibles version of the software is available now. Macintosh and Apple II versions are slated for a March release.

To set up the system, you fill out a form that authorizes

CheckFree to make payments from your account. The company submits that form to your bank, which is legally obligated to honor it, and furnishes you with a CheckFree account number. The company also sends you the menu-driven *CheckFree* program, which you use to set up your accounts and to transmit your payments. Use your modem to send your checks to the CheckFree processing center, which then routes them through the

Federal Reserve System. To maintain security, all transfers are made with burst transmissions.

Besides helping you write and transmit checks, *CheckFree* can also be used to help balance your account and set up automatic monthly payments for bills like car or mortgage payments. Most transactions are posted the day they're sent, but the company advises you to send your payment at least three days before the due date to guard against unforeseen delays.

Other costs include \$15.00 for returned checks (insufficient funds); \$2.00 for nonaccepted payments; \$10.00 for stop-payment orders; \$3.00 per statement for receipts, records, and statement reproductions; and \$6.00 for an extra manual.

If you're interested in CheckFree, you can write or call CheckFree Technologies, P.O. Box 897, Columbus, Ohio 43216; (614) 898-6000 or (800) 882-5280.

— Peter Scisco >



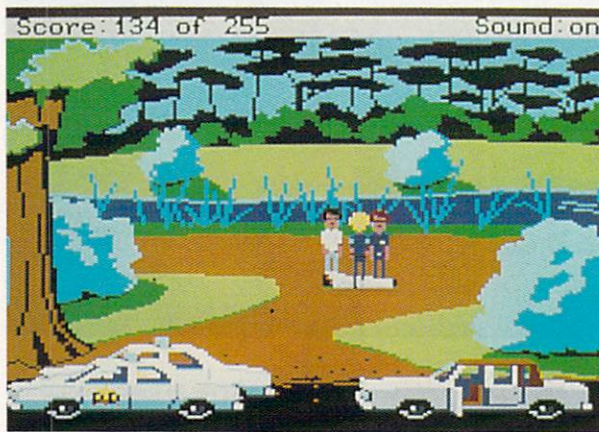
Drawing programs have come a long way. These playing cards show what's possible with a top-of-the-line package like Adobe Illustrator 88.

Is It Live or Is It Memorex?

Death Angel Escapes—Threatens All Who Helped Convict Him. Is the headline from real life or from a computer game?

Both. Sierra On-Line's *Police Quest* series was written by Jim Walls, a 15-year veteran of the California Highway Patrol, and the story lines are based on his real-life experiences.

In *Police Quest II*, you wear the badge of homicide detective Sonny Bonds, in pursuit of the Death Angel. In real life, Walls has retired from police work because of a shootout with the man on whom the Death Angel's character is based. In February 1987, while Walls was writing the first *Police Quest*, the real Death Angel escaped from prison. He's still at large.



Although the *Police Quest* series is based on real people and real events, Walls designed the game so that you can catch the criminal and bring him to justice. Giving the game a happy ending was a treat for Walls. "It's neat because I could make the story come out the way I wanted," he said.

When Walls first started working on *Police Quest*, he had no experience with computers. He wrote the plot with a text editor, broke up the story into scenes, and let a programmer write the code.

The game's attention to detail offers so much realism that some police agencies have inquired about using the series

to train police officers. The biggest attraction for law enforcement agencies is the game designer's devotion to proper police procedure; if you don't follow the rules, you don't catch the Death Angel. "You can't interrogate someone without reading them their rights first," Walls explained.

The game offers interesting insights into police work. "*Police Quest* gives an inside look at how a police officer's hands are really tied and the process he has to go through and the quick judgments he has to make," said Walls.

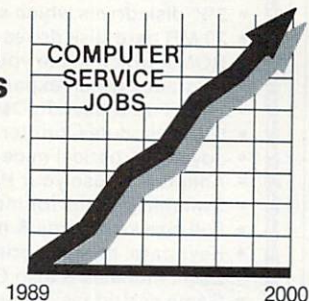
Police Quest II is available for IBM PC or compatible computers with 512K of RAM; it costs \$49.95. Sierra On-Line is located at P.O. Box 485, Coarsegold, California 93614; (800) 344-7448.

— Heidi E. H. Aycock

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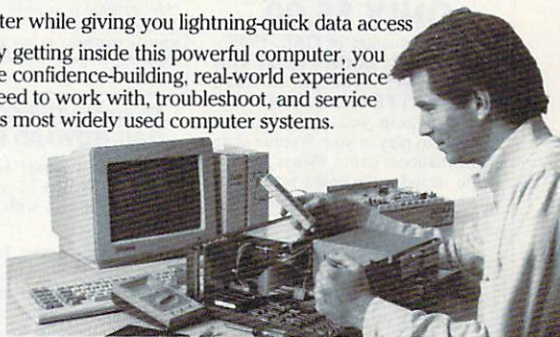
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news & notes

Eyeball to Eyeball

Ultraminiature computer monitors worn as part of a headset conjure up images of Jordy LaForge from the new generation of "Star Trek" space travelers. But if Reflection Technology has its way, such displays won't remain the futuristic vision of Hollywood set designers.

The Cambridge-based company unveiled Private Eye last November, and 100 prototypes are being shipped to several developers. Instrumentation, computer, medical, and consumer electronics companies have expressed interest in the tiny monitor, which provides the full-size image of a 12-inch display from its 1 x 1.2 x 3.2 inch package.

"Everything inside the display is present-day technology," said Neil Golden, the

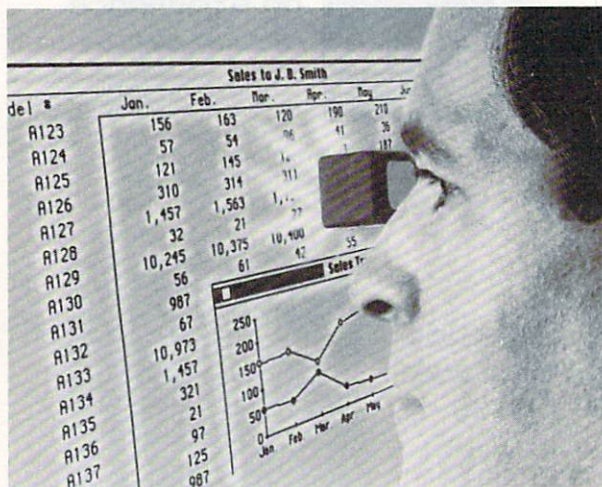
company's director of sales.

"It's just applied differently."

You can hold the monitor near your eye or mount it on a headset. The company said Private Eye displays text and graphics at 720 x 280 pixel resolution. The screen image appears to float in space about two feet from your eye, but the image doesn't occupy your full field of vision, freeing you to do other things while incorporating the information that's displayed.

"It's the virtual image of a 12-inch display," Golden said. The eye and brain recognize the way the image is presented as being much larger than Private Eye's one-inch screen, he explained.

Golden expects Reflection Technologies to be in full production in 12 months. By that



time, developers will have created some of the products that can use the innovative display. The range of possibilities runs from videogames to commercial manufacturing.

Used with a pocket computer, for instance, the miniature monitor could provide the equivalent of a desktop computer in a form much more portable than today's laptops.

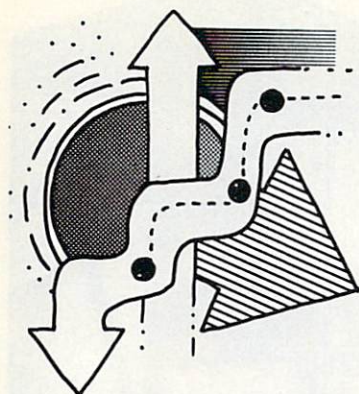
Once in full production, expect prices at around \$500. After a couple of years, Golden said the price may drop to near

\$50, which would make it a hot consumer item.

Only time will tell how far Private Eye will go. But visions of a midlevel sales executive cruising the freeway in a BMW, a car phone planted against one ear, one hand on the wheel and the other pounding a laptop, one eye on the road and the other focused on a spreadsheet that floats in the air just past the windshield, may make pedestrians of us all.

— Peter Scisco

continued on page 82



gameplay

ORSON SCOTT CARD

Programming for Its Own Sake Can Lead to "One- Trick Pony" Games

Too many game designers think of themselves as programmers who happen to be writing games, as opposed to game designers who happen to be using computers.

It makes a difference. There is such a thing as a "programmer's programmer"—the wizard who writes such deft and elegant code that other programmers gasp in awe at its brilliance. Too often, though, in the effort to dazzle fellow code masters, a programmer lets the program shape the game instead of letting the game shape the program.

Whole games are designed around one cool thing that a programmer has figured out. "Why do that?" you ask the game designer.

"Because I can," he answers. Programming is its own reward.

The result? One exciting graphic is the centerpiece of the game. The rest is just filler, hackwork, tossed in to showcase the star effect.

Sometimes it's good enough. Accolade's *Bubble Ghost* feels like such a game. A bubble floats lightly in the air. The player controls a ghost whose job is to send the bubble through a tricky obstacle course—by blowing at it.

The central effect is as good as it gets. When the ghost puffs, the bubble moves quickly at first, then slows down rapidly and hangs or drifts. It absolutely moves like a bubble.

But what of the game? It's a pretty standard scramble scenario. Figure out how to move the bubble past various needles, fans, vacuums, and so on. Not since *Centipede* have we seen a game whose action makes so little sense—a rocket shooting at bugs? A ghost blowing a bubble through a maze? What for?

Oh, don't be such a spoilsport. It's fun, for a while at least, if only because nobody has simulated a bubble before. But once the novelty has worn off, it's just a pretty good game (which isn't anything to sneeze at—half the games published each year don't even achieve that).

Why does *Bubble Ghost* exist? I wouldn't be at all surprised if it began with some programmer figuring out how to simulate a bubble's movements. Other programmers loved it. Then somebody said, "Well, what are you going to do with it?" That's benign enough, really. But sometimes Programming for Its Own Sake leads to really dumb decisions.

CGA graphics on the IBM, for instance.

That purple, green, and cyan screen is the palette from hell. It's so bleak that looking at it makes me thirsty.

It's even worse when compared to a computer with good graphics. On the Amiga, the *Bubble Ghost* bubble looks so light and airy you keep looking around for the kid with the bubble blower. On the CGA screen, the bubble might as well be made of brick. No wonder programmers would rather see their IBM-compatible games displayed on the EGA screen.

But why have the designers at Koei decided to release their new *Genghis Khan* in EGA only, cutting off most IBM owners? While *Genghis Khan* is pretty in EGA, there's nothing in it that wouldn't have played just as well in CGA. Apparently the programmers have taken over.

I haven't become proficient enough at *Genghis Khan* to give it a real review yet. But I've played enough to recognize other signs of "cool programming" at the expense of playability.

One of the great drawbacks of historical simulation in board games is sheer tedium. The more detailed the simulation, the more unbearably slow the game. Every turn takes forever. The only thing that keeps you playing is the knowledge that if you don't finish the thing, 22 hours of setup time will have been wasted.

Computers are supposed to change all that, right? Setup takes only moments, and the computer speeds the flow of the game. Chris Crawford proved it could be brilliantly done with his *Eastern Front*. And Koei's own *Romance of the Three Kingdoms* took the form to new heights—exquisite simulation with almost effortless play.

But with *Genghis*, the tedium is back. For instance, if you want to make money, you have to sell your territory's trade goods to any of three merchants. But you can't call all three merchants onto the screen at the same time. Nor can you barter with them. The result is endless flipping from screen to screen, and for what? The decisions are obvious; the computer could have made them all—in the background.

Maybe some of you will like all this detail for detail's sake. If so, have I got a game idea for you. It's called *Journey*, and is it realistic! You get to make your character take every step. You press L for left and R for right. Between each pair of steps, you select Speed and Length of Stride. But watch out for the deadly Untied Shoelace. Some fun, eh? □



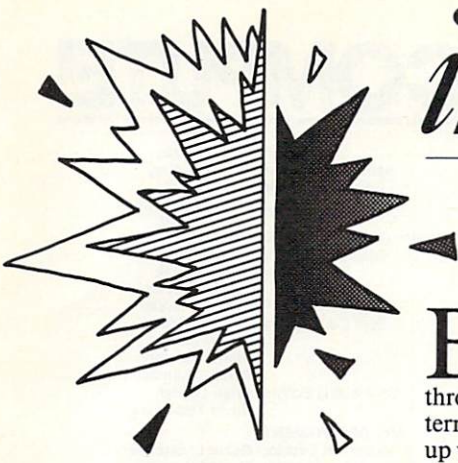
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impact

DAVID D. THORNBURG

The Global Village Under Siege—We've Met the Enemy and He Is Us

Before personal computers, the only way that most people could gain access to computer technology was through time-sharing systems. If you had a terminal or teletype machine, you could link up with a remote computer system through the telephone lines. Your terminal sent your keystrokes to a central computer (called the *host*) and printed the results of that computer's program on your display screen or on paper.

Then computers started replacing terminals. While the personal computer lacks the power of mainframe computers used in most time-sharing networks, it makes up for that by being devoted to one user—suitable for all but the largest applications.

But even as the one-computer/one-person model was becoming the new standard, many people felt we were becoming too isolated from one another. Personal workstations offer great benefits, but there's also much to be said for interconnections with our colleagues and with remote databases.

Consider, for example, the difference between libraries and bookstores. If I'm interested in a particular author's book and I want to make sure I can always have access to it, I'll purchase a copy from the bookstore. If, on the other hand, I'm only interested in a few passages from that book, I'll go to the library and borrow a copy.

Computer use can be thought of in the same manner. I use my personal documents and document-creation tools so often that I need to have my own copies. On the other hand, reference materials—especially those that are updated frequently—are better supplied through a remote "library." The concept of the interconnected work group, in which several computer users share a single file server (the library) and a high-quality printer, makes good sense. It connects users who share interests and tasks, making collaborative work possible.

This work-group concept can link team members who are separated by great distances. Large computer networks can interconnect people from various companies, universities, and countries, promising to create what philosopher Marshall McLuhan called the *global village*.

Imagine the power of a well-designed network. You're in Europe on business. You connect your portable computer to your cellular car phone, and within seconds you're linked with the home office. While downloading your memos, you remember that you've forgotten to turn on the water sprinkler system at your house. After finishing

your business, you dial the host computer at your home and enter the water cycles for your garden. When you finally disconnect, you know everything is being taken care of.

Too futuristic? Not in the least. Everything I've just described has been going on for ten years, carried out by an intrepid group of forward-thinking hobbyists. But such connections are within the reach of all computer users today.

Yet we're in grave danger of turning this dream of a networked nation into a nightmare. Computer viruses that infect major networks threaten to crush their real-world potential. Those who sabotage computers with unwanted programs may successfully keep the promise of network technology from reaching the rest of us.

The challenges of networking this nation are not technological, but social. We've allowed a few postpubescent pranksters to hold us hostage with a few self-replicating programs that can critically damage data stored in network-connected computers. The fear of infection will cause fewer people to explore the benefits of networks.

There are those who suggest that we practice safe computing by downloading only programs we know to be uninfected. But this doesn't always protect against viruses. Others argue that we should develop vaccines to eradicate viruses once they're loaded, or that we should build interface programs that effectively block viruses from being transmitted.

None of these approaches will work permanently. Virus creators like nothing better than the challenge of breaking a new copy-protection scheme or bypassing security measures to get into a system.

There's another solution.

The Fourth Amendment to the United States Constitution guarantees *the right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures*. . . . If I've connected myself to a computer network for the purpose of communicating with others, and my computer is invaded by someone's virus program, my personal security has been breached; it's the same as if someone had broken into my home and gone through my papers and effects. The only way to stop virus creators is to convince them that they're committing a federal offense.

If some of these people find themselves guilty of a federal crime, they might find less humor in their acts. And the "nutworks" could become networks once again. □

Letters

Parts on Fire

In the January "Levitations," Levitan compiled a group of amusing "news" stories, and one concerned the ignition of magnesium cases on the NeXT computer. If such a danger did exist, many of us should immediately retreat from our PCs, as many of them contain magnesium components. The NeXT computer is not even the first computer to have a magnesium housing. Many disk drives have magnesium components, as do printers, where other metals are too heavy and plastic lacks the strength to keep up with the high-speed computing your readers demand.

Each year I spend several days conducting seminars for design engineers explaining the benefits of "hot-chambered magnesium die casting." These components are run through a fluxless process which produces a component that must be heated to the melting point (approximately 1000 degrees centigrade) before ignition can occur. Arlan's high school chemistry has failed him, and we computer users are the winners. If you would like Arlan and your staff to attend such a seminar, I will be glad to arrange it for them.

Patrick McDaid
Greensboro, NC

Downscale Daisies

Your article on the new printers ("Print That Page," November 1988) was very interesting and informative.

While a 24-pin printer is a necessity for many people, a simple daisywheel printer will meet my needs for light word processing, which requires letter-quality print. This point was noted by the article's author who stated that 20 cps (character per second) daisywheel printers could be found for \$100 and 40 cps daisywheel printers could be found for about \$200.

To which printers was he referring and where can they be located? Several calls netted only one printer for \$345.

Perhaps your writer could be persuaded to disclose his sources.

Eric A. Stovall
Reno, NV

Arlan found the low-cost daisywheel printers in the monthly magazine Com-

puter Shopper. *Hunting through this 650-page magazine is no easy task, but one excursion yielded the Alphapro 101, 22-cps printer for less than \$100.*

Commodore 64 Kudos

A quick reading of the January 1989 issue of *COMPUTE!* moves me to make some comments. I fully agree with your choice of Microsoft *Multiplan* as the best multicomputer spreadsheet. It is almost equal to *Lotus 1-2-3* in features. What I cannot understand is your neglect of the Commodore 64 version of this program. While the limitations of the 64 and its 1541 disk drive slow down calculations and data transfer, there is no reduction of capabilities. If the 64 version is out of production by either Microsoft or Epyx, mentioning that this fine program had been produced for the 64 could have generated new interest. I doubt that any other spreadsheet available for the 64 has the features, including logic functions, that *Multiplan* has.

Having purchased the Commodore 64 release of *Sky Travel* soon after it became available, I can only echo Richard Sheffield's enthusiasm for it. If his problem with printers and this program proves to be general, then some of the changes made since I bought the program were not improvements. I have had no problems using my version of the program with a Cardco G-Wiz interface driving a Star SG-10 printer. I suspect that the ability to copy my edition to a working disk with a fairly simple copy program has some bearing on the problem. Some forms of copy protection will not allow the program to load if anything is chained to the serial bus or to the cassette port.

I would be interested to know if the secret pictures of landmarks such as the CN tower in Toronto and the Eiffel tower in Paris are still in the program.

William A. Brewer
Rochester, NY

Let us have it! Send your comments, complaints, questions, and quips to us at *COMPUTE!* Magazine, Attention: Gregg Keizer, Editor; 324 West Wendover Avenue; Greensboro, North Carolina 27408.

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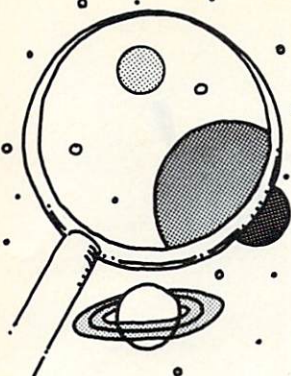
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discoveries

DAVID STANTON



Give Your Child's Reading Skills a Big Boost—Turn On the Computer

“What can I do to help my daughter improve her reading comprehension skills?” inquired a concerned friend recently. “Is there computer software that would help? Should I hire a tutor? We’re not sure what to do,” he continued.

His problem is not unique. All parents want the best for their children. Most recognize the importance of a solid education. Most understand that reading is the cornerstone of learning.

Without good reading skills, children have a tough time in school. How can a child who can’t read a newspaper follow current events in history? How can a nonreader solve word problems in math? The ability to comprehend written material is an absolute necessity.

Educators recognize the problem. Progressive administrators encourage the use of alternative (non-reading-related) teaching strategies wherever appropriate. Some state education departments have even instituted policies that require teachers to read tests to nonreaders. Although audiovisual approaches, hands-on learning, and coverup “That’s OK, I’ll read it to you” strategies can be effective in some situations, nothing can compensate for an inability to read well.

But can computers and software help?

Yes. Teachers of remedial reading have been using computer software effectively for years. In fact, there is enough good software available to bankrupt all but the wealthiest parents. That’s the good news.

The bad news is that learning to read takes time, patience, and infinite practice. If a magic formula exists in software or elsewhere, I’m not aware of it. But a carefully planned program of regular reading practice and computer-based study can produce excellent results over time. With that in mind, you might want to consider the following software packages.

Optimum Resources’ *Vocabulary Development* (Apple II, and IBM PCs and compatibles) is suitable for elementary-age youngsters; the program includes lessons about synonyms, antonyms, homophones (such as *hear* and *here*), prefixes, suffixes, multiple meanings, and the use of context clues. The program keeps a record of results and advances students to more difficult lessons as they succeed. Parents can even include their own word lists in custom lessons. When your children have finished all seven levels, why not reward them with *Reading Comprehension* (ages 9–12, also from Optimum Resources) or another reading pro-

gram of their choice? Everybody wins!

Another excellent vocabulary package is Davidson’s *Word Attack!* (Apple II, Macintosh, IBM PCs and compatibles with CGA, Atari 8-bit, and Commodore 64/128). The program disk presents 675 words in four formats: word displays, sentence completions, multiple-choice quizzes, and the simple, but strangely captivating, *Word Attack!* game. Parents and students can add their own word lists—a great way to learn classroom vocabulary lists. Davidson offers additional vocabulary disks for grades 2–9, as well as a special SAT data disk. *Word Attack Plus* adds foreign language capabilities and many other new features to the original *Word Attack!* program.

For attacking reading comprehension skills more directly, consider Davidson’s *Read ‘N Roll* (Apple II, and IBM PCs and compatibles with CGA). The publisher recommends it for grades 3–6, but a built-in editor lets teachers or parents enter passages of any difficulty level. Students read from passages on disk and then answer questions about main ideas, facts, sequencing, inferences, and vocabulary.

MECC’s *Those Amazing Reading Machines* series (Apple II) provides hours of challenging and enjoyable reading comprehension practice for children in grades 3–6. Each edition invites readers to get involved by rearranging misplaced paragraphs, fixing inaccurate descriptive paragraphs, or analyzing Rube Goldberg-style contraptions. If your child daydreams through the words and misses the meaning, this series can really help. Keep a close eye, though: Frustrated children get discouraged easily.

For sheer reading pleasure, it’s tough to beat Scholastic’s *Twistaplots* (Apple II). Each story includes several plot paths—as a story progresses, readers respond to questions, and their answers change the story line. No one knows how things will turn out until it’s over. Children might even enjoy writing short plot summaries for each new ending. Although *Twistaplots* stories can be purchased separately, the best way to get them is by buying Scholastic’s *Microzine* (grades 4–8) or *Microzine Jr.* (grades 1–4) by subscription or by the issue.

Remember: Learning to read takes time and practice. Parents who help their children discover its pleasures, though, will be amply rewarded for years to come. □

David Stanton can be contacted via CompuServe (72407,102) or by mail at P.O. Box 494, Bolivar, New York 14715.

new products!

A Real Bad Cat

Watch out for *Street Cat*, the toughest cat in the city and the latest release from the U.S. Gold line of games from Epyx.

The game features four events that test cats' athletic abilities and knowledge of the streets. In the city park sprint, cats must make their way through an obstacle course. The cats then hop on their motorcycles, which they must ride over roadside disks without being caught for speeding.

The next event, set in a swimming pool, requires the cats to float on platforms and knock geometric shapes off a diving board. If they can stay dry, they can move on to the catwalk event in the sewer system, where they must avoid rats, a mad dog, slimy pipes, and slippery barrels and ladders. Should a cat slip, it could wind up in the city cesspool.

The final event is bowling against a bulldog, but there are no pins. A cat and dog try to bowl each other over and into the gutter. Whoever gets bowled over has to drink a milk shake before resuming the match, and, after downing a few shakes, will find it difficult to move around.

Street Cat can be played individually, against an opponent or the computer. The game is currently available for the Amiga, Commodore 64 and 128, and the IBM PC and compatibles and has a suggested retail price of \$24.95.

Epyx, 600 Galveston Dr., P.O. Box 8020, Redwood City, CA 94063
Circle Reader Service Number 199.

Commodore AT

Commodore Business Machines has added the PC40-III to its Professional Series II line of MS-DOS computers.

The AT compatible features a 12-MHz 80286 microprocessor with 1 megabyte of RAM, 256K of video display RAM, and IBM VGA-compatible video and graphics modes. Storage includes a 1.2-megabyte 5¼-inch floppy disk drive and a 40-megabyte hard disk

drive.

The computer includes four full-length expansion slots (three AT-style and one PC XT-style), internal space and power to add a second floppy disk drive, and an AUTOCONFIG BIOS that automatically recognizes most installed add-ons. Also included are built-in parallel, serial, and mouse ports and a clock/calendar with battery backup. A 101-key keyboard with numeric keypad and security lock comes standard.

The PC40-III has a suggested retail price of \$2,395.00 without a monitor and \$2,595.00 with the Commodore Model 1403 monochrome VGA monitor.

Commodore Business Machines,
1200 Wilson Dr., West Chester, PA 19380

Circle Reader Service Number 200.

Laptop Modem

Anchor Automation has begun shipment of 2400-baud modems for use in Toshiba laptop computers. The Anchor 2400TLT has been available in Canada under the Toshiba label.

The modem is constructed with only HCMOS components, which eliminate heat and help to provide a clearer signal. Anchor guarantees that the modems are 100-percent Hayes-compatible.

The suggested retail price for the Anchor 2400TLT is \$299.00.

Anchor Automation, 20675 Baha-ma St., Chatsworth, CA 91311

Circle Reader Service Number 201.

Become a Navy Fighter Pilot

Activision's *F-14 Tomcat* is a Naval Weapons Fighter School simulation for the Commodore 64. The program's story line recreates the career of a Naval fighter pilot from the training program to actual mission flights.

The game features aerodynamic modeling, realistic acceleration and

flight ceilings, loops and rolls, and G forces that can make the player "black-out" or "redout." On-board weaponry includes a 20mm M61A1 Vulcan Cannon, plus Amraam air-to-air, Sidewinder, and Phoenix missiles. Players can track six independent targets simultaneously, while a heads-up display shows altitude and airspeed.

After enlisting in the Navy's pilot training program, learn the basics of aerial combat maneuvers. Go on to an assignment aboard the USS *Nimitz*. There are 80 randomly assigned missions in five theaters of action: the Persian Gulf, Central America, Libya, Korea, and Lebanon. You may earn a spot in the Naval Fighter Weapons School.

Between missions, relax at any of four different locations. *F-14 Tomcat* sells for \$39.95. Activision is distributed by Mediagenic.

Mediagenic, 3885 Bohannon Dr., Menlo Park, CA 94025

Circle Reader Service Number 202.

Paragon Marvels at Comics

Paragon Software has signed an exclusive agreement to create a series of games featuring the heroes and villains of Marvel Comics.

Paragon's first release will be an interactive comic arcade adventure titled *Spider-Man and Captain America in Dr. Doom's Revenge*. The plot, outlined in an actual comic book included with the package, involves Dr. Doom and his plan to steal a nuclear missile and launch it toward New York City. The U.S. government calls upon Spider-Man and Captain America to thwart Doom's plan. But Doom has enlisted the help of several Marvel Comics supervillains to do battle with the superheroes.

The computer game picks up where the comic book leaves off, revealing the new comic panels on the computer monitor. Interact with the story through your computer; the future of New York is in your hands.

The IBM PC and compatibles ver-

Mickey McLean

new products!

sion of *Spider-Man and Captain America in Dr. Doom's Revenge* should be available in March. A Commodore 64 version is scheduled for release in June. A suggested retail price was not available at press time for either version.

Paragon Software, 600 Rugh St., Suite A, Greensburg, PA 15601
Circle Reader Service Number 203.

My Hometown

If you've ever wanted to build your own town, Publishing International can make it possible with *Hometown U.S.A.* The program provides a series of plans for model buildings from a typical small town in America.

Make the buildings as simple or as complex as you want with a wide variety of building designs. Then use the buildings as decorations, as accessories for a train set, or even as gift boxes.

Children and adults alike can use the program. It's available for the Macintosh, Apple II series, Commodore 64

and 128, Amiga, and IBM PC and compatibles. The suggested retail price is \$39.95.

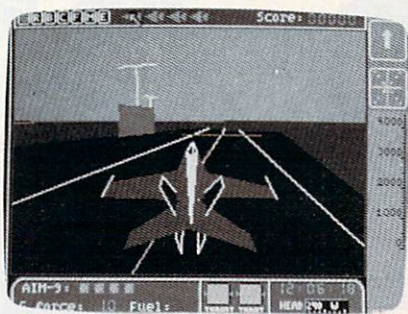
Publishing International, 333 W. El Camino Real, Suite 222, Sunnyvale, CA 94087

Circle Reader Service Number 204.

ST Takes Off

Atari ST owners can now strap themselves in an F-16 Fighting Falcon or a carrier-based F/A-18 Hornet with SubLOGIC's *Jet* flight simulator.

Features include a full-screen heads-up display that allows users to monitor instruments and the environment below simultaneously. On-board equipment includes an arsenal of combat ordnance, a search radar, an automatic target-tracking computer, and an ejection seat. Players can choose from a variety of land- and sea-target strike scenarios or have a dogfight against computer-controlled enemy MiG-21 and MiG-23 fighters. Additional Scen-



Jet's heads-up display provides players a simultaneous view of the instruments and the environment.

ery Disks are available.

Jet requires a minimum of 512K, one 3½-inch floppy disk drive, a mouse, and a color or monochrome monitor. A joystick is optional. The suggested retail price is \$49.95.

SubLOGIC, 501 Kenyon Rd., Champaign, IL 61820

Circle Reader Service Number 205. □

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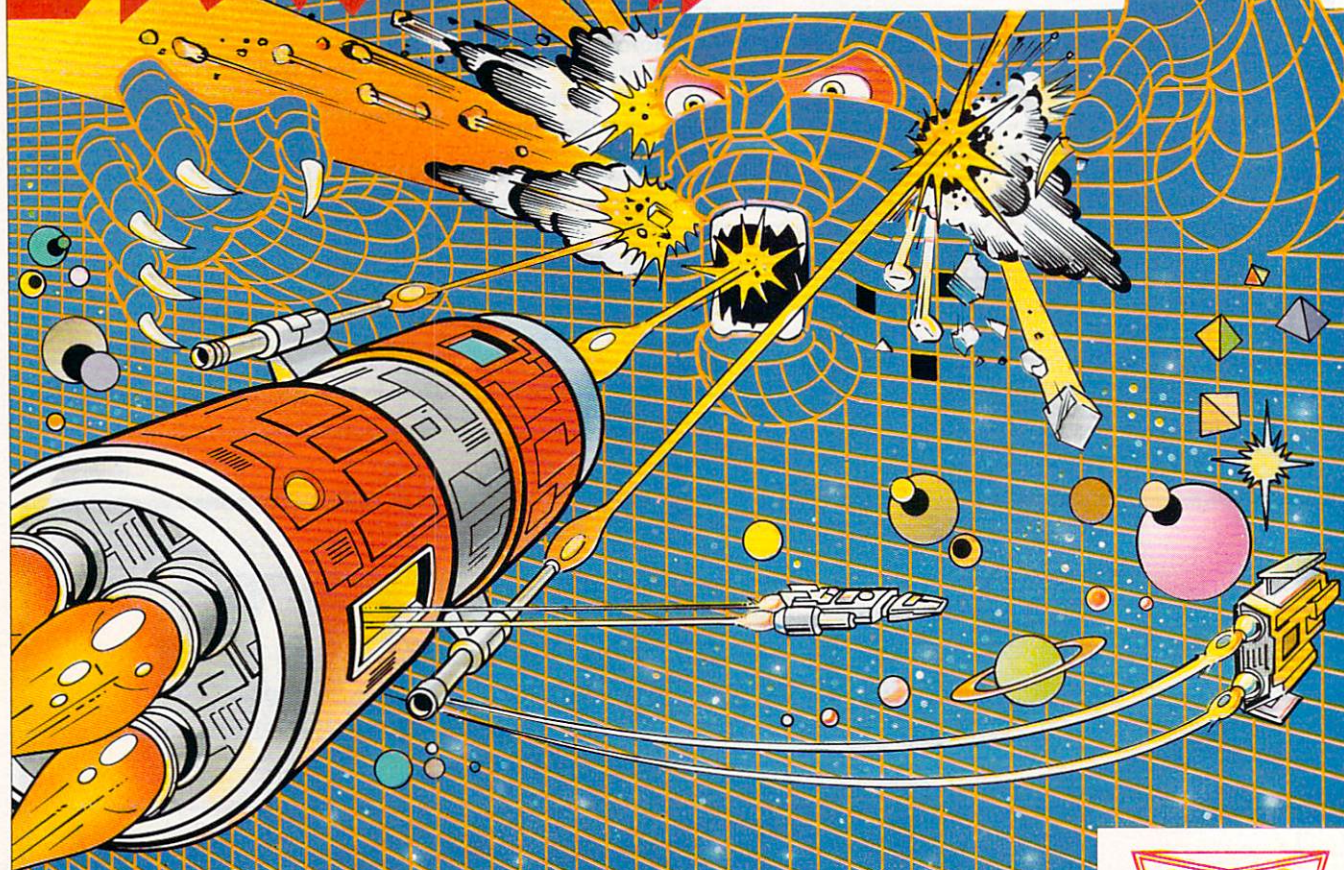
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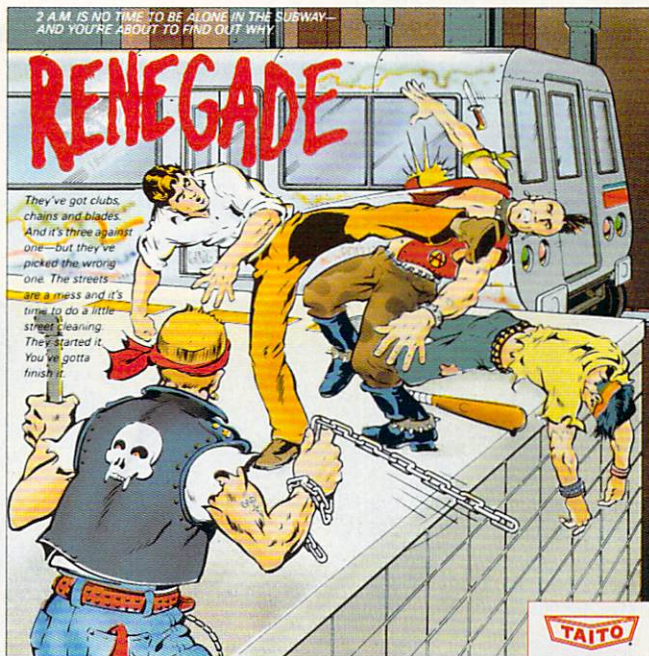
TAITO

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...TWO, THREE, FOUR, FIVE.



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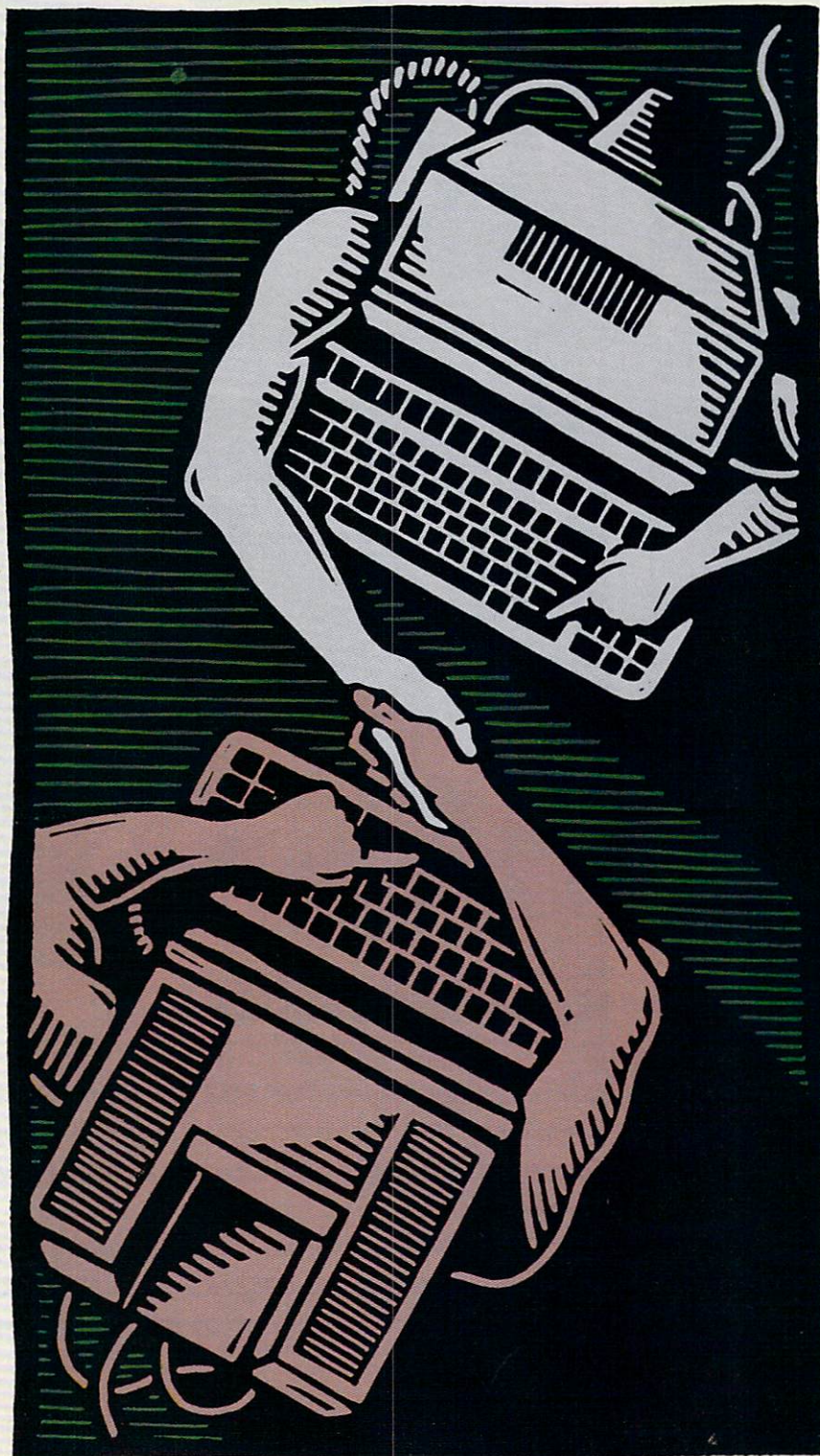
been an arcade leader since 1953. Since then we've made over 1,000 classics for arcade and home play. Count on Taito to bring the heat of the arcade to your home computer.

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COMING T



Under a single light sits a lone computer, the darkness making an island of the machine. Disks are stacked beside the computer; software manuals edge out of the pool of light.

That's the picture most home computer users have of their machines. Home computing usually means solitary computing. To high-powered business computer users—those familiar with information sharing, immense computer networks, and computerized work groups—the image of a computer toiling alone seems quaint. To the millions of us using personal computers at home, that image is a fact of life.

But working with only one machine need not mean that you must be exiled from every other computer and from every other computer user. There are literally dozens of ways for one computer to share information with another. Some are sound, practical methods. Others are on less firm ground. But all are available to those people who need to move data, files, and information from one computer to another.

And in these times of personal computer fragmentation, those people will, at some point, probably include you.

The Computerized Babel

As long as there have been personal computers in the home, there has been disagreement among personal computer users. Not known for their non-partisanship, computer users have always had preferences for various operating systems and thus for various kinds of computers.

Operating systems, the programs that tell a computer how to interact with such external devices as disk drives and keyboards, vary widely in form and function. Unfortunately, different operating systems (and the software written under them) are almost always mutually exclusive. A program

TOGETHER

written to work under one operating system, for instance, hardly ever works under another operating system. And because many computers are so closely identified with a single operating system, it's unlikely that one software package will run on more than one kind of computer. It's a problem that's been around since the beginnings of personal computing.

No more than seven years ago, CP/M was the operating system of choice, spawning such business computers as the Osborne and the Kaypro. Commodore fought back with the PET and its proprietary operating system. Apple was there, too, with its own DOS (Disk Operating System).

In the intervening years, the MS-DOS and PC-DOS operating systems grew into giants as the IBM PC and its clones swept through businesses and into homes. But the Macintosh, another business computer contender, uses an operating system that differs greatly from MS-DOS. The same can be said for every home computer. The Commodore 64 is different from a PC just as the Amiga is different from the Atari ST, just as the Apple IIGS is different from the Commodore 64.

Although they may have little in common, different computers can share information. This article amply illustrates how work done on one kind of computer can be used on a totally different kind of computer.

If you have more than one kind of computer in your home or if you're planning to buy a different system in the future, you'll eventually face the problem of how to bring work from one machine to another. As you move from the old computer to the new, you'll quickly discover that some information is not disposable—valuable data is locked in an old format that must be translated to the new.

Or perhaps you work on one kind of computer at work but have an entirely different kind of computer at home. Without some way to transfer

files or share data, doing your work at home is going to be impossible. Your children could face the same problem; they probably use a different brand of computer at school from the one you have at home. What if they want to do homework at home?

Computers *can* come together. Barring a worldwide computing standard—something neither expected nor much wanted—the file-transfer, emulation, and conversion products gathered here offer the last, best hope to true personal computer communication.

MS-DOS

Lap-Link

IBM PCs aren't everyone's dream computers, but you'll find them everywhere, from corporate America to the kitchen table. As their numbers have grown, an interesting fact has emerged: Your personal computer, the symbol of individual power in the Information Age, reaches its full potential when you connect it to another machine.

The call to connect is tied to several factors, including the rise of the laptop computer, the increasing number of people bringing work home from the office, and the use of personal computers in schools. But even within the world of MS-DOS, the Big Brother of compatibility, linking two computers can present special problems. You may want to upload data from a diskless laptop to your desktop computer; you may use 3½-inch disks at work, but 5¼-inch disks at home; or your kids may use Apple II computers at school.

Lap-Link, a software/hardware file-transfer program and cable combination from Traveling Software, can help. *Lap-Link* simplifies data transfers between any two PC compatibles. The software comes on both 3½- and 5¼-inch disks, which makes it useful on laptop and PS/2 computers. The special four-headed cable, with two different styles of connectors at each end, ensures a link no matter

Computers really can talk to each other.

Here's how to get your machine on speaking terms with nearly any other computer.

what type of serial port your computers have.

Lap-Link is bidirectional, which means that your source and target disks can be in either the local or the remote computer. The program's interface—a split-screen windowlike environment—displays the files residing on each computer. You can move between the windows (back and forth between computers), group files in each window, copy files from window to window, and erase, rename, tag, and view files. You can issue commands by highlighting them and then pressing Enter or by pressing the key that corresponds to the first letter of the command (the L key to log a new drive, for example).

Although *Lap-Link* is geared toward connecting MS-DOS laptop and desktop computers, it can also connect two personal computers with different-sized drives, provided the machines are close enough for the cable to reach. That's a lot less expensive than buying another disk drive.



Traveling Software isn't the only player in the MS-DOS file-transfer game. *Direct-Link*, from Micro-Z, links PC compatibles through the serial or parallel port; White Crane Software's *Brooklyn Bridge* does much the same.

For those who need to transfer files from non-MS-DOS computers to a PC or compatible, several other products are available. *Lap-Link Mac*, also from Traveling Software, allows file transfer between the Macintosh and the PC. MicroSolution's *Uniform PC* is an MS-DOS file-conversion utility for CP/M machines; the company also manufactures the MatchMaker card, which makes it possible to connect a Macintosh disk drive to a PC. *Big Blue Reader*, from SOGWAP Software, formats MS-DOS disks in Commodore 1571 or 1581 drives and converts Commodore files to ASCII format for use in MS-DOS computers. (There's also a version for the Commodore 64/128.) The Trackstar 128 board lets you run Apple II programs on PCs and compatibles. Central Point Software's Copy II PC Deluxe Option Board is designed to make archival copies of copy-protected programs, but as a side benefit lets an IBM PC, PS/2, or compatible with a 3½-inch disk

drive read and transfer files from Macintosh disks.

— Peter Scisco

Commodore 64/128

GIF

The Commodore 64, the least expensive home computer still sold in mass numbers, may not get a lot of respect these days, but it still has a lot of life left in it. To extend that life even further, use your 64 to share data with other personal computers.

Transferring files between a Commodore 64 and a non-Commodore computer can be a snap or a struggle, depending on what kind of information you want to share. Text files, for instance, can easily be shared with other machines. If you have a modem, you can send an ASCII file from one computer to another.

Sharing graphics files with other computers was, until recently, an entirely different story. Transferring graphics from one system to another was nearly impossible, what with the babel of graphics file formats.

The problem was that there was no equivalent universal language for hi-res pictures. A Commodore 64 can display 16 colors on a screen of 320 × 200 pixels. But an IBM with a VGA card has a resolution of 320 × 200, with 256 colors. The screen is the right size, but there are too many colors. Other computers presented similar incompatibilities.

Two years ago, the CompuServe Information Service invented the Graphics Interchange Format (GIF) to circumvent this problem. GIF is to graphics as ASCII is to text; it's the universal language for viewing pictures.

With the Commodore GIF decoder—available on the CompuServe service—you can view a graphics screen generated by an IBM PC (in CGA, EGA, Hercules, or VGA graphics modes), a Macintosh or Macintosh II, an Amiga, an Atari 8-bit or ST, a Radio Shack Color Computer, or another

Commodore 64/128. And the pictures you create on your 64 or 128 can also be shared with nearly any other computer.

The program that allows you to view a GIF picture is called a *decoder*. To translate a 64 picture to a GIF file, you use the *encoder*. (Each computer system that GIF supports has its own encoder/decoder program.)

Unfortunately, GIF cannot make allowances for every kind of graphics transfer. Some pictures are simply

too complex for your computer to display, so the decoder must make compromises.

When a decoded picture has too many colors, for example, the decoder might round off to the nearest color. If a decoded picture is too large for the screen, you might have to decide which part to view. There's even a chance that the picture will look like mud—an

Amiga picture that uses 33 shades of blue might appear on a 64 screen as a big lump of blue with some light blue and cyan sprinkled here and there.

GIF isn't perfect. Yet, even with the compromises, you get amazing results most of the time.

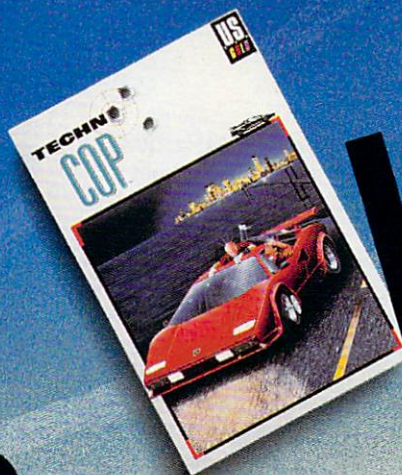
If you'd like to learn more about GIF, visit the CompuServe GIF forums—PICS, GALLERY, and QPICS. The Commodore Arts & Games forum (CBMART) also contains a variety of graphics programs for viewing GIF, *Doodle*, *Koala*, computer-aided design (CAD), and GEOS pictures. The CBMART forum also contains a program that converts *MacPaint* files into GEOS-compatible graphics files.



GIF isn't the only way Commodore 64 or 128 computers can share information with other machines. If you have a 1571 or 1581 disk drive, you can use a file-transfer utility called *Big Blue Reader 128/64* to move word processing, text, and ASCII files from Com-

CompuServe's GIF
format lets you view
graphics created with
nearly any computer
on your 64 or 128.

KILLER



Technocop. You're bad. You're cool. You're part of the Enforcers, a high-tech police task force. And it's up to you to take down the sleazeball members of an organized crime empire and restore safety to the city.

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Your mission? Race down savage highways and blow away punks. Check out seedy buildings where rats and thugs are buddies. If you're tough enough to survive, then it's back in the V-Max and on to the next crime scene.



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modore disks to IBM-formatted disks, and vice versa.

— Todd Heimarck

Apple II

PC Transporter

Everyone likes a winner. And the winner at the moment, in both business and home software formats, is the IBM PC and its millions of MS-DOS clones.

Which is why you'll have a hard time finding anyone who wants to emulate another computer from an IBM PC, and, conversely, why most emulators that fit in other machines imitate the PC.

One such emulator is the PC Transporter, a hardware and software combination that lets you run MS-DOS software from an Apple IIe or IIGS computer. To Apple II loyalists, admitting a need for MS-DOS is like downing a bowl of hemlock. But plenty of Apple II owners, especially those who use an MS-DOS machine at work, know how powerful PC software can be.

PC Transporter is an IBM PC XT compatible on a board. It installs inside the Apple IIe or IIGS (a scary process for techno novices, but one that can be finished in an hour). Although Apple 3½-inch disk drives can act as MS-DOS drives when connected to the board, you'll have an easier time if you buy a 5¼-inch, MS-DOS-format disk drive (in either a single or double-drive configuration) from Applied Technology. The emulator's PC-dedicated RAM is on the board; PC Transporter doesn't use any of the Apple's own memory.

Getting to MS-DOS means booting the Apple with the supplied disk and then loading MS-DOS (not supplied). On an Apple IIGS equipped with an RGB monitor, the PC programs run in CGA-style graphics; non-RGB monitors will display only monochrome. Neither monochrome nor CGA is up to Apple color standards, but they're both usable for most applications and some games. PC

Transporter runs at 7.14 MHz, quite fast by Apple II standards, but not blindingly so in today's 80286-equipped-PC-compatibles market.

Although the PC Transporter is an emulator, you can also use it to transfer files between Apple II and PC software. A utility is provided, but since it does not actually translate between file formats, it's only for moving ASCII files between ProDOS and MS-DOS.

PC Transporter runs most MS-DOS software; all the major applications that make the PC so powerful—1-2-3, dBase, WordPerfect, Works, SideKick—work fine. Any compatibility problems will likely revolve around copy-protected games.

The usefulness of PC Transporter lies in its sharing of the Apple system's peripherals—the monitor, printer, disk drives, and even the mouse can be used by the emulator, provided you have the

proper MS-DOS device drivers (generally supplied with PC software). You can even share a hard disk. PC Transporter also saves space. If you're pressed for room at home and can't find a place to put another computer, this two-in-one approach works well. Another extra is that the RAM on the PC Transporter board can be used by the Apple II as a ramdisk or as an expanded desktop in *AppleWorks*.

Unfortunately, it's impossible to add IBM PC-style boards to your Apple II because the connections are completely different. So though Transporter puts a PC inside your Apple, it's an unexpandable, limited PC.

No emulator is perfect—compromises must always be made. Even though it's an elegant solution, PC Transporter is no match for a stand-alone PC—providing you have the room and the money for another complete computer system. For a workable and, in most cases, affordable compromise between MS-DOS and Apple, PC Transporter fits the bill.



Although the Apple II can emulate only the IBM PC, there are several products which make it possible for the

Apple to share files and data with other computers. An *AppleWorks*-to-IBM conversion program called *Cross-Works* uses software and a special cable to connect Apples and PCs and then transfer *AppleWorks* word processing, database, and spreadsheet files to *WordPerfect*, *dBase III*, and *1-2-3* format, respectively. Moving ASCII files from the Apple II to the Macintosh (and vice versa) requires the Apple File Exchange program, a Macintosh utility included in the machine's latest System Software Update. With Apple File Exchange, a 3½-inch ProDOS disk can be inserted into a Macintosh disk drive, and its ASCII files transferred to the Mac; Macintosh ASCII files can also be transferred to this ProDOS disk. And *Fruit to Friend*, a Commodore Amiga program, allows that machine to read or write in Apple II DOS 3.3 and ProDOS formats.

— Gregg Keizer

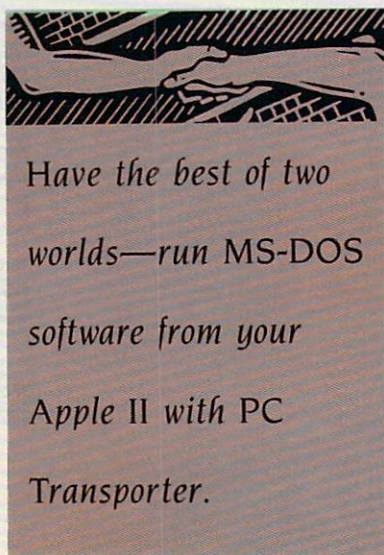
Amiga

2088 Bridgeboard

An IBM PC inside the Amiga 2000? Sounds strange, but that's what many Amiga owners want. After all, there are 40 times more MS-DOS machines out there than Amigas. That means more software and more third-party support. If you need to run programs such as *Lotus 1-2-3* or *dBase*, or if you need to transfer files between your home computer and the office PC, then MS-DOS emulation is a viable solution.

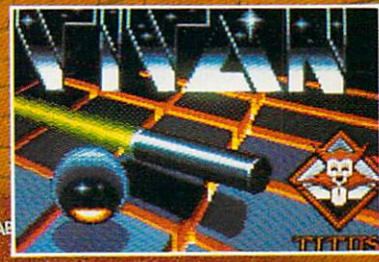
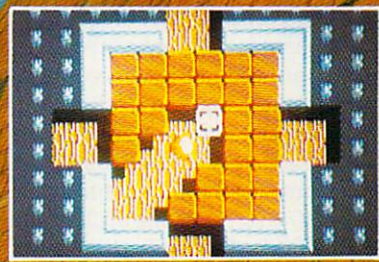
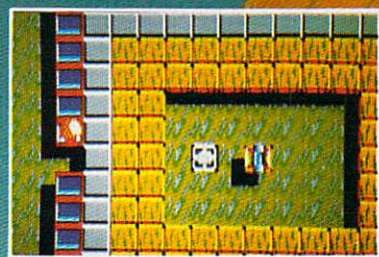
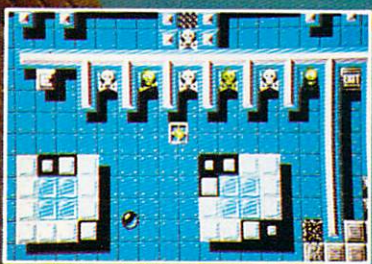
Besides, PCs are easy to emulate. They have no specialized circuitry and their off-the-shelf technology can be purchased through electronics stores and mail-order catalogs. An entire MS-DOS computer—minus keyboard, disk drive, and monitor—can fit onto a 4 × 12 inch circuit board.

The Commodore Amiga is not immune to the MS-DOS invasion. The 2088 Bridgeboard IBM PC emulator was one of the first Amiga 2000 products shipped. Simply put, the 2088 Bridgeboard is a 512K IBM PC on a card (about 4 × 12 inches). It uses an 8088 microprocessor running at 4.77 MHz (a faster 80286 version is



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also available), a Phoenix BIOS (Basic Input/Output System), and a 5¼-inch disk drive that mounts internally (an external drive is optional). It is, in effect, a PC clone that fits inside the Amiga 2000.

MS-DOS compatibility was not an afterthought on the Amiga 2000. The computer comes standard with five Amiga slots and four IBM PC-compatible slots. The Bridgeboard plugs in where the Amiga and PC slots align, forming a literal bridge between the two bus systems. The PC slots are next to useless without the Bridgeboard.


You operate the Bridgeboard just as you would any other Amiga application: Double-click on its icon and a window appears with the PC screen inside. You can resize this window, send it to the front or back of other windows, or close it. In fact, you can run Amiga software at the same time you run MS-DOS software. To the Amiga, the PC is merely another task requesting attention.

To cut down on hardware, the Bridgeboard uses the Amiga's keyboard, printer port, and video hardware. One of the drawbacks to this setup is that the Bridgeboard's video output must be translated into Amiga graphics before it can be displayed (the Amiga's screen is bitmapped, while the PC's screen is normally character-based). This conversion slows down video output—but not microprocessor speed—and results in a jerky-looking display. With a dedicated monitor and a video board in a PC slot, you can do away with the problem. As it stands, the Bridgeboard supports both monochrome and CGA graphics, both of which can be displayed at the same time in separate windows.

The main advantage to using a Bridgeboard instead of a stand-alone clone is that the Bridgeboard and Amiga can share devices, such as hard drives and printers. You can even transfer (cut and paste) text between the PC window and other Amiga applications. And with the Amiga's

custom chips driving the Bridgeboard's video output, you can change the PC's CGA colors to something more appealing.

If you must give in to IBM's siren call, the Bridgeboard is a logical choice. It's as compatible as any MS-DOS clone and, best of all, it works with the Amiga, not against it.

 The Amiga can emulate three different computers: the IBM PC, the Commodore

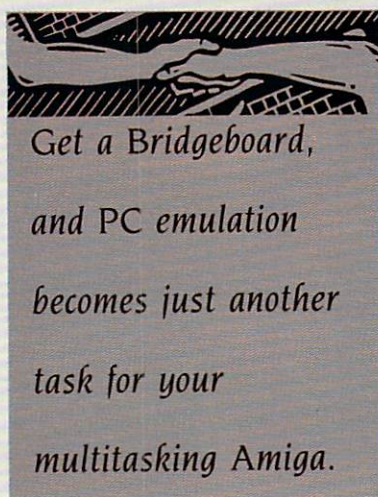
64, and the Apple Macintosh. PC emulators are the most abundant. They include the software-based *Transformer* and the hardware-based

Amiga 1000/ 500 Sidecar and already-mentioned Bridgeboards.

To transfer MS-DOS files to and from the Amiga, you could use an emulator, but all you really need is Commodore's 1020 5¼-inch disk drive and the PC copy programs found on your Extras disk. Another program, *DOS-2-DOS*, supports both 5¼- and 3½-inch PC disks.

The 64 Emulator is a Commodore 64 emulator for the Amiga that comes with a hardware interface for connecting 64 peripherals and lets you transfer files from one system to the other. With *The 64 Emulator*, you have access to the Amiga's mouse, disk drives, and extra memory. If file transfer is all you're interested in, consider *Access-64* or *Disk-2-Disk*. *Access-64* lets you use Commodore 64 printers and disk drives on your Amiga; *Disk-2-Disk* reads 1541/4040 and 1570/1571 disks using the Amiga's 1020 5¼-inch disk drive.

The newest emulator available for



The Cost of Connecting

Access-64

Makes it possible to use Commodore 64 printers and disk drives with the Amiga—\$79.95

Progressive Peripherals
464 Kalamath St.
Denver, CO 80204
(303) 825-4144

A-Max

Hardware-based Macintosh emulator for the Amiga—\$149.95

The 64 Emulator

Hardware interface and file-transfer software for Commodore 64 emulation on the Amiga—\$59.95

ReadySoft
P.O. Box 1222
Lewiston, NY 14092
(416) 731-4175

Apple File Exchange

ASCII file transfer between Macintosh and Apple II (3½-inch disks)—\$49.95

Apple Computer
20525 Mariani Ave.
Cupertino, CA 95014
(408) 996-1010

Big Blue Reader 64

File transfer from Commodore 64 to PC and compatibles—\$29.95

Big Blue Reader 128/64

File transfer from Commodore 64/128 to PC and compatibles—\$44.95

SOGWAP Software
115 Belmont Rd.
Decatur, IN 46733
(219) 724-3900

The Brooklyn Bridge

File transfer between IBM PC, PS/2, and compatible computers—\$139.95

White Crane Systems
6889 Peachtree Industrial Blvd.
Suite 151
Norcross, GA 30092
(404) 394-3119

Copy II PC Deluxe Option Board

Breaks copy protection and allows application-specific file transfers between Macintosh and IBM compatibles with 3½-inch disk drives—\$159.00

Central Point Software
15220 NW Greenbrier Pkwy.
Suite 200
Beaverton, OR 97006
(503) 690-8090

Cross-Works

Cable and software utility for AppleWorks-to-IBM PC file translation/transfer—\$79.95

SoftSpoken
P.O. Box 97623
Raleigh, NC 27624
(919) 878-7725

DaynaFile

IBM PC-format disk drive(s) and file-translation software that lets a Macintosh read PC data files and vice versa—\$905.00 (two drives); \$125.00 (Dayna translation software)

Dayna Communications
50 S. Main St., 5th Floor
Salt Lake City, UT 84144
(801) 531-0600

Dirac-Link

File transfer between IBM PC, PS/2, and compatibles—\$59.50; parallel and serial cable—\$45.00

Micro-Z

4 Santa Bella Rd.
Rolling Hills Estates, CA 90274
(213) 377-1640

Disk-2-Disk

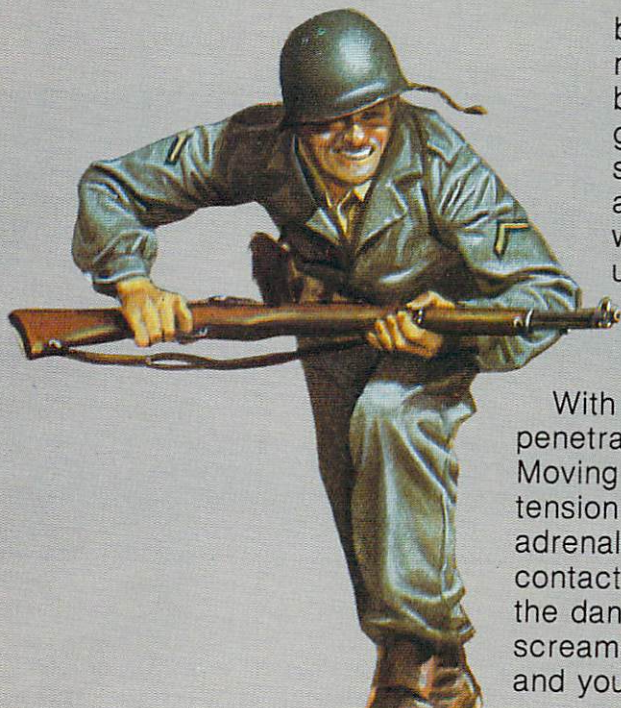
Reads Commodore 1541/4400 and 1570/1571 disks using the Amiga 1020 5¼-inch disk drive—\$49.95

DOS-2-DOS

File transfer from 5¼-inch PC disks, 3½-inch PC disks, and 3½-inch Atari ST disks to Amiga 3¼-inch disk, and vice versa—\$55.00

Central Coast Software
424 Vista Ave.
Golden, CO 80401
(805) 528-4906

continued on page 28

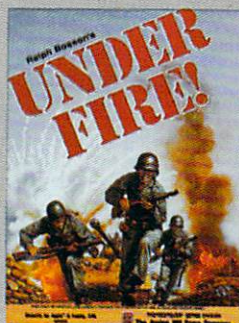


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the Amiga is *A-Max*, a full-speed Macintosh emulator. You must purchase the required Macintosh ROM chips separately and install them in the *A-Max* box yourself. To read Macintosh disks directly, you must buy a Macintosh disk drive and plug it into the back of the box.

While there are no Atari ST emulators available for the Amiga, *DOS-2-DOS* lets you read from and write to ST disks using the Amiga's built-in 3½-inch disk drive.

— Randy Thompson

Macintosh

DaynaFile

Sharing files between IBM PC and Macintosh computers is one of the biggest headaches suffered by Macintosh users. One hardware solution that simplifies two-way data sharing is the DaynaFile, from Dayna Communications.

Using specially engineered disk drives and file-translation software, the DaynaFile lets Macintoshes read PC data files and PCs read Macintosh data files. The DaynaFile is not an

FROM THIS MACHINE . . .

TO THIS MACHINE . . .

	MS-DOS	COMMODORE 64	APPLE II	AMIGA	MACINTOSH	ATARI ST
MS-DOS	Lap-Link	Big Blue Reader	Trackstar 128	Bridgeboard	Lap-Link	ASCII
COMMODORE 64	Big Blue Reader 128/64	—	ASCII	Disk-2-Disk	ASCII	ASCII
APPLE II	PC Transporter	ASCII	—	Fruit to Friend	Apple File Exchange	ASCII
AMIGA	Bridgeboard	The 64 Emulator	ASCII	—	A-Max	DOS-2-DOS
MACINTOSH	DaynaFile	ASCII	Apple File Exchange	A-Max	—	Spectre 128
ATARI ST	pc-ditto	ASCII	DOS-2-DOS	Spectre 128	—	

emulation device, so you can't run PC applications on a Macintosh. The premise is that you don't need to run the application—you only need to transfer the data.

The typical DaynaFile package consists of two IBM-type floppy drives (options include 5¼-inch drives in 360K or 1.2-megabyte capacities and

3½-inch drives in 720K or 1.44-megabyte capacities) that attach to the SCSI port of any Macintosh. DaynaFile drivers treat the added drives exactly like Macintosh devices and enable the Macintosh operating system to recognize MS-DOS-formatted disks. Any MS-DOS disk inserted in the DaynaFile appears as a Macintosh volume on the desktop; MS-DOS directories are folders, and MS-DOS files are documents. You can do all the usual Macintosh things with MS-DOS files: Drag them around with the mouse, copy them from one disk to another, and so on. Volumes, folders, and documents retain their MS-DOS names, including file extensions.

File transfer is all that you'll need for many PC-to-Macintosh tasks. Most programs that run on both platforms, such as *Excel*, *WordPerfect*, and *PageMaker*, can read data files created on either machine. It's simply a matter of opening a PC *Excel* data file directly with *Excel* for the Macintosh. Since *Excel* also understands the *Lotus 1-2-3* file format (WKS), you can open *Lotus* files with *Excel* for the Macintosh as well.

The flow goes the other way just as easily. Because DaynaFile saves Macintosh files on MS-DOS-formatted disks, you can take your Macintosh data files on the road and read them with compatible MS-DOS applications on your PC laptop. You can also use the higher-capacity DaynaFile drives to make faster backups of your Macintosh hard disk.

If you're using an application that

The Cost of Connecting, continued

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Newburgh, NY 12550
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Lap-Link Mac

File transfer between IBM PC, PS/2, and compatibles and the Macintosh—\$139.95

Traveling Software
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Bothell, WA 98011
(206) 483-8088

Magic Sac

Hardware-based Macintosh emulator for the Atari ST which uses the older Mac 64K ROMs—\$94.95 (does not include Macintosh 64K ROMs)

Translator One

Makes it possible for Atari ST disk drives to directly read Macintosh-formatted disks—\$299.95

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SoftPC

Software emulator of MS-DOS on the Macintosh—\$595.00

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Spectre 128

Hardware-based Macintosh emulator for the Atari ST—\$179.95 (does not include Macintosh 128K ROMs)

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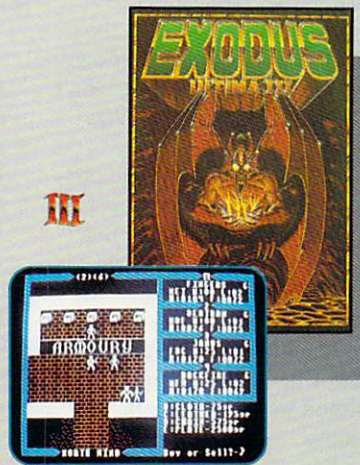
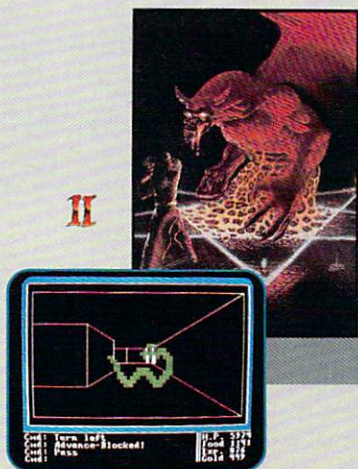
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doesn't run on both platforms, DaynaFile supplies file-translation software: a custom version of *MacLinkPlus*, by Dataviz. This lets you convert files from, say, *MacWrite* to a format that *PageMaker* for the PC can understand. The software is easy to use and appears to work well for the applications it covers—a handful of the most popular word processing, spreadsheet, and database applications.

Graphics are the Mac's forte, so you'd expect DaynaFile to handle graphics file transfer effortlessly. In a quick test, however, that proved difficult. A utility supplied with the PC version of *Deluxe Paint II*, from Electronic Arts, was used to convert an MS-DOS graphics file into *MacPaint* format. When the disk was put in the DaynaFile, a document icon appeared on the Mac's desktop, even though no Macintosh graphics application would recognize the file. It wasn't clear whether the problem was with the DaynaFile software or with *Deluxe Paint II*'s conversion program. Don't count on being able to share every kind of file.

Overall, though, DaynaFile provides an elegant and nearly transparent way to share files between the Macintosh and IBM worlds. Add to that the advantage of having extra disk drives and a faster way to back up your Macintosh hard disk and you have what is perhaps the most complete solution to Macintosh/PC file compatibility.

 Besides the DaynaFile, there are other packages that let Macintosh users emulate and communicate with the MS-DOS world. *SoftPC* is a software-emulation package that lets your Macintosh run PC applications, read MS-DOS data files, and write in MS-DOS format. *SoftPC* requires a Macintosh SE or a Macintosh II with two megabytes of RAM (and an accelerator card if you're using it on an SE). *LapLink Mac* includes a cable and software for transferring data files between Macintoshes and PCs. *LapLink Mac* makes it a snap to transfer files between a Mac and an MS-DOS laptop, bringing at least some degree of on-the-road computing ability to Macintosh owners.

— Steve Anzovin

Atari ST

Spectre 128

Spectre 128 turns your Atari ST into an Apple Macintosh. With Spectre and your ST, you can run most Macintosh programs, including such classics as *Word*, *Excel*, *HyperCard*, and *PageMaker*. Not only do most Macintosh programs make use of the larger Atari ST screen, but in many cases the programs will run faster on the ST.

This emulator comes in the form of an external cartridge that plugs into the ST. Although the cartridge and the Spectre software are included in the package, you must supply a set of Macintosh 128K ROMs and Apple's System/Finder software yourself. Such ROM chips are not available from Apple dealers but can be obtained from other sources (Gadgets by Small, maker of the Spectre 128, can recommend several).

It's these newer 128K Macintosh ROMs that make Spectre compatible with far more Macintosh programs than the earlier emulators, based on the older 64K ROMs, could. Spectre 128 runs all well-behaved Macintosh programs—programs written according to Apple's rules for Macintosh software. Most major applications meet Apple's requirements, so they run fine with Spectre. Apple's HFS (Hierarchical Filing System), System/Finder 6.0, and many other advanced features are fully supported by Spectre. Most Macintosh applications will also recognize the Atari's larger screen size, displaying more information on the ST screen than they would on a Macintosh screen.

Spectre can read from and write to only its own disk format—ST hardware limitations prevent Spectre from reading Macintosh-formatted disks. This is plainly the greatest limitation of the emulator. You can't simply stick a Macintosh disk into an ST drive and expect it to work. And getting Macintosh software to the proper

disk format is a clumsy process at best. One way to move Mac software to Spectre-formatted disks is by telecommunicating the files by modem. Another method is to buy a Translator One, from Data Pacific. The \$299.95 Translator plugs into the ST disk drive and lets the ST read from and write to Macintosh disks. Reading Macintosh-formatted disks with the Translator is slow, however.


Don't expect Spectre to make it possible to transfer data from GEM (the ST's operating system) to the Macintosh environment, or vice versa. Spectre 128 is strictly an emulator and has no provisions for sharing information with the ST when it's an ST.

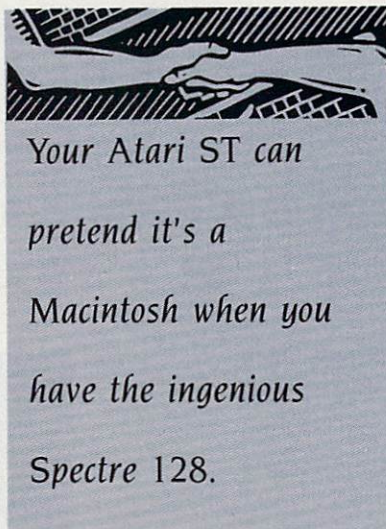
The reason why Spectre 128 is such an attractive alternative to buying an actual Mac-

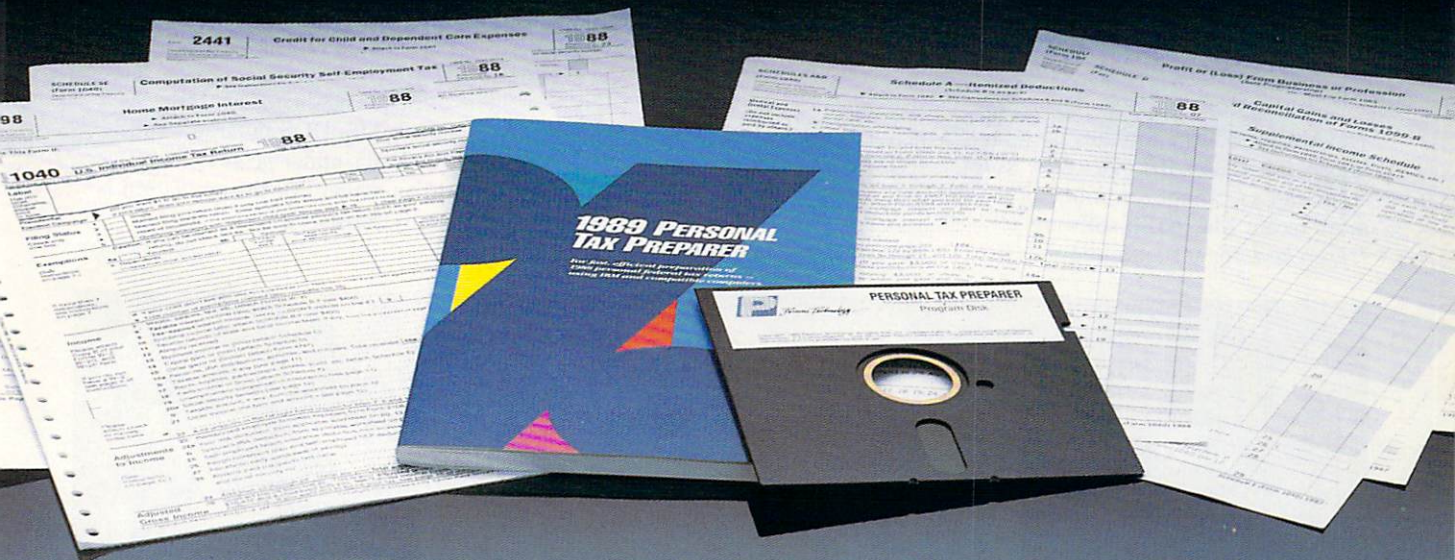
intosh is that it effectively creates two computers from one physical system. With Spectre, you use not only the computer, but also its peripherals—monitor, printer, hard disk drive—to display, print, and store Macintosh programs and data. The savings are considerable, especially when you remember that the least expensive Macintosh probably costs more than your entire ST system.

Another reason why you might want to turn to Spectre is the renowned quantity and quality of Macintosh software, primarily in the business-applications area. While you might be unable to find an ST application to fit your exact needs, you'll probably be able to locate the appropriate Macintosh program.

Spectre 128 works well and is the best product available for those ST owners who want or need to emulate the Apple Macintosh.

 Spectre is but one option open to ST owners. Another is the Magic Sac, an earlier cartridge-based emulator created by David Small, the maker of Spectre 128. ▸





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The Magic Sac also imitates the Macintosh, but it uses the older 64K ROM chips and so cannot run much of the more recent Macintosh software. *HyperCard*, for instance, requires the

newer 128K ROMs. Macintosh 64K ROMs, however, are less expensive and easier to find.

For MS-DOS emulation, check out *pc-ditto*, a software-based emulator.

Although MS-DOS programs run much slower under *pc-ditto* than they do on an actual PC, the emulation is generally satisfactory.

— David Plotkin

Emulation—Who Needs It?

A number of products highlighted in this article make it possible to emulate, or imitate, one kind of computer using yet another kind of computer. PC Transporter, for instance, is an IBM PC emulator for the Apple II; Spectre 128 lets an Atari ST imitate a Macintosh; the Bridgeboard lets an Amiga pretend it's an IBM PC.

Emulation has roots nearly as deep as those of personal computing. The market quickly splintered into Apple II, CP/M, and Atari 8-bit operating systems—software written for one brand of computers ran only on that brand. The operating system schisms

It's Cool

Some people wonder why emulators exist. The answer is simple—emulators exist because people want them. Emulators are inherently fascinating. A double take is standard when someone sees a computer perform the machinations of one of its competitors.

Most people want a computer that can run everything—the game and video software of the Amiga, the business and productivity software of the PC, the elegant and creative software of the Macintosh. Emulators can complement a computer and help turn it into that everything machine. Emulators are also a valid way to expand a computer's (especially a new one's) software base.

You might even want to use an emulator to see what's going on in another computer's market. Sure, the emulation may not be perfect or full-speed, but that doesn't mean it's worthless. If you use a PC at work, you might be perfectly happy with your Apple II, Amiga, or ST at home. Why not bring your work home onto a software emulator like *pc-ditto* or the *Transformer*, or to a hardware emulator like the PC Transporter or the Amiga Bridgeboard?

It's true that not all emulators work as well as the machines themselves, but that may be only a temporary problem. As microprocessors become faster and more powerful, emulation of old

Forget It

Emulators are the cheats of personal computing. Like the wolf in sheep's clothing, an emulator tries to be something that isn't. That falsehood, bad enough on its own, lulls people into a sense of fall-back security.

The example of the Atari ST and its Macintosh emulator, Spectre 128, is a good case in point. The ST, for all its strengths, hasn't developed a software base as strong or as broad-based as the Macintosh's. No spreadsheet with the power of *Excel*. No integrated package as varied as *Works*. But the potential Atari ST buyer could rationalize what might be an inappropriate purchase by repeating the phrase "It runs Mac software, too."

If you need to use Macintosh software, buy a Macintosh. If your work at home requires an MS-DOS machine, buy one. Buy a computer for its own software, its own strengths—not another's. For no matter how good the emulation, it cannot completely imitate the object of its desire. Emulation, by definition, is second-rate. The Spectre 128-equipped Atari ST, for instance, cannot read Macintosh disks, a problem that forces you to somehow find access to a Macintosh anyway while you clumsily transfer programs from one disk format (the Mac's) to another (the ST's). Oth-

er emulators forget differing keyboards, differing port configurations, or differing slot specifications.

er emulators forget differing keyboards, differing port configurations, or differing slot specifications. It's no coincidence that emulators pop up most often for computers without a broad base of software. Poorly supported machines must be approached with caution—the computer without software today will be the orphan of tomorrow. If you buy such a computer, it had better be for good reason—excellent graphics abilities, perhaps, or a built-in MIDI port. The ST, with both, becomes a smart buy for the home if that's what you're after.

er emulators forget differing keyboards, differing port configurations, or differing slot specifications. But use solid reasoning, not tossed-off lines like "Emulators are inherently fascinating" or "Most people want a computer that can do everything." The only thing fascinating about emulators is that people actually use them rather than the real item. And if you're looking for an everything machine, buy the strongest computer with the broadest software base, not some half-baked machine that needs an emulator to satisfy your computing needs.

er emulators forget differing keyboards, differing port configurations, or differing slot specifications. Don't let the empty promise of emulation sway you into believing that an ST can be a Macintosh or that an Amiga can become an IBM PC. It just ain't so. Stick with the real McCoy. Emulation? Who needs it!

er emulators forget differing keyboards, differing port configurations, or differing slot specifications. Emulators also let manufacturers develop new and powerful computers that don't have to be directly compatible with last year's (or last decade's) technology. Emulators even have some advantages over the machines they imitate. Users of the Amiga Bridgeboard can alter the colors of the CGA screen—why settle for cyan and magenta when you can have blue and red? The Macintosh emulators for the ST and the Amiga offer higher-resolution screens than most Macs.

er emulators forget differing keyboards, differing port configurations, or differing slot specifications. Emulation can help a machine become accepted. (And remember, today's hit computers were yesterday's "poorly supported computers"—the Macintosh, for example.) Certain businesses and government agencies still require that a machine be capable of running MS-DOS programs. An emulator is a loophole through these restrictions.

er emulators forget differing keyboards, differing port configurations, or differing slot specifications. Emulators are also a good way to transfer software from one format to the other. You don't need an emulator to do that, of course, but it is often the most convenient solution to the problem of moving data.

er emulators forget differing keyboards, differing port configurations, or differing slot specifications. Not everyone can afford every computer. Why not sample some foreign architectures?

— Rhett Anderson

— Gregg Keizer ☐

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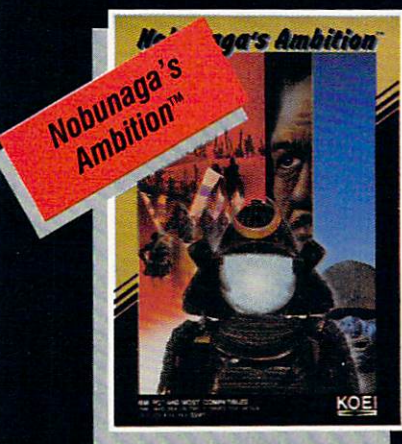
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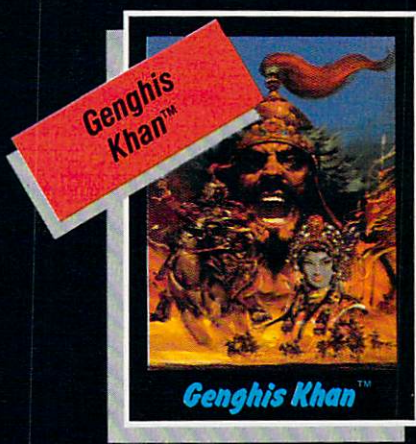
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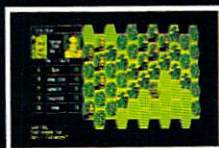
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Some game construction sets are like Tinkertoy sets, but with icons instead of dowels; you simply grab and position the icons to build a game. A few are more elaborate; you use a

specialized form of BASIC to create your gaming masterpiece. And a growing chorus of games provide scenario builders that let you plant trees and mountains where you want, decide how many tanks the evil enemy commands, or scatter magic scrolls and potions across a fantasy land.

Be forewarned, though: After you've hammered together your own game or scenario, you probably won't have as much fun playing it as you did designing it. The fun comes in watching someone *else* play your game.

Choose a package and become a game designer, game programmer, and game publisher. Ah, the wonders of computers!

ARCADE GAME CONSTRUCTION KIT

Adopting a Hollywood approach to game construction, *Arcade Game Construction Kit* calls animated objects *Actors* and the background *Scenery*. Hopping among four editors—Environment, Level, Actor, and Sound—you can create surprisingly well-animated ladder games, maze games, and shoot-'em-ups for one to four players. The joystick-based interface consists of pull-down menus and pop-up windows, the latter offering push buttons for most choices and sliders for setting variables such as speed or volume. Some commands may be made from the keyboard, and function keys support frequently used commands. The game-design process consists of picking items from each editor's parts boxes and modifying their actions and interactions before placing them on the screen.

You first decide on things such as screen colors, the effects of gravity, and the number of lives a player will have at the start of the game.

Then the Scenery editor puts the magic wand in your hand and grants you free reign over the characteristics of background objects, the 4 × 8 pixel blocks whose attributes may be altered to suit your needs. You might make one a ladder, another a conveyor belt, and a third a teleporter. The graphics for blocks may be edited, and you can create new blocks and store them in a

parts box. Blocks can be easily copied, making it a simple task to build a wall by designing one brick and then duplicating it. Movable objects may also be added, allowing you to create action-style quests along the lines of *Gauntlet*.

The Actor editor facilitates picking icons to represent the spaceships or monsters that will attack the player. There are Sentry Actors, which follow a path you lay out around the screen; Drones, who always move in the same direction; and Computer Actors, who rely on artificial intelligence to change direction and chase the player. And since it wouldn't be much of a shoot-'em-up without missiles, they can be added, replete with appropriate sound effects. Speeds, patterns, and other Actor characteristics can all be altered.

By writing a simple F/X Script, you can drop in special effects. The Actors and Scenery Blocks communicate via four channels, somewhat like phone lines. By sending cues back and forth on these channels, you can surprise the player with unexpected actions. *Be Barrier*, for example, tells a Scenery Block to act like a wall while the cue is on, and *Be Deadly* tells it to kill an Actor. By setting a block as a Switch, you can transform it from, say, a ladder to a man-eating plant.

Sound effects and animation are easy to orchestrate, rounding out a versatile construction set with almost unlimited potential. If a game is to be played in conjunction with the master program, it can hold as many as 50 levels, while a

gift disk game can be played without *Arcade Game Construction Kit* but is limited to 15 levels. Unlike most construction sets, which require you to save your work and test a copy, you can play a single round to fine-tune your design. This streamlines an otherwise often tedious and time-consuming process. The lucid 80-page manual is interspersed with design tips from the system's programmer, and the six games on the disk give you something to play right away and can serve as subjects for your first game-editing effort. ▶

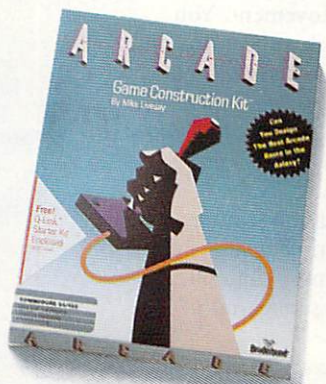
Arcade Game Construction Kit

Computers: Apple II, Commodore 64/128

Best Feature: Switch blocks can transform objects in the middle of a game

Included Games: Six

Best Creation: Shoot-'em-ups



Too Lazy to Roll Your Own?

You don't have to design games to get your money's worth from a construction set or scenario, for the people who do roll their own are more than willing to share their creations. Here are some sources to get you started on your quest for quests.

Online services. Among the best sources for user-created games and scenarios are the online information services such as CompuServe, GEnie, and QuantumLink. Local bulletin boards are also worth checking out.

On CompuServe, look to the Gamers Forums Libraries; on Q-Link, go to the Commodore Software Showcase, the Software Support Center, and the Electronic Arts Enhancement Library.

I recently located scenarios on CompuServe and GEnie for *Paladin*, *Breach*, *War Game Construction Set*, *Pinball Construction Set*, and *World Builder*. A quick look into QuantumLink (a Commodore 64/128 service) revealed racetracks for *Racing Destruction Set* and mazes for *Demon Stalker* (both also on CompuServe), plus a number of character editors for *Ultima* and *Phantasia*.

And QuantumLink is planning a special department to support *Arcade Game Construction Kit*.

The ACS Club. This group maintains libraries of *Adventure Construction Set* games for all systems and publishes a newsletter on game design. Individual games cost \$5.00 each, while members get two for \$5.00; you can also trade an original one for two adventures. Contact Ken St. André, ACS Fan Club, 3421 East Yale, Phoenix, Arizona 85008.

Adventure Game Toolkit. Games may be obtained from the manufacturer: \$6.00 for as many as will fit on a disk (the games are also on CompuServe). Look for one called *Star Portal*.

Breach and Paladin. Modern Day Publishing puts out two newsletters—"VidComm" covers scenarios and design tips for *Breach*, while "Legends" is devoted to *Paladin*. With a subscription to either newsletter, you get a disk containing 15 scenarios. This is also the best source for collections of shareware: For \$7.95–\$15.95, you can get gamer-created scenarios for both games. And the company has produced two disks of its own: *The Secrets of Anforra*, with 30 quests for *Paladin* (\$15.95), and *Warmaster*, with 15 quests (\$8.95). Contact Modern Day Publishing, 10822 Copperfield Drive, Pineville, North Carolina 28134.

SSG games. Strategic Studies Group publishes *RUN5*, a magazine with instructions for recreating user-designed scenarios for its most popular war games. Contact SSG, 1747 Orleans Court, Walnut Creek, California 94598.

Questbusters. This newsletter covers all aspects of adventure gaming, including construction efforts. Ads in the "Questbusters" newsletter Swap Shop section are particularly useful—they're a gold mine for anyone looking for a character editor. Contact Questbusters, P.O. Box 32698, Tucson, Arizona 85751.

Tips on Game Design

Arcade-Game Construction Mike Livesay, Program Designer

1. When you first start, use the Environment Editor to set the effects of gravity, to determine whether the screen wraps around, to select colors, and to set other aspects.
2. Do the graphics for the actors first so that you can get a feel for what they look like before setting their attributes.
3. Use switch-mode blocks to replace one block with another; chaining such switches can produce animated effects.
4. Use the Sentry often: It executes quickly and won't bog down the game.
5. Trace a path for the Sentries to follow (to duplicate *Pac-Man*-style ghost movements).

World Builder

William Appleton, Designer and Programmer of *World Builder* and *Enchanted Scepters*

1. Use the draw graphics as much as possible to conserve disk space; use bitmaps only when you need details.
2. Recycle objects and characters so that your world doesn't use up the allowable number of objects and characters.
3. To create a peaceful character, make it an object instead of a character. Replace the object with a character if it becomes aggressive or is killed.
4. Generate animation by exchanging objects with move commands, such as replacing a closed door with an open one.
5. Search for partial string responses with the parser so that your game will recognize player intent with just a couple of words.
6. Use play testers to ensure that you've included responses for the most commonly entered text.

War Game Construction Set

Roger Damon, Program Designer

1. Don't take things at face value: What's important is not what a unit is called or what it looks like, but its capabilities and the effects different terrain has on it.
2. Look for ways to twist the rules. Just because an icon looks like a tank doesn't mean it has to act like one. You could use a tank icon but set its unit type as *helicopter* and create a hovercraft.
3. Engineers can turn an impassable square into a passable one. Use this trait in your game: Make an obstacle the players have to get through—maybe barbed wire.
4. Have fresh units pop up in the middle of the battle, even behind enemy lines, as in guerrilla warfare.
5. Some terrain types, such as water, are impassable to certain units. Use a water icon and draw a maze on land; then change the water's color to light green, matching the land: It will become an invisible maze.

Adventure Construction Set

Ken St. André, Co-Designer of *Wasteland*, President of ACS Club

1. Making a good adventure is like writing a novel: It can't be done in one day. Patience and planning are essential. Plan on work sessions lasting one to three hours, and work on one region at a time.
2. Make lists of necessary items and creatures before getting deeply involved in the game.
3. Make as many changes as you can at one time when customizing your character set.
4. Build a character-customizing room on one disk, where you can set up characters designed especially for your game. The customizing room should have blocks rigged with spells that boost a character's strength, constitution, and so on when it bumps into them. When the character is ready, transfer it into the game.
5. Choose the most effective room border, even if that means no border at all. With the background black, an empty border looks perfect for a dark cave or the depths of space.
6. To effectively double a room's size, take out one wall and completely replace it with invisible doors.



WAR GAME CONSTRUCTION SET

Games created with *War Game Construction Set* put one or two players at the head of tank, infantry, truck, and other military units. With joystick or keyboard, you select units and give them firing instructions or marching orders (in four directions, not the eight permitted in more complex war games); the computer opponent responds likewise. The map scrolls, and a zoom option presents a close-up of the immediate area. Limited sound effects bolster the action, though your only option is sound or no sound.

You draw the game map by selecting and setting terrain icons that depict mountains, roads, rivers, and other landscape features on a blank map. (You may also edit the eight games included with the program.) One handy option lets you print your map, which depicts roads, borders, and other features with ASCII characters. Troops are edited by calling up a text screen that lists attributes such as Firepower, Defense, and Movement. You can pick an icon to represent each unit, but you can't draw your own. It is possible, and very useful, to change the unit's name. A duplication feature saves time when you need more than one of the same kind of unit.

Icons include swordsmen and other adventurous types as well as the expected tanks and soldiers, so you can design role-playing games (though you can't include logical puzzles) and recreate a variety of historical battles. Or generate totally off-the-wall games: How about the War of the Sexes, pitting Amazon warriors against hordes of Rambo's?

The *War Game Construction Set* system is flexible in terms of the scope of the battle you can design: Four combat levels range from man-to-man—where icons represent individual soldiers—to large-scale affairs, where they depict squads, divisions, or battalions. Each side can have as many as 31 units on the battlefield; you can even add offscreen artillery whose targets are determined during the Fire phase. The detailed 28-page manual offers tricks and suggestions for game design and includes tables and charts describing the effects of terrain on various kinds of units.

War Game Construction Set is easy enough to learn—actually more so than many of SSI's war games—and capable of producing some near-professional-quality games.

War Game Construction Set

Computers: Atari 8-bit, Atari ST, Commodore 64/128, IBM PC and compatibles

Best Feature: Four different combat levels to choose from

Included Games: Eight

Best Creation: Historical battle recreations



ADVENTURE CONSTRUCTION SET

Adventure Construction Set is more a role-playing-game construction set than anything else; games you'll create with it play more like *Ultima* than like *Zork*. Characters are illustrated with icons that move about an aerial-view map of a fantasy world or the interior of indoor locations; game decisions are made with joystick or mouse rather than by typing commands. Up to four people can play, each with a different character icon. Each game takes place on a world map 40 X 40 squares in size. By entering doors scattered about the main map, your character ventures into towns, castles, and so on to collect weapons, magic scrolls, and other gear. Some aspects of combat are minimally animated, and sound effects and brief tunes enhance the action. A game's world map can contain as many as 15 map regions, each with 16 rooms, 300 props, and 335 text messages. *Adventure Construction Set* comes with seven mini adventures that you can play or use to familiarize yourself with the game system before setting out to conjure up your own mythological amusements.

You'll do so by accessing a collection of menus that look like a gear-shift pattern: Options in each of the three main menus are connected with lines, and you move the cursor with mouse or joystick around the pattern until it's over the appropriate option; then you hit the button. Mini menus at the bottom of the screen lead you farther into the command structure.

Using the menu system, you can create terrain, monsters, weapons, and other items. Magic spells empower characters with fantastic abilities, and custom text messages let you tell a story and give clues to the player.

Adventure Construction Set consists of three different construction sets: fantasy, science fiction, and mystery. Each has a unique set of graphics and sounds. If you don't like the hundreds of provided pictures of creatures, people, weapons, and objects, you can edit them or draw originals from scratch. You can edit the games included with the program (one of which serves as an online tutorial that supplements the 43-page manual). But it takes solid planning and long hours of play testing and fine-tuning to fabricate a satisfying game. Fortunately, if you tire halfway through the creation process, *Adventure Construction Set* can even complete the game for you!



Adventure Construction Set

Computers: Apple II, Amiga, Commodore 64/128, IBM PC and compatibles

Best Feature: There are actually three different construction sets included in the package: fantasy, science fiction, and mystery

Included Games: Seven

Best Creation: Fantasy role-playing adventures

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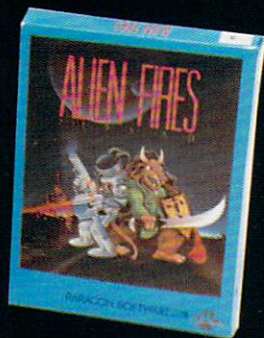
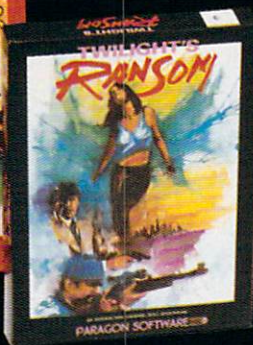
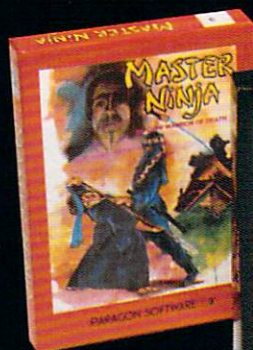
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WORLD BUILDER

World Builder, the only construction set that's been used to develop a commercially sold game (*Enchanted Scepters*), opens the realm of graphics adventures to would-be world makers. The program comes with an assortment of illustrations that can be added to any location, plus a built-in graphics program if you prefer to sketch your own pictures (you may also import clip art and graphics drawn with other software). Text can be embedded to describe a location, event, or response to the player's action. With *World Builder*, you can create adventures containing as many as 2,500 locations, 32,767 objects, and 32,767 characters and sounds. Speaking of sounds, the included library of digitized sound effects is the most amazing part of this entire system.

Because gameplay revolves around text-based commands, *World Builder* games exhibit extraordinary freedom

(or at least the potential for it) in what the player can do during an adventure. Logic-style puzzles like those in *Zork* are but one possibility, while combat and magic are also possibilities on the game-designer's palette. During design and play, most common commands (such as Look, Examine, and Take) can be selected from pull-down menus or with keyboard shortcuts. Players can even examine objects displayed on the screen by clicking on them.

Game design looks easy, since it's done in windows with such names as Scene Map, Character List, Object List, and Sound List. But *World Builder* asks you to learn a form of BASIC that includes common BASIC statements such as LET and THEN, as well as some specialized commands. As you progress, you can tap the power of 234 user variables to keep track of what the player does in the game (the player's score, amount of gold found, and so on).

To determine what happens in each location, you type in lines of Scene Code such as IF {TEXT\$=examine stone} THEN PRINT "The stone rolls over". Until you've mastered the intricacies of the language, you won't be able to weave a truly polished adventure from these silicon threads. And even then, you can count on spending time tracking down logical bugs in your code that are often harder to find than the silver key in *Zork III*. Yet it's the power of this programming language that allows you to write top-notch adventure games.

World Builder, the sole Macintosh-only game creator reviewed here, does use the standard Mac interface and so supports the computer's cut and paste features. This greatly accelerates the adventure code-writing and debugging process.

The package's 87-page manual works in conjunction with an on-disk tutorial that gives a lucid overview of designing a *World Builder* game. For those who know some BASIC but

have no idea what to do with it, this system is especially recommended.

World Builder

Computer: Macintosh

Best Feature: Power-packed form of BASIC with 234 user-definable variables

Included Games: None

Best Creation: Sophisticated graphics adventures

PINBALL CONSTRUCTION SET

Pinball Construction Set is the 1983 program that broke ground for today's construction-set boom, but it still remains among the easiest to use. You begin with a blank canvas—a pinball machine on one side of the screen. The other side holds a parts box filled with icons that stand for various game parts: the ball, flippers, kickers, bumpers, and more. Alongside the parts box, other icons present visual programming commands such as a hand (to drag objects from the parts box to the pinball machine) and a globe (to change the effects of gravity). When you play, the parts box is replaced by the score displays, which track the hits and misses of as many as four players. The animation and sound effects are so crisp and entertaining, the interface so easy to use, that I spent more time "researching" this construction set than I spent with any of the others.

It's the ability to dynamically customize new shapes that permits you to bring your visions to life so readily with *Pinball Construction Set*. Even the playing surface may be reshaped. You can also paint assorted elements of the game pixel by pixel and then don the musical director's hat and pick sound effects to accompany each target. When you've finished designing your game, you might work with the magnify and paint options to emblazon a name across its top. I called mine "Pinhead Pinball."

The 14-page manual could be improved, for it neither offers a tutorial nor provides a single illustration of a design in progress, just pictures of the icons and their definitions. Five prebuilt games are included and may be edited. You don't need *Pinball Construction Set* to play a game you've made with it, so you can share your original pinball machines.

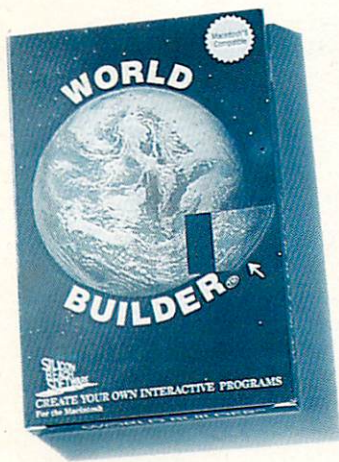
Pinball Construction Set

Computers: Apple II, Atari 8-bit, Commodore 64/128, IBM PC and compatibles, Macintosh

Best Feature: Customizable shapes for that perfect pinball game

Included Games: Five

Best Creation: Off-the-wall pinball games that violate the laws of reality



SCENARIO BUILDERS AND CHARACTER EDITORS

Paladin, a tactics-oriented role-playing game, includes QuestBuilder, a good example of a scenario builder. One window holds a blank map; another, a set of icons for terrain types. First you click on a terrain icon (wooden floorboards, perhaps) and then on the map square you want to cover with it. A pull-down menu lets you shift from indoor icons to those for outdoor terrain, opponents, objects, and other building blocks. This scenario builder also gives you an opportunity to select the goal of a quest: Find a certain number of scrolls, wipe out the enemy orcs and dragons, or simply get out alive.

This customizing of already-created games was popularized by war games, though few are as designer-friendly as *Paladin*. Check out such packages as *Mech Brigade*, *Demon Stalker*, *Roadwar 2000*, *The Ancient Art of War*, *Europe Ablaze*, *Battles of Napoleon*, *Warship*, *American Civil War I and II*, and *Halls of Montezuma* for more games equipped with scenario builders.

But scenario builders broke out of the war-game mold in the past few years. With *Racing Destruction Set*, a one- or two-player slot-car racing game, you modify the cars' capabilities and lay out your own courses. *Lode Runner's Game Generator* lets you handcraft your own ladders-and-mazes game. In *Mean 18*, your golf course-designing talents will be tested. *Rack 'Em* puts you in charge of hatching new bumper-pool table layouts. (The funniest scenario builder I've seen is in *Grand Slam Bridge*, with its design-your-own-hand capability.)

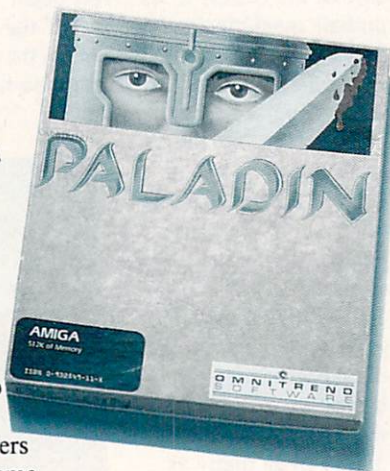
Related to scenario builders, character editors are utilities that alter the status of your party members in games such as *Ultima* and *Wizardry*, allowing you to instantly turn a 90-pound weakling into a weight lifter. Major software companies don't market these character editors; these programs are usually found on national and local bulletin boards or are sold by individuals or small mail-order companies. Although it may seem like a good idea, a character editor can easily spoil a game, since building up your party is half the fun.

THE FUTURE OF CONSTRUCTION SETS?

The next thing to look for, though it may be a couple of years off, is some sort of flight-simulator construction set. Designers say that the technology for such a game already exists, but that the main problem would be bringing the programmers of these two diverse software types together.

Another possibility would be the "Construction Construction Set" that Bill Budge (*Pinball Construction Set* author) talked about a couple of years ago. That may be even less likely to materialize than a set for designing and test-flying your own jet planes, but in today's high-flying world of construction sets, the sky's still the limit.

Shay Addams is the editor and publisher of "Questbusters," a popular newsletter devoted to adventure gaming, and the author of numerous books and articles about electronic entertainment.



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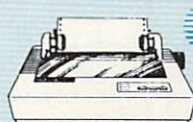
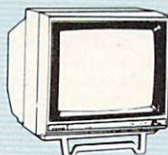
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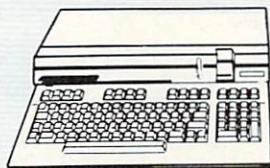
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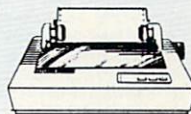


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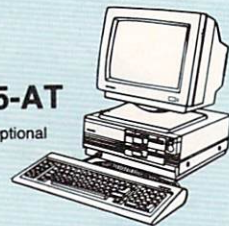
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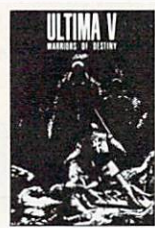
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Rampage
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buyer's guide

Arcade Games

Your mama was a pinball wizard. Your daddy caught her eye with his full-tilt boogie. You cut your teeth on Pac-Man and you learned to walk with a finger on the fire button. Whether it's blasting your way through a meteor shower or pushing your Lotus GT on the Grand Prix circuit, there's an arcade game in this buyer's guide that will bring the action home.

Caroline Hanlon

aaargh!

Arcadia
Distributed by Electronic Arts
Amiga
\$34.99
joystick required

In this arcade game, a monster tears through 12 cities, tramples natives, torches insects and reptiles, and destroys everything in its path as it searches for the golden dragon's egg. You can play as an ogre or as a dinosaur that wreaks havoc on humans and mutants alike. The game features animated color graphics and digitized sound.

Alcon

Taito
Commodore 64
joystick required
\$29.95

The planet Orac is occupied by aliens, and you have been chosen by the Allied League of Cosmic Nations (ALCON) to drive them out. Your weapon is a top-secret, experimental SW475 Starfighter.

Alien Mind

PBI
Apple IIgs
512K required
\$54.95

Players fight off more than 100 different types of monsters and robots while trying to defeat the aliens and regain control of a space station. Hidden clues help the player access the on-board computer to build a weapon that will destroy the aliens. Other weapons include laser beam devices, energy shields, and conductors. The game features stereo sound when played using a MIDIdeas SuperSonic Stereo card.

Amegas

DigiTek
Amiga
\$34.95

This arcade-style game contains 40 screens of bouncing, shooting, slamming, and juggling action.

Arkanoid

Discovery Software
Amiga
\$29.95

This arcade-action game is based on the video arcade game of the same name. It features 66 levels of gameplay and has a special mode that slows the action to a player's skill level. Each level has a configuration of bricks and hazards. The object is to hit a ball with a paddle against the breakable bricks, catch the powers contained in the broken capsules, and then advance to the next level. The game includes a 30-day money-back guarantee.

Awesome Arcade Action Pack

Arcadia
Distributed by Electronic Arts
Amiga
\$49.99

The *Awesome Arcade Action Pack* contains three arcade-style games. In *Sidewinder*, players pilot a spacecraft through 3-D scrolling screens to reach the interior of the alien Star Killer and destroy it. Captain Zod guides the player through 16 levels of attack launched by the aliens from Xenon. In this game, the player must switch between a ground-based hovercraft and a jet fighter to penetrate the enemy defenses. *Blasta Ball* is the thirty-seventh century's version of hockey. *Inertia* controls the spaceships on a metal playing field, and homing missiles are used to move the puck. There are ten craft to control; you can play against another human or against the computer.

Better Dead Than Alien

Discovery Software
Amiga
\$34.95

In *Better Dead Than Alien*, you must hunt down fugitive aliens. According to the game, an alien is at its weakest when its eyes glow green. The game features multilevel action, simultaneous dual-player mode, sound, and color graphics.

buyer's guide

Black Lamp

Rainbird Software
Amiga, Atari ST, Commodore 64
\$24.95 (Amiga, Atari ST)
\$19.95 (Commodore)

Jolly Jack undertakes a quest to find the enchanted lamps—especially the black lamp—and win the hand of Princess Grizelda. Skull-dropping buzzards, evil eagles, spitting witches, and a fire-breathing dragon complicate your journey.



Destroy an asteroid, outgun aliens, and bomb enemy installations in *Black Shadow's* two-player action.

Black Shadow

Scorpion Software
Amiga
\$34.95

The object of *Black Shadow* is to destroy an asteroid by outgunning the aliens and bombing enemy installations. The game features two-player simultaneous action.

Bomb Busters

ReadySoft
Amiga
\$29.95

In *Bomb Busters*, you are the leader of a bomb squad whose mission is to defuse bombs planted throughout famous buildings of the world. Robot guards protect the bombs and are programmed to kill anyone who interferes. Two disks offer 100 levels of play.

Boot Camp

Konami
Amiga, Commodore 64, IBM PC and compatibles
\$34.95

Sgt. J. T. Tail Kicker tries to whip you into shape in time to defend the American embassy from terrorists. Exercises include the obstacle course, a firing range, chin-ups, arm wrestling, and the iron-man race.

Bubble Bobble

Taito
Commodore 64
joystick required
\$34.95

Bub and Bob, the brontosaurus buddies, must battle bullies by bursting their bubbles. One or two players can move through 100 screens of arcade-style graphics.

Bubble Ghost

Accolade
Amiga, Apple IIGS, Atari ST, Commodore 64, IBM PC and compatibles
\$34.95

Guide a bubble-blowing ghost through 35 chambers filled with hazards and monsters. You must keep your bubble away from walls, burning candles, fans, and other bubble-popping paraphernalia.

Commando

Data East
Apple II, IBM PC and compatibles
CGA or EGA card required for IBM
\$34.95 (Apple)
\$39.95 (IBM)

Armed only with a machine gun and hand grenades, you must break through enemy lines, collect supplies, and reach the fortress in order to defeat the rebel forces and save the free world.

Contra

Konami
Amiga, Commodore 64, IBM PC and compatibles
\$34.95

You are the ultimate guerrilla warrior, fighting against the Red Falcon to save the whole world. Your weapons include rapid-fire machine guns, alien cannons, and high-tech lasers. The warfare takes place in 3-D mazes with underground security systems and in tropical forests with giant waterfalls.

Cosmic Bouncer

ReadySoft
Amiga
\$29.95

A freak computer mishap has turned a simple yellow tennis ball into a living object. Bounce that ball through more than 20 levels of play to earn yourself the title of Cosmic Bouncer.

Crazy Cars

Titus
Amiga, Atari ST, IBM PC and compatibles
\$39.95

Experience the speed of some of the world's fastest cars as you race through six courses—Arizona, space shuttle, Florida, mountain, Malibu, and New York. You start out in a Mercedes 560 SEC and, after successfully completing all six races, you can move up to a Porsche 911 Turbo, a Lamborghini Countach, and, finally, a Ferrari GTO. Cars can reach speeds up to 189 mph. Sound effects and color graphics accent the 72 levels of play.

CritterEditor

CasadyWare and Greene
Macintosh
Crystal Quest game, one megabyte required
\$40.00

CritterEditor is a tool kit for customizing *Crystal Quest*. Use it to draw figures, add color, alter attributes, import or export sounds and graphics, edit sounds, change point values, and save modifications. *CritterEditor* and *Crystal Quest 2.2* can be purchased together for \$79.95.

Crystal Hammer

Constellation Software
Amiga
\$19.95

This breakout-type arcade game has 30 levels of play for one or two players.

Crystal Quest 2.2

CasadyWare and Greene
Macintosh
System 3.2 required
\$49.95

The tasks in this arcade game include picking up all of the crystals on the screen, avoiding the mines, killing the Nasties, passing through the Gateway, and scoring points along the way. The number of crystals increases and the game becomes more difficult with each wave or level. There are 12 types of Nasties, each with its own attributes and varying degrees of intelligence. The game features color and digitized sounds. The instructions are given onscreen, and a demo game is provided. Owners of version 2.0 can upgrade for \$10.00. The *CritterEditor* is a separate program that can be used to modify the elements of the game. *CritterEditor* and *Crystal Quest 2.2* can be purchased together for \$79.95.

CubeMaster

ASDG
Amiga
Kickstart 1.2 or later required
\$24.95

In this arcade-style shoot-'em-up game, you are the cubemaster, a combination sports celebrity and NASA astronaut. Strapped into a manned mobility unit with forward, retro, and attitudinal rockets, you man a rapid-fire particle cannon to shoot down the cubedrones. However, the cubedrones have both positive and negative side effects that must be anticipated if you are to progress to the level of cubelord.

The Cyber Complex

DigiTek
Amiga
\$44.95

As troubleshooter for the Computer, you try to prevent evil men from the subterranean city from destroying the Computer.

Dark Castle

Three-Sixty Pacific
Amiga, Atari ST, Commodore 64, IBM PC and compatibles
mouse or joystick required
\$39.95 (Amiga, Atari ST, IBM)
\$34.95 (Commodore)

Play is set in medieval times, where you must fight your way through 14 different castle rooms. The rooms become progressively more hazardous as you face rats, bats, and fire-breathing dragons. Dungeon torture and an evil wizard also await you. The object of the game is to find and slay the Black Knight.

Diablo

Classic Image
Amiga
\$29.95

The object of this mazelike game is to arrange a track to keep the advancing ball on a continuous course. After the ball has crossed a section of track, that section is removed, giving you less and less track to work with. The game includes 240 track sections—2 tracks on each of 120 movable panels.

Enlightenment

Rainbird Software
Amiga, Commodore 64
\$24.95 (Amiga)
\$19.95 (Commodore)

Playing as Hasrinaxx the Druid, you must free the lands of Belorn from the evil wizard Acamantor and his legion of the undead. Magical powers aid Hasrinaxx in his fight through the ten lands of Belorn and a five-level dungeon. The game includes 15 levels of increasing difficulty, 32 spells, and five different characters to control.

Final Mission

DigiTek
Amiga
\$34.95

In the final mission of training, you work your way through the labyrinth of terror, the last stage of insanity. There are more than 20 levels of play.

Fire and Forget

Titus Software
Amiga, Atari ST, IBM PC and compatibles
\$39.95

The Inter-Galactic Liberation Organization threatens to destroy Earth; it's up to you to save it. As commander of Thunder Master, the world's ultimate fighting machine, you sit at the controls of a V-16, triple-turbo engine with four-wheel drive and tetranuclear-propulsion missiles. A second player can command the magnetic levitation unit, Thunder Cloud. There are three levels and six conflicts, ranging from guerrilla warfare to global war.

Fire Power

Microllusions
Amiga, Apple IIGS, IBM PC and compatibles, Macintosh
512K, color graphics card required for IBM
\$24.95 (Amiga)
\$29.95 (Apple IIGS, Macintosh)
\$32.95 (IBM)

The first in the One-to-One series, *Fire Power* is an arcade-style tank battle with color graphics and digitized sound effects. Choose from three tank types; earn extra points by saving friendly soldiers. Two players can share a machine by using split screens, or they can play on separate machines connected by modem. The IBM PC version includes both 5¼- and 3½-inch disks.

Foundation's Waste

Scorpion Software
Amiga, Atari ST
\$34.95 (Amiga)
\$39.95 (Atari ST)

Escape a hostile planet in a stolen spacecraft by defeating your captors.

Galactic Invasion

Microllusions
Amiga
\$24.95

The *Galactic Invasion* space battle features a realtime star field of the Milky Way Galaxy. Two players can play against each other on the same machine or on separate machines connected by modem.

Ganymed

ReadySoft
Amiga
joystick required
\$29.95

Ganymed, the frozen moon of Jupiter, has been under the rule of the oppressive Tyrans for centuries. As leader of the outlawed star warriors, you must defeat the giant deathbots and free the planet.

Gauntlet

Mindscape
Amiga, Atari, Atari ST, Commodore 64
joystick required
\$34.95 (Atari, Commodore)
\$49.95 (Amiga, Atari ST)

More than 100 mazes comprise this arcade-style game designed for one or two players. Each player chooses a character and searches the mazes for food, treasures, door keys, magic potions, and the exit to the next maze. Throughout the mazes, the heroes—Thor, Thyra, Merlin, and Questor—must battle a variety of monsters, ghosts, demons, and sorcerers.

Gun Shoot

DigiTek
Amiga
\$34.95

Try to shoot 12 different opponents, including bank robbers, without hitting any innocent bystanders. The game includes a two-player mode and digitized sound.

Ikari Warriors

Data East
Apple II, IBM PC and compatibles
256K, CGA card required
\$34.95 (Apple)
\$39.95 (IBM)

Two players are behind enemy lines, and they must fight their way out using guerrilla warfare. To win, they must reach a village and defeat the enemy leader. Weapons include machine guns, grenades, rocket launchers, and a tank. The game offers five levels of difficulty. Players score points by killing enemy soldiers and destroying tanks and bunkers.



Race against the clock or against an opponent as you roll a marble through the raceways and over the goal line in *Marble Madness*.

Into the Eagle's Nest

Mindscape
Amiga, Atari ST, Commodore 64
\$39.95 (Amiga, Atari ST)
\$29.95 (Commodore)

The goal is to rescue three Allied saboteurs from a Nazi fortress, salvage the great art treasures of Europe from the Nazis, and destroy the fortress. The four missions take place on four floors connected by elevators. The view of the game is from the top, looking down. The arcade-style game features four-way scrolling animation, graphics, and sound.

Jackal

Konami
Amiga, Commodore 64, IBM PC and compatibles
\$34.95

Use the army's all-terrain attack jeep to rescue your comrades from behind enemy lines. The jeep is equipped with guided missiles and incendiary grenades. Play against the computer or with a friend.

Mandroid

Scorpion
Commodore 64
\$29.95

Mandroid, half man and half machine, undertakes two missions to save the world. First, Mandroid must infiltrate an enemy base, save seven astronauts, and restore radio contact with Earth. In the second mission, Mandroid must stop an evil scientist from creating an army of deadly soldiers.

Marble Madness

Electronic Arts
Amiga, Apple II, Atari ST, Commodore 64, IBM joystick required
\$49.95 (Amiga)
\$34.95 (Apple IIGS, Atari ST)
\$14.95 (Apple II, Commodore, IBM)

One or two players race against the clock or each other to get their marbles through the raceways and over the goal line. Obstacles include the humming hovers, marble munchers, and steelies. Six raceways—such as the silly level and the aerial race—provide varying degrees of challenge. The game features 3-D graphics and the musical score and sound effects from the original Atari coin-op version.

Master Ninja: Shadow Warrior of Death

Paragon Software
Distributed by Electronic Arts
Amiga, Atari ST, Commodore 64, IBM PC and compatibles
\$39.95 (Atari ST, Amiga)
\$34.95 (IBM)
\$29.95 (Commodore)

Assume the identity of a ninja warrior sent on a quest to recover a magic sword stolen by an evil Japanese warlord. You must fight your way through more than 25 chambers of the warlord's castle, confronting evil ninjas, samurai guards, mystic ninja priests, curses, and deadly tigers. The player uses the ninja's martial arts skills and weapons to kill his or her opponents, recapture the sword, and kill the warlord.

Menace

Psychapse
Distributed by Psygnosis
Amiga, Atari ST
\$19.95

The mission is to stop six mad rulers and destroy the unnatural planet, Draconia. Play takes place on six levels, with two levels of difficulty. Game features include parallax scrolling, more than 60 different aliens, a restart-game option, graphics, and a soundtrack. The Amiga version also offers an overscan display and 64 colors onscreen.

Monster Power

Free Spirit Software
Commodore 64
joystick required
\$14.95

One to four players compete in three events that test the power of monster machines. In Tractor Pulls, you depend on power and revs to pull a weight sled down the track with a tractor. Keep the car in bounds and out of the mud to finish the race in Mud Bogs; Monster Trucks challenges your driving skill and power.

Off Shore Warriors

Titus Software
Amiga, Atari ST, IBM PC and compatibles
\$39.95

A new sport has evolved on Earth after a takeover by extraterrestrial pacifists. Powerful boats race against each other and the elements in international competition on some of the world's largest lakes. Each boat is armed with only two missiles and one captain. The captain who finishes the game alive is declared the winner.

Phantasm

Scorpion Software
Amiga, Atari ST
\$34.95

Play a destitute wanderer transported to a distant moon and given the opportunity to save Earth. To save a section of the planet, you must destroy eight reconstitution installations and then redock. You may choose which sections to rescue first.

Pharaoh's Revenge

Publishing International
IBM PC and compatibles
CGA or EGA card required for IBM; Tandy graphics card required for Tandy
\$29.95

Pharaoh's Revenge is an arcade-style logic puzzle with 200 levels of play. The player attempts to steal treasures from the pharaoh's tomb and to avoid capture by the tomb guards and mummies. You must take all the treasures on one level before you can advance to the next level.

Pinball Wizard

Accolade
Amiga, Apple IIGS, Atari ST, IBM PC and compatibles
\$34.95

Pinball Wizard brings arcade-style pinball action to the computer screen. Several pinball tables are provided, as are an assortment of obstacles and targets whose bonus values you can assign yourself. The game penalizes the players when they tilt, and the stroboscope feature causes the ball to vanish occasionally. Use the built-in construction set to build your own tables with customized designs and colors.

Power Stix

DigiTek
Amiga
\$34.95

Joystick pros can work their way through 15 levels of obstacles.





In *Speed Buggy*, it's a race against time as you steer your car around sharp curves and obstacles.

Rampage

Activision
Apple II, Commodore 64, IBM PC and compatibles
512K required for Apple IIGS
\$34.95 (Apple, Commodore)
\$37.95 (IBM)

Rampage is a monster-style action adventure that features three creatures much like Godzilla, King Kong, and a wolfman. The monsters stomp through cities, climb skyscrapers, attack helicopters, eat bystanders, and smash cars, tanks, and trolleys. Each monster searches for food to help it maintain energy. When time and energy run out, the monsters shrink into little people that can be eaten by other monsters. Available on 3½- and 5¼-inch disks.

Roadwars

Electronic Arts
Amiga, Commodore 64
\$34.99

In the twenty-fifth century, the Galactic Federation rules, and computers and robots do all the work. Moons are connected by roadways controlled by computers. As commander of a battlesphere tank, you must repair the roadway and clear the debris when one of the computers malfunctions. Use your laser cannon to blast barricades and aliens.

Rush 'N Attack

Konami
Amiga, Commodore 64, IBM PC and compatibles
\$34.95

Ambushes, guerrillas, bazookas, flame throwers, and a fleet of choppers try to stop you from rescuing dozens of POWs hidden in an enemy camp. For one or two players.

Skyblaster

DigiTek
Amiga
\$34.95

One or two players can battle it out in this air-to-air and air-to-ground 3-D combat simulation. There are 20 degrees of difficulty and 80 levels of play.

Speed Buggy

Data East
Atari ST, Commodore 64
joystick required for Commodore
\$44.95 (Atari ST)
\$29.95 (Commodore)

Steer your car down five tracks, each with sharp curves and obstacles such as fallen trees and boulders. You must complete the courses in a predetermined amount of time. Win bonus points by running over flags, jumping obstacles, and driving on two wheels.

Spinworld

DigiTek
Amiga
\$34.95

Players must battle the inhabitants of Spinworld, a large object spinning toward the solar system.

Super Bike

Free Spirit Software
Commodore 64
joystick required
\$14.95

Players race motorcycles against the clock in the Motocross, Endura, Supercross, or Trials course. Bikers must learn to bounce, jump, steer around obstacles, and outmaneuver other bikers to gain the gold cup.

Superbike Challenge

Brøderbund
Atari ST, Commodore 64, IBM PC and compatibles
color graphics card required for IBM
\$19.95

Players race bikes on 12 Grand Prix courses, including Austria's Salzburgring and Great Britain's Silverstone. One player can race against bikers controlled by the computer, or two players can race each other using a split screen. Onscreen indicators show speed, RPM, lap times, race position, and course layout. Choose the novice, intermediate, or pro level. A save feature allows games to be saved between races.

Tag Team Wrestling

Data East
Apple II, IBM PC and compatibles
CGA or EGA required for IBM
\$34.95 (Apple)
\$39.95 (IBM)

The player and a partner can use body slams, drop kicks, back-breakers, and flying head-butts to defeat opponents and win the championship belt. To win, you must pin wrestlers for a count of 3 or throw them out of the ring.

Technocop

Epyx
Amiga, Apple II, Atari ST, Commodore 64, IBM PC and compatibles
\$39.95

You are a member of the Enforcers, an elite police force committed to saving the city from a crime family known as D.O.A. Whenever a mug shot appears on the computer in V-Max, a specially equipped vehicle, you set out armed with a computer wristwatch, a criminal radar locator, a snare-net gun, and an .88 Magnum. There are five levels of difficulty.

Thexder

Sierra On-Line
Amiga, Apple IIGS, Atari ST, IBM PC and compatibles
CGA or EGA required for IBM
\$34.95

In *Thexder*, players control a robot that has the ability to transform from an android to a fighter jet and back again. Players must battle more than 20 types of aliens and explore caves and battlefields. The program features a musical score that choreographs itself to reflect the action.

Triple Pack

Access
Apple II, Atari, Commodore 64
joystick required
\$19.95

This one package includes three games. In *Beach-Head*, you try to liberate an island from hostile enemy forces. In *Beach-Head II*, you continue the fight against the dictator and that portion of his army that escaped destruction in the first game. Commandos must stop the Soviets from launching an attack in *Raid over Moscow*.

Turbo

MicroIllusions
Amiga
\$24.95

A part of MicroIllusions' One-to-One Series, this auto-racing game allows one player to compete against the computer or two players to race either side-by-side or via modem. The game features a choice of cars as well as oil slicks, spiked wheels, different road courses, and police chases.

Typhoon Thompson: Search for the Sea Child

Brøderbund
Atari ST
color monitor, mouse required
\$34.95

Typhoon Thompson is the Intergalactic Rescue Force's last hope to save an infant child, the lone survivor of a crash on an uninhabited planet in Omega sector. This not-so-lucky rescuer must outwit and defeat mischievous sea sprites who have hidden the baby. Features include animation, 3-D effects, seven enemy weapons and tactics, and a variety of play levels.

Way of the Little Dragon

Constellation Software
Amiga
\$19.95

Way of the Little Dragon is a karate adventure game with eight levels of play and four different challengers. For one or two players.

Wings of Fury

Broderbund
Apple IIe, IIc, and IIgs
joystick required
extended 80-column card required for IIe
\$34.95

As pilot of a F6F Hellcat, your mission is to seek and destroy enemy-held islands, destroyers, and torpedo planes while avoiding deadly Zeros. You can progress from Midshipman to Captain, receiving new assignments and extra planes at each level. The onscreen display shows the type and number of available weapons, plus oil pressure, fuel level, and the number of Zeros shot down. Weapons include 100-pound bombs, five-inch rockets, and a torpedo.



Pilot your F6F Hellcat in a battle against enemy islands, destroyers, torpedo planes, and deadly Zeros in Wings of Fury.

Publishers of Arcade Games

For more information about the arcade games listed in this buyer's guide, contact the publishers listed below.

Access
#A 2561 S. 1560 W.
Woods Cross, UT 84087

Accolade
550 S. Winchester Blvd.
Suite 200
San Jose, CA 95128

Activision
3885 Bohannon Dr.
Menlo Park, CA 94025

ASDG
925 Stewart St.
Madison, WI 53713

Broderbund
17 Paul Dr.
San Rafael, CA 94903-2101

CasadyWare and Greene
P.O. Box 223779
Carmel, CA 93922

Classic Image
M. W. Ruth
3100 W. Chapel Ave.
Cherry Hill, NJ 08002

Constellation Software
17 St. Mary's Court
Brookline, MA 02146

CSS
2150 Executive Dr.
Addison, IL 60101

Data East
470 Needles Dr.
San Jose, CA 95112

DigiTek
104 W. Seneca Ave.
Suite 4
Tampa, FL 33612

Discovery Software
163 Conduit St.
Annapolis, MD 21401

Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404

Epyx
600 Galveston Rd.
Redwood City, CA 94063

Free Spirit Software
P.O. Box 128
58 Noble St.
Kutztown, PA 19530

Konami
815 Mittel Dr.
Wood Dale, IL 60191

MicrolIllusions
17408 Chatsworth St.
Granada Hills, CA 91344

Mindscape
3444 Dundee Rd.
Northbrook, IL 60062

PBI Software
1163 Triton Dr.
Foster City, CA 94404

Publishing International
1209 W. Knickerbocker Dr.
Sunnyvale, CA 94087

Rainbird
3885 Bohannon Dr.
Menlo Park, CA 94025

ReadySoft
P.O. Box 1222
Lewiston, NY 14092

Scorpion
19 Harbor Dr.
Lake Hopatcong, NJ 07849

Sierra On-Line
P.O. Box 495
Coarsegold, CA 93614

Spectrum HoloByte
2061 Challenger Dr.
Alameda, CA 94501

Taito Software
267 W. Esplanade
N. Vancouver, BC
Canada V7M1A5

Three-Sixty Pacific
2105 S. Bascom Ave.
Suite 290
Campbell, CA 95008

Titus
20432 Corisco St.
Chatsworth, CA 91311

Zig Zag

Spectrum HoloByte
Commodore 64
joystick required
\$24.95

As a star fighter-pilot speeding through narrow passages of the Matrix of Zog in the 12th dimension, you must negotiate sharp turns, ramps, traps, and barriers to locate the Eight Crystals of Zog. By destroying enemy aliens, you can gain cash that you can use to purchase objects for the search. Codes for future reference can be found in the Save Zone; the Death Zone can end the game. The game features 1400 screens, extra lives, maps, x-ray vision, time locks, and a scoring system.

Zoom!

Discovery Software
Amiga
\$29.95

Zoom! is a nonviolent arcade-style game featuring Zoomer. Zoomer is chased through an outer-space land, Zoomland, by a gang of reckless enemies as he tries to collect territories and points. However, Zoomer must watch out for the "oops" factor when he tries to advance to the next level. There are 50 levels of play. The game includes a 30-day money-back guarantee. □

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Wars; Glance
at Works
GS; Super
Amiga; Mac's
Big Brother;
and ST
Starglider**

MS-DOS

You can never be too rich or too thin—and you can never have too much RAM. But it's hard to know which direction to take when you want to upgrade your computer's memory because the PC's memory structure is so difficult to understand. Not only does PC memory come in three flavors—conventional, extended, and expanded—but since the PC can't accept memory beyond 640K and be happy with it, you usually need a memory manager, too.

If you're planning to upgrade, the first type of memory to install is conventional, which brings your PC up to its full complement of 640K. Often, upgrading your conventional memory is simply a matter of buying some chips and popping them into your motherboard. There are three things to be aware of, however.

First, make sure you get memory chips that are at least the same speed as the chips currently in your machine. (Look at the last two numbers on the top of the chips: 12 means the chip's speed is 120 nanoseconds, 15 means 150 nanoseconds, and so on.) Second, chips come in *bit* sizes, with the most common size being 256 Kbits. If you have an older machine, all your memory slots may be filled with 64-Kbit chips. You'll have to remove some of these

and install the larger-capacity chips. Third, PC chips come in banks of nine. Eight bits make a byte, so eight 256-Kbit chips make 256K, but you need one extra chip for parity checking, for a total of nine chips for each bank.

If your machine has 640K, the next type of memory to install is probably expanded memory. Expanded memory works in PCs and ATs, and it's supported by a variety of commercial applications and DOS 4.0.

The key to expanded memory is the driver. There are three currently available: LIM EMS (Lotus/Intel/Microsoft Expanded Memory Specification, or simply EMS for short) 3.2, EMS 4.0, and E/EMS (Extended/Expanded Memory Specification). The choice is simple, however. You'll want a board that supports *all*, or at least *most*, of the EMS 4.0 specification. Most boards say that they comply with EMS 4.0, but sometimes they support part of the specification only.

The crucial ingredient in the 4.0 specification allows you to multitask on your PC. Before buying a board, ask the manufacturer or salesman this vital question: *Will this board multitask with DESQview?* If the answer is *yes*, you're in business. If it's *no*, keep looking.

The last kind of memory, extended memory, is only available on ATs and 386s. DOS applications can't really use extended memory the way they use expanded memory, but there is software that can install disk caches and ramdisks in extended memory.

If you have an AT, extended memory is often the least expensive upgrade because you can install 512K of it right on your motherboard without buying another board. The AT has room for one megabyte of RAM on its motherboard, so you can simply buy the chips and slide

them in. Be sure to match the speed of the chips the same way you would when installing conventional memory in a PC or XT. And note: If your AT has 640K, you'll have to remove the two banks of 64-Kbit chips that provide the last 128K and replace them with 256-Kbit chips (you can't just buy 360K to bring your machine up to snuff—that would be *too* simple).

Intel's Answer

If memory expansion sounds complicated, take heart: More and more manufacturers are designing boards that can be configured as conventional, expanded, or extended memory. One worth considering is Intel's Above Board Plus (Intel, Mail Stop C03-07, 5200 NE Elam Young Parkway, Hillsboro, Oregon 97124-6497; 503-629-7354; \$495—0K, \$795—512K). This is an upgrade to Intel's famous Above Board 286, which didn't fully support EMS 4.0 (Above Board 286 owners can upgrade to the Above Board Plus for \$150).

The Above Board Plus supports all types of memory, it can multitask, and it can hold as many as eight megabytes of RAM. You can install the Above Board in about 20 minutes. The technical setup is done with software, so there are no nasty DIP switches or jumpers to fool with.

Intel's documentation includes a manual for experts and a manual for novices. Both are clear, well designed, and easy to use. The board comes with some software—a device driver you'll need to put in your CONFIG.SYS file, a print buffer, a ramdisk, and installation and diagnostic programs.

Your performance boost with Intel's Above Board Plus, or any memory upgrade, de-

depends on the way you use the memory. If you have, for example, one megabyte of expanded memory and you dedicate it all to a disk cache, you'll have dazzling disk performance.

If you use your extra memory for multitasking or context switching, you'll be able to fly between programs, but the ones that access the disk won't run any faster than they did before you added the memory.

Meet the Block

If you've been around personal computing for a while, you may be familiar with *Ski-Writer*, the first word processor written for laptops, or *Ski-Writer II*, an outstanding word processor and telecommunications package for the Commodore 64. Both text crunchers were written by Ken Skier, to whom Commodore users owe another debt of gratitude for his excellent book *Top-Down Assembly Language Programming for Your Commodore 64*.

For the last five years, Ken has been designing *Byline*, a PC desktop publishing package marketed by Ashton-Tate. *Byline 1.0* was released about a year ago and *Byline 2.0* is due out by the time you read this.

Not only did Ken write *Byline* by himself, an incredible feat in this age of team and committee programming, but he also wrote it all in assembly language. It almost killed him. (There will be more on *Byline* in a future column.)

After he'd finished *Byline*, Ken was looking for a *small* project. One happened by. A friend said he couldn't see the cursor on his new laptop. Ken said he could fix that.

The result is *No-Squint Laptop Cursor* (SkiSoft Publishing, Suite 79, 1644 Massachusetts Avenue, Lexington, Massachusetts 02173; 617-863-1876; \$39.95 plus \$2.50 shipping and handling)—a product that not only makes your cursor big and bold, but also allows you to control the rate at which the cursor blinks. To use the program, you simply type *lcd on*, or *lcd* followed by *very fast*, *fast*, *normal*, *slow*, or

very slow. If you want finer speed increments, the numbers 1 through 9 can be used. *No-Squint* is a TSR that takes about 1K of memory.

The improvement in size is a boon, but the control of blinking speed is a godsend. A slowly blinking cursor is much easier to see than a fast one, and it's easier on the nerves, too.

If you have a laptop, *No-Squint* is a must. If you have any MS-DOS machine, *No-Squint* is highly recommended. On a desktop PC, the program does everything it does on a laptop and more.

The PC's hardware cursor, besides being small and fanatically fast, obliterates the letter beneath it. If you have *No-Squint* installed, you can actually read the character under the cursor. This may not sound like much, but the difference it makes during long stretches at the keyboard is amazing. Give yourself a break: Try *No-Squint Laptop Cursor*.

— Clifton Karnes

64 & 128

Increasingly, World of Commodore has become an Amiga show, with Commodore's booth proudly displaying Amigas rather than 64s or 128s. This year's show, held in Toronto December 1-4, confirmed that trend, with software publishers joining in the recognition of Amiga dominance.

The buying public, though, refuses to let the 64 fade away. People left the show

with Commodore 64s, 1541 disk drives, and software as often as with Amiga products.

Charting GEOS

Meanwhile, the new software blitz continues as Berkeley Softworks (2150 Shattuck Avenue, Berkeley, California 94704) releases *geoChart* (\$29.95), the most recent package in a productivity software series. *geoChart* builds nine chart types from data stored in GEOS, *geoWrite Workshop*, *geoFile*, *geoCalc*, and the Note Pad. The available chart types include bar, scatter point, line, area, and the well-known pie.

Charts can plot as many as 80 values, and it can also plot subsets of values, as well. Once you've decided on the chart type, you can add text (all 53 *FontPack Plus* fonts are available), fill with patterns (32 fill patterns are available), and experiment with marker types for scatter-point and scatter-line charts. Axes can be labeled in many formats, and the charts can be printed on any GEOS-compatible printer.

This Year's Model

Just as they do every year, new games invaded the market this winter. The offerings were impressive. I won't get to all of the games this month, but as soon as my joystick cools down, you'll hear about them.

In *Rack 'Em* (Accolade, 550 South Winchester Boulevard, Suite 200, San Jose, California 95128; 408-296-8400; \$29.95), you can choose from straight pool, eightball, nineball, or snooker. You put the appropriate amount of English on the ball, as well as apply just the right amount of power to the shot. The feel of the game is very close to real pool, except that there is no provision for using the rake, no stretching or reaching behind your back to make a shot, and snookers aren't always obvious. The game's detail includes ten trick shots as well as different ways of determining who

breaks. I know the game works, because I miss exactly the same shots on the computer's slate as I do on a real table.

Serve and Volley (\$29.95), Accolade's tennis game, appears impressively detailed, but it's surprisingly unsuccessful. After learning how to hit a ball, in fact, playing the game quickly becomes a matter of watching the Control Box, which shows your options, rather than watching your player on the court. As long as you remember to keep your eyes off the court, you should defeat just about every opponent.

On a military theme, SSI (1046 North Rengstorff Avenue, Mountain View, California 94043; 415-964-1353; \$49.95) has released *Typhoon of Steel*, a small unit-level simulation of World War II combat. The two-disk game includes seven ready-made scenarios. Two are set in the Pacific theater (Kakuzu Ridge and Iwo Jima), two are in the British vs. Japanese Asian theater (Kohima and Kampar), and three pit Americans against Germans in the European theater (including Omaha Beach).

Like all SSI's historical simulations, *Typhoon of Steel* is extremely rich in detail and in historical feel. The main manual is 43 pages long, with the final 4 pages devoted to charts and tables. An accompanying manual, which contains 15 double-sized pages, offers extensive unit data on all the combatant equipment, formation charts, and scenario information. *Typhoon of Steel* is derived from SSI's popular *Panzer Strike* game, and it furthers the company's reputation as a creator of detailed, but playable, tactical-level historical simulations. It's hardly an easy game to master, but *Typhoon of Steel* rewards continued attempts.

Electronic Arts (1820 Gateway Drive, San Mateo, California 94404; 415-571-7171) offers a highly unusual game. Following the spate of Olympics-based games, *Cave-man Ugh-lympics* (\$29.95), by Dynamix, sets the contest in prehistoric times. The six events include the Mate Toss, in which you toss your spouse; the Saber Race, in which a

hungry tiger chases you; and Fire Making, in which you rub two sticks together while thumping your opponent on the head with some of your kindling. You can also compete in club fighting, dinosaur racing, and dinosaur vaulting.

Remote Opponents

One of the most important releases of the season is *Modem Wars* (Electronic Arts, 1820 Gateway Drive, San Mateo, California 94404; 415-571-7171; \$34.95), a game made to play through a modem. Telecommunications services have picked up on the game's possibilities by offering opponents.

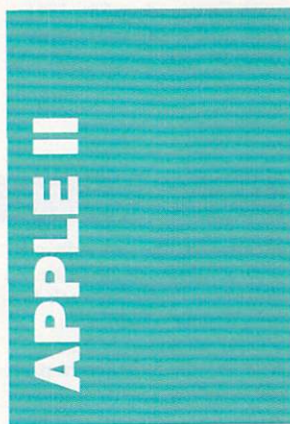
Dan Bunten, designer of several other brilliant games, including *M.U.L.E.*, *Seven Cities of Gold*, and the underrated *Heart of Africa*, opens new territory once more in this fascinating design.

Describing the game is next to impossible, except to say that it's loosely based on football—with a whole lot of nasty extras. The game even includes a messaging system.

You will need a modem to play *Modem Wars*, although you can practice without one. First, find out who else owns the game (often a call to your local software store can handle this); then, call the person and arrange for times to play. Your opponent must own a copy of *Modem Wars* but not necessarily for the Commodore (IBM owners can play against Commodore 64 owners). Alternatively, connect to Q-Link, the Commodore-specific communications service that supports *Modem Wars*. The *Modem Wars* package contains a Q-Link disk and instructions.

After setting up, prepare to spend a lot of time on the phone. Individual scenarios may not take long, but the game is addictive and will likely absorb more than a few hours. It's worth it, though; playing against an invisible opponent is as tense as anything you've likely experienced, and this game is far better than most of the games on the communications services.

— Neil Randall



The shrink-wrap is off and the colorful, cartoon-decorated box is sitting next to the IIGS. After a brief but furious examination of the much-touted *AppleWorks GS*, here are some quick first impressions.

It's not a total snail. One of the biggest complaints of IIGS-specific software is the creepy way it imitates the pace of a zombie. You'd think 16-bit software had died and voodoo-transformed into a shuffling, stumbling imitation of real computer applications. Though not a speed demon like its forebear, *AppleWorks Classic*, *AppleWorks GS* isn't as slow as many had feared. True, a professional typist can outrun the word processor's ability to display characters, but for most of us, the lag time is only barely bothersome.

There's sure a lot here. When you read about, or hear about, *AppleWorks GS*'s six modules—word processor, spreadsheet, database, graphics design, page layout, and telecommunication—you can't tell how large and feature-filled the program is. Weighing in at a whopping 753K, it requires at least 1.25 megabytes of RAM. (That's what the box says; the manual says it needs only 1 megabyte, but what's 256K among friends?) Even for *AppleWorks* veterans, there's a lot of new ground to cover. It helps that the programs use the Apple interface, with some shared pull-down menus.

Don't throw away those *AppleWorks* disks! *AppleWorks GS* opens all *AppleWorks* word processing, spreadsheet, and database files directly. No Mickey Mouse

importation process is required. This feature alone is going to make a lot of friends for *AppleWorks GS*.

Cut and paste to make the Mac-heads envious. *AppleWorks GS* can have up to 14 windows open at the same time. In and of itself, that's no big deal. But one of *AppleWorks GS*'s most impressive tricks is its ability to move data directly from one window to another. You can bypass the Clipboard by selecting data and dragging it with the mouse when you hold down the Control key. Even Macintosh software doesn't let you do that.

Nose-in-the-book time. The documentation runs almost 700 pages, and it's not enough. Apple documentation was never great, and although Claris has improved on that performance, *AppleWorks GS*'s manuals are clearly not the last word on the program. Of the two manuals included in the package, *Reference* is best. But because it's organized by command, not by concept, finding things isn't always easy. Look for a rush to the bookstore when the first *AppleWorks GS* books hit the racks.

There's more, a lot more, to *AppleWorks GS*. We're scheduling a review of *AppleWorks GS* for next month's *COMPUTE!*. Stay tuned until then.

Has Apple Lost?

Is Apple in danger of losing the all-important educational-software market? Numbers, so they say, don't lie. And the numbers from the Software Publisher's Association (SPA) don't look good for the Apple II.

According to the SPA, an organization representing more than 400 software publishers, software sales figures from the first three quarters of 1988 showed the Apple II losing ground on all fronts. Compared to the same period of 1987, total sales of Apple II software were down nearly 6 percent.

One of the most telling indicators of the Apple II's future, however, is the losing battle being waged against MS-

DOS in educational software. Apple II educational software owned just 49.7 percent of the market over the first three quarters of 1988. During the same period in 1987, Apple II educational software accounted for 56.5 percent of total sales. Where did the lost sales go? MS-DOS.

The MS-DOS format accounted for 37.2 percent of educational-software sales in the first three quarters of 1988. That's up from the 30.8 percent that the format garnered in 1987. In other words, the numbers show that the fall of Apple sales corresponds with the rise of MS-DOS sales. It's nearly an even trade: Apple II sales are off 6.8 percent; MS-DOS's are up 6.4 percent.

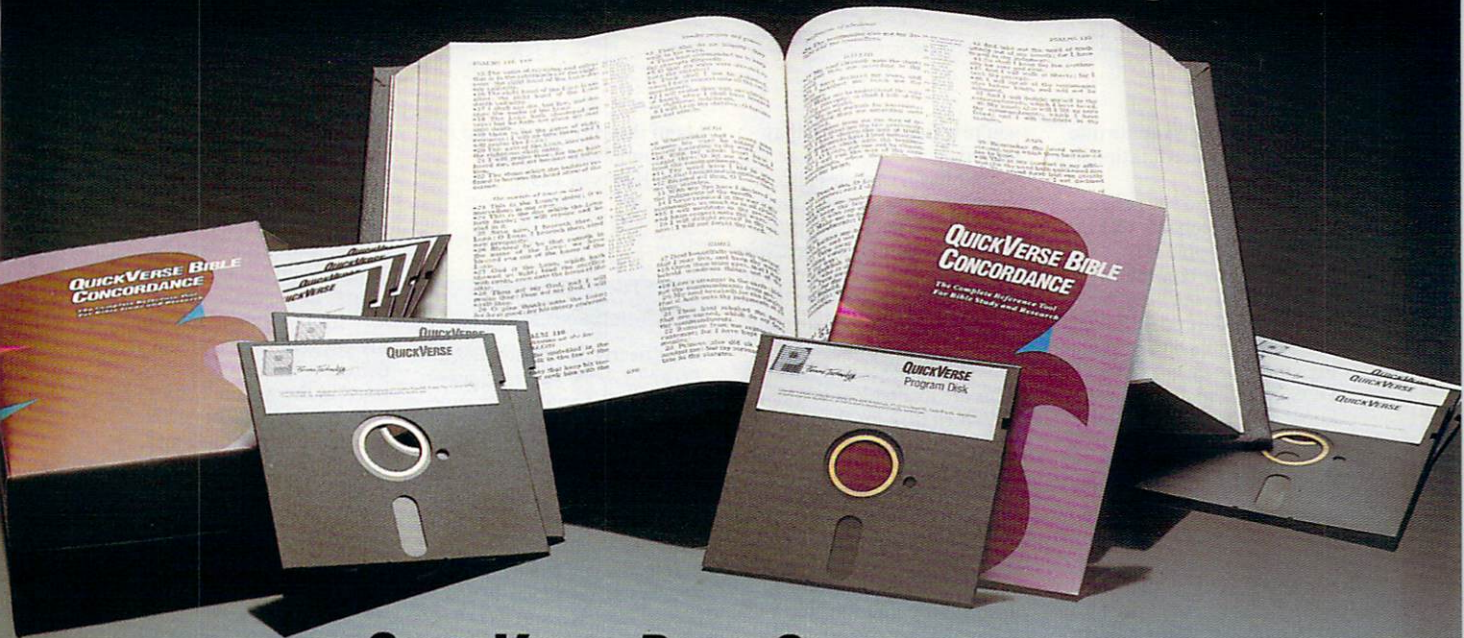
Even more worrisome are the sales figures for the third quarter of 1988. Apple and MS-DOS sales are almost neck and neck, their market shares separated by only 3.2 percent. In other words, things are getting worse.

What's so troublesome is that education is really the last bastion of Apple II strength. One of the best reasons for buying an Apple II for the home had been that the kids could use it there as well as at school. If the educational-software gold mine plays out, though, that reason will be gone.

Not all software publishers see the numbers as evil portents, though. Gary Carlston of Brøderbund Software says he can see the trend toward MS-DOS software as easily as anyone, but it doesn't mean his company is going to discard its Apple II line. "If the Apple II was going, we would be the last ones out the door. We make good money there [in the Apple II format]."

Carlston theorizes that as new software companies come into a market—the educational arena, for instance—they're less likely to develop for the top-ranked system simply because they don't want to compete with the established software publishers who have that format sewn up. And because the Apple II has long been the number 1 computer in schools, these new publishers are developing for other machines. More new non-Apple educational-software re-

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IBM version requires IBM, Tandy or compatible computer with 256k or more memory, two floppy disk drives or floppy disk drive and hard disk drive, and DOS Release 2.0 or later. (A hard disk drive is recommended but is not required.)

Macintosh version requires 512k or more memory and works with any disk drive configuration.

leases may then translate into more non-Apple educational-software sales.

Bröderbund's experience and outlook probably reflect much of the Apple II educational-software community: They'll stick it out with the Apple until the end (if there is one), even though they're making more money with MS-DOS. Says Carlston, "I don't know if we're looking at any rapid change, at least from our point of view, even though MS-DOS is our biggest format."

So does the Apple II line have a full future? It has to be a tossup if this downhill trend continues. What could Apple do to turn back the tide? Drop its computers' prices, especially the overpriced IIGs. When educators and parents are forced with the hard economic choice between one IIGs or two MS-DOS machines, it doesn't take a rocket scientist to predict the decision most people will make.

Bat Bricks

Raise your hand if you remember *Breakout*. OK, hands down. Boy, have you been using computers too long!

Back in the Pleistocene of personal computers, *Breakout* burned up more monitor phosphors than almost any other game. Simplicity itself, *Breakout* was a bouncing-ball-against-bricks contest of joystick dexterity and eye/hand coordination.

Things that go around come around, and the *Breakout* idea has returned—sort of. *Arkanoid*, an Apple II and IIGs translation of a video arcade hit from the Japanese giant Taito, will peak high on the addictive-game-of-the-year chart. The game is like *Breakout* in that you use a moving paddle to bounce balls against bricks, but there the similarity ends. *Arkanoid* offers 33 different screens, each with a different configuration of bricks to erase. Some bricks vanish at a ball's first touch; others have to be hit repeatedly before they go away. And devilish gremlins float down to haunt your tactics—they always seem to be right in the way when

you're trying to aim for that last brick.

Colorful capsules also drop down the screen. Catch one and you get special powers—your paddle expands, one ball multiplies into three, your paddle can suddenly fire lasers to destroy bricks long distance, and more.

The Apple II and IIGs versions are available separately: a 5¼-inch disk for the IIe/IIc and a 3½-inch disk for the IIGs (the 3½-inch disk will *not* work with the Apple IIc Plus). Naturally, the IIGs version wins the graphics and sound effects contest hands down. In both versions, though, the arcade action is fast and furious, something not easily found on any Apple II, making the game even more impressive. Mouse or joystick control is used to move the paddle; the mouse proves to be an excellent input device for the game.

There's no thought, no strategy needed to play *Arkanoid*—only fast eyes and even faster hands. Try it out if you have a spare week or two to kill.

Arkanoid is available for \$29.95 from Taito, 267 West Esplanade, Suite 206, North Vancouver, British Columbia, Canada V7M 1A5; (604) 984-3344.

One Million Sold

Claris shipped the 1 millionth copy of *AppleWorks* during the last month of 1988, a company spokesman said.

Long sold by Apple, *AppleWorks* was the sole Apple II program handed to Claris when the software spin-off was formed. Now, of course, *AppleWorks* has been joined by *AppleWorks GS* and *MultiScribe GS*, products acquired in the Styleware purchase.

Only two other commercial software packages have made it past the 1 million mark: *Lotus 1-2-3*, the omnipresent spreadsheet for MS-DOS machines, and *The Print Shop*, the ever-popular printing program available for most personal computers.

Interestingly, the three 1 million sellers were introduced

about the same time: *1-2-3* in 1983 and *Print Shop* and *AppleWorks* in 1984.

Say Goodbye

After nearly four years, *COMPUTE!'s Apple Applications*—an Apple II-specific magazine that specialized in publishing type-in programs—has published its last issue. The February 1989 issue was the magazine's 13th (for its first 2½ years, *Apple Applications* was published only twice a year) and included six type-in programs. Among them were two of the magazine's most powerful pieces of software—*SpeedCalc*, a full-featured spreadsheet, and "Powerball," a super-*Breakout*-style arcade game.

Back issues and back-issue disks are still available direct from *COMPUTE!* Publications. Check the advertisement found in each issue of *COMPUTE!* for ordering details.

COMPUTE! magazine would like to welcome many of the readers of *Apple Applications* to these pages.

—Gregg Keizer

during the last quarter of 1988. If that prophecy is fulfilled, it will push the Amiga over the 1 million sales mark, the magic number which is supposed to attract Microsoft, Ashton-Tate, and other big software houses to the machine.

It's too soon to tell, but my guess is Microsoft and company will never be interested in the Amiga, except in a peripheral way—the profit margins are too small, and, anyway, the machine is too much fun. No one is buying an Amiga to run databases or big spreadsheets. Desktop video, graphics design, color desktop publishing, and, above all, games will continue to power the Amiga market for some time. What was Lotus's last game title, anyway?

Deluxer than Ever

Deluxe Paint is getting another facelift from Electronic Arts (1820 Gateway Drive, San Mateo, California 94404, 415-571-7171). Due out in late February, *Deluxe Paint III* will support overscan and the 64-color, Extra Half-Brite mode, real boons for desktop video artists. There is also a host of other minor improvements.

The tint brush mode and brush wrapping are welcome additions. In tint mode, you lay a translucent wash over related colors; this works best in the Extra Half-Brite screen format. With brush wrapping, you mold a brush to fill any bounded area. You can, for example, make the brush look as though it's mapped onto the surface of a sphere.

The big news, however, is *Deluxe Paint III's* page-flipping animation feature. Using ANIM compression routines, *Deluxe Paint III* will allow you to create and play full-color animations several seconds long at 30 frames per second (the standard video frame rate) or any other frame rate you specify. The maximum animation length depends on the screen format, how many bit-planes you use, and how much RAM you have installed. Animations can take up the whole page, or you can create—and paint with—animated brushes. ▸

AMIGA

Even before the holidays started, Commodore Business Machines, once the *sick man* of computer manufacturers, expected a very merry selling season. Commodore marketers were predicting worldwide sales of 300,000 Amigas

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Any frame can be cut and pasted anywhere else in the animation, and you still have a spare page. You can play your creations forward, backward, or in yo-yo mode. The results are remarkably smooth because *Deluxe Paint III* double-buffers the frames.

A slick feature combines the perspective and animation tools to automatically paint moving brushes across every frame. Once you've entered the necessary settings, *Deluxe Paint III* brushes will swoop, turn, spin, and zoom—while you go get a sandwich. This works especially well with text. Use a font program like *Calligrapher* or *VideoTitrer* to create fancy display type; then load the type into *Deluxe Paint III* to render the text animation. The end product is as good as what you see on the typical local cable news show. And the whole thing is simple to learn and easy to use, which can't be said about many animation programs. It's so easy that you really don't need strong artistic skills to create useful animations.

Deluxe Paint III ANIMs are fully compatible with the Aegis/Sparta format, so you can play them back with the Aegis Player utility in *VideoScape 3-D* or with any other program that reads ANIMs. Every *Deluxe Paint II* owner—and that includes most Amigas—will want to upgrade.

Aegis Activity

Despite rumors you may have read elsewhere, sources at Aegis Development (2115 Pico Boulevard, Santa Monica, California 90405, 213-392-9972) insist that the company is neither going down the tubes nor abandoning the Amiga—a good thing, because Aegis has consistently been ahead of its time with Amiga graphics and sound software. *Aegis Animator* was the only animation package for the Amiga for more than a year, and *Aegis VideoScape 3-D* was the Amiga's first 3-D animator—in fact, the first complete 3-D animation program for any

personal computer.

The best proof of Aegis's continuing vitality is the 20 Amiga products that the company has on the market or in the works. Aegis has just released *Modeler 3-D*, the long-awaited 3-D object editor for *VideoScape 3-D* that will finally save *VideoScape* users from their bondage to graph paper and meter sticks. *Modeler 3-D* has a clean object-creation interface, and the program is compatible with *Aegis Draw/Draw 2000*, meaning you can extrude into three dimensions any outline that you create with *Draw*. *Modeler* also accepts files created in *Sculpt 3-D* and *VideoScape's* EGG and OCT utilities.

By the time you read this, Aegis should also have released *ANIMagic*, a special-effects program that will let you play separate ANIMs on the sides of a cube and create many other ADO-type effects. Add *Modeler 3-D* and *ANIMagic* to *Lights, Camera, Action*; *VideoScape 2.0*; *VideoTitrer*; *Animator*; *Sonix*; *Audio Master II*; and *Images*; and you can see that Aegis has more product-line depth in the desktop video market than does any other company.

In fact, the burst of new graphics products for the Amiga is getting out of hand. The number of animation and 3-D packages is up to about two dozen, and each program has so many features that choosing one is almost harder than using one. And to think that just two years ago no one thought you could create real animation with a personal computer.

NeXT Amigas

Speculation continues to fly about the Amiga 3000. The latest rumors are that the machine will sport a 68030 microprocessor (the same chip that's in Steve Jobs' NeXT machine and the Mac IIX) as well as memory management; a noninterlaced, 1K × 1K, 256-out-of-16-million-color display; 4 megabytes of RAM; 2 megabytes of chip RAM; a better sound chip; an 80-

megabyte internal hard drive; five Amiga slots; five IBM AT slots; and, believe it or not, an 80386 chip on the motherboard (that's almost certainly not true).

The 3000 will come in a tower configuration, like the IBM PS/2 Model 80, and it will be about the same size. Workbench 2.0, which will supposedly run only on the 3000, will incorporate many of the functions of the CLI and have a much nicer look and feel than earlier versions of Workbench—nearly as nice as the NeXT desktop. This is definitely a machine to drool over. Don't expect to see any 68030 Amigas before the last quarter of 1989, but surprises are always possible from Commodore.

There's more substance to the claim that Commodore will be marketing the Amiga 2500UX soon, possibly by January. The A2500UX, positioned by Commodore as a rival for the Mac II and Sun workstations, will be a souped-up Amiga 2000 powered by a 68020 and with a 68881 numeric coprocessor. It will include a hard disk and a clone of System 5 UNIX with a proprietary windowing interface. (There will be a system board upgrade for current Amiga 2000 owners but no human brain upgrade to help us understand UNIX.)

As you might imagine, Commodore has no plans to mass market the A2500UX. Amiga 500s, however, will finally be flowing through the mass pipeline at Electronic Boutique, Walden Software, and Software, Etc. as per a November agreement in which these retailers also plan to carry at least 40 Amiga game titles in each store. This has Commodore dealers ticked off, but they might be satisfied with a lower-priced A2000 and the A2500UX, when it comes, to anchor the high end.

Commodore may also be keeping dealers happy with some of the long-awaited products it displayed (but didn't actually announce) at Fall COMDEX and World of Commodore, including the hires gray-scale monitor, the 80286 Bridgeboard, the fast 80-megabyte hard drive, and the professional video board.

(Is it true, as some Commodore insiders claim, that CBM production managers hide when they see top management coming down the hall with a new product idea?)

One new Commodore product that is available and highly recommended for all Amiga owners is the Workbench 1.3 upgrade. It comes as a disk kit with the new 1.3 Kickstart for A1000 owners and as a ROM chip and disk upgrade for A500s and A2000s. The new 1.3 ROMs are only available from authorized Commodore dealers and, according to Commodore policy, can only be installed by them. The price for chip, disks, and installation is \$60-\$70.

— Steve Anzovin

MAC

I tried to maintain a healthy skepticism about the NeXT computer—really I did—but it's hard to resist the hype. When I finally saw the machine, when I finally got to click the mouse button and drag windows around the screen, I realized there was no hope for me. I'm in awe.

The components are sleek black metal. Put your hand on the laser printer and wonder at how cool it is. Feel the raised logos on the power cord. We're talking classic styling here.

NeXT has also provided a beautiful user interface. Grab the mouse and move a window around the screen. No temporary dotted lines appear on this 17-inch monitor; the window, contents and all,

COMPUTE! *specific*

moves just as smoothly and quickly as you please. Your menus collapse into one strip of main options. You can drag the strip and leave it anywhere you want, much like the tear-off menus in *HyperCard* or *MacPaint*, and you can leave any of the submenus open or drag them to other convenient places on the screen. Applications icons line the right edge of the screen; you can slide them off to make more room if needed. There are even two ways to see files: with the traditional icon-based Macintosh method and with a file browser with lists of directories displayed in columns so you can see several levels of directories at a time.

Screen and printer graphics are both driven by PostScript, so WYSIWYG is a lot more WYSIWYG than it is on our Macintoshes.

Bundled software includes a NeXT version of *WriteNow*, *Mathematica*, several online reference books (such as the complete works of William Shakespeare and a Webster's dictionary), and an electronic mail system that includes voice messages.

Also included is a programming environment that resembles colorforms, those sticky vinyl pieces we used when we were kids. To build the user interface for any Macintosh program, you usually have to write the code yourself. At best, you can summon routines from the Toolbox. On the NeXT, you build an interface by grabbing objects and defining them as input or output. You link interface elements with the core program objects as you define them. It's still no replacement for programming logic, but programming is much easier.

The optical drive holds more data than 350 floppy disks could store, and the computer comes with eight megabytes of RAM. A choir of angels should have burst out in song by now.

If you haven't fallen in love yet, listen to the NeXT sing. It has compact disc-quality sound, clear as rainwater. As a matter of fact, you ought to hear the Amazon rain forest thunderstorm the computer can conjure up.

For people like me, the

NeXT is overkill—like a Jaguar sedan with a wet bar in the glove compartment, a television in the back seat, and a jacuzzi in the trunk. Right now, you have to be comfortable with UNIX to run the computer (the system isn't quite finished). By June, though, UNIX should be completely hidden by NeXT's interface.

Don't look at the NeXT as your next computer; look at its features as a wish-list of options you should ask for if Apple ever calls.

Dabble with DTP

Brøderbund has stepped into the desktop publishing arena with three new, reasonably priced packages.

Drawing Table is an object-oriented graphics package along much the same lines as the original *MacDraw*—with a few added attractions, like the ability to wrap text around objects, à la Aldus' *Freehand*. You can also drag clip-art images directly from a window to your work without cutting and pasting. Not bad for a \$129.95 graphics package.

The second installment in the trilogy is *DTP Advisor* (\$79.95), a design and marketing planner accompanied by a tutorial. Running under *HyperCard*, *DTP Advisor* is a collection of forms that helps you devise a public relations strategy. You go through all the stages, from audience definition to typeface choices. On each planning form, you can click buttons that explain the concepts involved. What's most impressive about the package is its use of hypertext. You still might get as much out of a book, but the convenience of clicking for information is hard to beat.

Third in the series, *TypeStyler* lets you create typographical special effects by twisting, stretching, shadowing, and shading letters. Again, Brøderbund has supplied a package with some high-end capabilities for a low-end price: \$149.95.

Don't be fooled, though. Brøderbund's creativity line won't replace the capabilities of more advanced, expensive

packages. You can produce some impressive documents and organize some exciting projects with packages like these, but if you need more sophisticated tools, you'll have to turn to a more sophisticated package. But for those of us who have the time and resources to only dabble and tinker with design and publicity, these programs can fulfill most of our needs.

Get Small

In the past year or so, the Macintosh has grown up and moved into the *real* world of microcomputers, the business world. I realize Apple has to make a buck, but somehow programs that need more than a megabyte of memory can sap a lot of goodwill out of the little guy.

So I'm always pleased to find developers offering programs that preserve the Macintosh's no-frills, no-thrills environment—easy to use, high-quality programs that work on low-memory Macintoshes. T/Maker (1390 Villa Street, Mountain View, California 94041; 415-962-0195) is just such a company, offering a strong word processor upgrade that works on a 128K Macintosh. *WriteNow 2.0* (\$195.00), the latest version of T/Maker's *MacWrite*-killer, is packed with features, including mail merge, both a memory-saving 50,000-word spelling dictionary and a luxurious 100,000-word one, and a word-counting utility.

Other nice features include tab fillers, those dots that print between a chapter head and its page number in tables of contents; Stationery, templates that control the page and paragraph format for all new files (you can override Stationery with a flick of the option key); and a powerful search-and-replace function, which finds returns and tabs and uses wildcards.

WriteNow also offers one of the most accurate WYSIWYG displays ever seen on a Macintosh. The footnotes show up at the bottom of the page, where you'd expect them

to be, not in a separate window. (However, you must summon a footnote window to edit the citations.)

Most notably, you can work with as many as four columns, and they show up side by side on the screen. As you edit, the words wrap from one column to the next... shades of desktop publishing.

Compared to Microsoft *Word*, *WriteNow 2.0* is sluggish, but you need about a megabyte of memory to run *Word* well, not to mention more money in your pocket to get it to your desk in the first place. But when compared with the low-end word processors like Microsoft *Works* and *MacWrite*, T/Maker's package holds its own in speed trials.

Changing Styles

Have you ever written a report in *Microsoft Word* and found that you needed to go back and italicize every occurrence of the word *voilà*? That'll be 20 search-and-replace operations, please. Find the word, select it, hit Command-Shift-I for italics, and then on to the next one. Right?

Wrong. Maybe you have a macro program. Maybe you could write a script that would accomplish the change with the stroke of a key. But here's a faster method that you should try next time you use *Microsoft Word*. Find the first occurrence of a word that you want to italicize. Italicize it as you normally would and then copy the newly formatted word to the Clipboard.

Call up the Change window from the Search menu. In the Find What field, type the word you want to reformat. In the Change To field, type a caret (Shift-6) and the letter *c*. Then start the search and *voilà*, you have your change.

You can use the caret-c method to change recurring words to any character format or paragraph format (centered, double-spaced, and so on). This trick doesn't work in *MacWrite*, *Works*, or *WriteNow*; too bad, it's a nice feature.

— Heidi E. H. Aycock ▸

ATARI ST

It's time to find the keys to your spaceship; *Starglider II* is out and you're again being called to save the planet Novenia. In this sequel to the smash flight simulator and combat game, the Egrons have conquered another star system and are fixing to fry the Novenians with a beam of energy from a nearby sun.

Equipped with your new *Starglider*, a more sophisticated craft than its predecessor, you must prevent the construction of the sunbeam by locating rebel colonists to help you build a neutron bomb. You must also destroy the Egron defenses constructed on various moons and supply the colonists with weapons and food.

Your cockpit view is created by solid-filled, smoothly animated graphics complete with shadows. Other views are available. Control the craft with the mouse or joystick, and use the complete set of simulated 3-D instruments to keep on top of the ship's condition. It's up to you to figure out how to gather the needed supplies, how to refuel, and how to defeat the Egrons.

As with *Starglider*, a novella gives necessary hints. Your craft is equipped with lasers, but you must collect or build other weapons, such as the Bouncing Bombs necessary to destroy the defensive stations. One unique feature of *Starglider II* is that you must fly between planets (occasionally facing space pirates) and locate various objects—sort of a scavenger hunt in space. Be prepared to spend long hours playing, because this game is

extremely challenging. You can save the game as many times as you like, so all is not lost if you blow up (and you will). The Atari ST and Amiga versions are on the same disk; the Amiga version looks and plays like the ST version, except it has a few extra colors in the tunnels.

Starglider II costs \$44.95 and comes from Rainbird, distributed by Mediagenic, 3885 Bohannon Drive, Menlo Park, California 94025; (415) 329-0800.

Disk Cupboard

If storage space for your 3½-inch disks is getting to be a problem, the Banx disk storage box (\$24.97) is the solution from T.S. Microtech, 12565 Crenshaw Boulevard, Hawthorne, California 90250, (213) 644-0859. Holding 75 disks, it's a file cabinet-like box with a drawer that holds disks. Banx disk storage boxes can either connect side by side or be stacked on top of each other, and they're joined with the included connectors. You can lock the boxes, which come with five multicolor dividers.

Act Like a Mac

Spectre 128 (Gadgets by Small, 40 West Littleton Boulevard, #210, Littleton, Colorado 80120; 303-791-6098; \$179.95) is David Small's latest Macintosh emulator for the ST. As with Magic Sac—Small's earlier emulator, which worked with the Macintosh 64K ROMs—you must find the Macintosh ROMs yourself. Gadgets can't sell the ROMs because of legal considerations. You must also transfer your commercial Macintosh software to Spectre-format or Magic-format disks from a Macintosh via telecommunications software and a null modem cable. An alternative is to directly download Macintosh public domain and shareware programs to a Spectre-equipped ST.

The advent of Spectre is

significant because much of the new Macintosh software won't run on the old Macintosh 64K ROMs (and thus won't run on MAGIC SAC). Such software as *PageMaker*, *Adobe Illustrator*, and *HyperCard* require the new ROMs. Look for enhancements to the Spectre software to address the unavoidable bugs.

By the way, Macintosh sound is still not supported, primarily because the ST's sound chip is different from the one in the Mac.

Video Words

Antic Software continues to enhance its Cyber series. *The Video Titling Design Disk* (The Catalog, 544 Second Street, San Francisco, California 94107; 800-234-7001; \$29.95) provides a complete two-color 3-D font, and it features a series of objects that can be put together to construct custom characters.

A remarkable Cyber Control script included on the disk demonstrates how the software works, showing one of three different animated pens writing on the screen. The method is complex, and setting up a file is time-consuming, but the program achieves excellent effects. In other scripts included with the package, *The Video Titling Design Disk* creates spinning and rotating titles, a superb rendition of the Starship Enterprise going into warp drive, and some very effective ADO effects for use with *Cyber Paint*. This product is a must if you do any titling for your animations.

Action Trio

Usually, when a company sells a package containing more than one arcade game, it's because none of them are good. That's not the case with *The Awesome Arcade Action Pack Volume 1* from Arcadia (711 West 17th Street, Unit G9, Costa Mesa, California 92627; 714-631-1001). For a modest \$49.95, you get three fun ar-

cade games: *Xenon*, *Sidewinder*, and *Blastaball*.

Xenon is a horizontally scrolling battlefield over which your craft must move, defeating enemy guns, ground vehicles, and aircraft. Your vehicle can be either a car or a jet plane: The car can travel (and shoot) in more directions, but the plane is faster. It's important to figure out where the car works best and where the jet is more advantageous. As you travel over the landscape, you have to pick up various weapons, including extra cannons, high-powered lasers, and small craft that follow you and shoot when you shoot, effectively widening your striking power. The toughest villains in *Xenon* are the sentinals, which appear twice on each level. They're very hard to kill because each sentinal is vulnerable in only one spot. The graphics are excellent, with shading that gives a 3-D look to the screen.

The graphics in *Sidewinder* are not quite as good, but they are very detailed, and the game is incredibly addicting. Your object is to penetrate each level of the enemy ship Star Killer, until, by destroying the innermost level, the whole ship self-destructs. Again, you pilot a ship over a scrolling landscape that's loaded with targets, many of which shoot back. Often you'll need several shots to explode an enemy installation, but partial damage appears with each hit. The digitized sound is very realistic, and the landscape is wider than the computer screen, so the screen scrolls horizontally.

The third game in the collection, *Blastaball*, is played from an overhead view of a playing field. The object of this game is to guide your spaceship in a game of high-tech hockey. To move the puck, you fire a missile at it or push it with your spacecraft. You can choose from 12 ships, which vary in the amount of friction between ship and the playing surface and in the homing ability of the missiles. A craft with a low friction factor accelerates easily but is very difficult to control, while higher friction slows you down as it improves your control. *Blastaball* is unlike any other game of hockey.

— David Plotkin ☐

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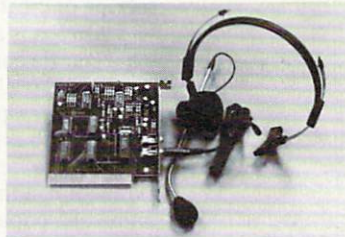
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Each month, "Fast Looks" offers up snapshots of some of the most interesting, unusual, or important software and hardware for the Amiga, Apple II, Atari ST, Commodore 64/128, IBM PC, and Macintosh lines of personal computers. Get the last word on what's new—here, fast, first.

Rebus Writer

It seems children learn language by magic; anyone who's learned a foreign language must envy their success. But it isn't magic—it's a complex trial-and-error method that leads children to fluency and language comprehension. *Rebus Writer* gives them the chance to experiment with sounds and language while solving or creating a rebus.

A *rebus* is a word, phrase, or sentence puzzle composed of pictures and symbols as well as letters or words. In *Rebus Writer*, players try to figure out what the rebus represents. Usually the solution is a famous saying, a common expression, a movie or book title, the name of a popular TV show, or the name of a celebrated personality.

Rebus Writer features more than 350 puzzles, divided into five levels of difficulty. Solving a puzzle requires that players type in the correct answer, encouraging the use of a dictionary or thesaurus. Players can also use the program's *pictionary*, which features 250 illustrations, to create their own puzzles. Other drawing tools let you clear, undo, erase, or add contrast to your rebus.

If your children are intrigued by puzzle solving, then *Rebus Writer* might be just the tool for enhancing

word usage, association skills, and imagination. The kids might even let you sit at the computer long enough to design your own rebus.

— CH

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Police Quest

Drugs have infested the small town of Lytton (population 28,831), along with the attendant unpleasantness of theft and murder. At the heart of this rot is the notorious Death Angel. Somebody has to track down this dope monger and bring him to heel. That somebody is you—it's your job.

Police Quest: In Pursuit of the Death Angel goes beyond the usual adventure game. Written with the counsel of Jim Walls, a former police officer with 15 years experience on the force, this game puts you in the real world. You aren't Dirty Harry, grinding scoff-laws into the dust. You're a genuine police officer, and you go by the book. That means learning radio codes, police procedure, and the daily routine. Throw out the book, and the courts may void your arrests and the department may send you into early retirement.

The game's excellent 3-D animation abounds with delightful scenes. You'll find yourself playing poker, taking a shower, drinking a beer, and even operating an onscreen computer. The multiple solutions and variable scoring mean you'll be playing it over and over. But hey—be careful out there.

— DM

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Contributing to "Fast Looks" this month were Dan McNeill and Carol S. Holzberg.



Tandy 1000 SL

There's no great art to building an IBM PC XT compatible. It's a sophisticated but commonplace occurrence in factories from Maine to Malaysia. But anyone who carefully reads the ads in computer magazines soon realizes that not all machines are created equal. Tandy obviously came to the same conclusion and raised the stakes with its new 1000 SL. Here's a computer loaded with features, priced for the home, and ready to use right out of the box.



Tandy's burned MS-DOS and the DeskMate shell into its 1000 SL's ROM for fast bootup and anxiety-reducing ease of use.

The 1000 SL is built around an 8086 chip, with a software-selectable speed of 4 or 8 MHz. The system box measures 15½ inches wide × 5½ inches tall × 13 inches long and weighs 11 pounds—you'll need something bigger than a student's desk to set it on. The box houses one 5¼-inch 360K disk drive, with room for a second disk drive or a hard disk; five 8-bit expansion slots that will take PC XT-compatible boards; one RS-232 serial (to connect a mouse or a modem, for example) and one parallel port; 384K of RAM, expandable to 640K on the main board; 512K of ROM; and 1024 bits of EEPROM for system configuration.

It's the EEPROM and ROM that separate this computer from its clone cousins. Barring fly-by-night XT makers, there's little to differentiate one XT compatible from another. Many are reliable, most work the same way, and all boast roughly the same features while adhering to the MS-DOS standards. Tandy goes further by burning those standards into the hardware. It's an important decision, and users benefit by getting a faster, simpler, more efficient computer.

When you switch on the 1000 SL, the EEPROM is set to take you to Tandy's DeskMate graphics interface, a shell for the company's integrated software program. (The *DeskMate* program

itself comes on four disks.) It takes about 11 seconds for the shell to come up. If you don't want to go to the DeskMate shell, you can easily change the EEPROM configuration to display the A> prompt (practically instantaneous), or to boot from a disk.

Besides the DeskMate shell, the Tandy's ROM includes a spelling checker and some oft-used MS-DOS 3.3 utilities like *FORMAT* and *DISK-COPY*. The rest of the operating system and *GW-BASIC* come on two disks.

The SL's 101-key enhanced keyboard has 12 function keys at the top and a comfortably angled bed. Tandy could improve on the key play, however. The travel is fine, but the action is soft and slightly deadened. You may feel different, but I prefer a hard click under my fingers.

This computer is much quieter than the now-obsolete 1000 EX I have at home. The on/off switch is in the front, next to the top disk drive, and is easy to get to. The volume control, on the left front at the bottom, isn't as convenient, especially if your keyboard is butted up against the CPU. The red reset button on the front is a lot better than the old Control-Alt-Delete finger-stretching, wrist-twisting manual reset.

There are some other features that will make the SL appealing to home computer users. Built-in enhanced CGA support means you won't have to spend extra for a graphics board to get 16-color or high-resolution monochrome display. Two joystick ports with built-in joystick support save you more money and make gaming a blast. A three-voice sound chip and an analog-to-digital/digital-to-analog converter let you record to and play from disk. A built-in speaker, microphone and ear-phone jacks, and sophisticated sound and music editing/composing software let users experiment right away without investing in expensive MIDI systems.

I got a real kick out of the music program. Tandy has included four songs that you can play (from Bach to a Christmas medley). If you're a budding composer, you can write your own songs and print the scores on a laser or dot-matrix printer. You can edit, transpose, and play your compositions at the touch of a button. It'll take some time to learn how to do all of this, but you can be playing the included tunes within five minutes of opening the box.

The 1000 SL doesn't come with a monitor, but Tandy sometimes offers a discount on its CM-5 or CM-11 color monitor when you bundle it with a computer. I reviewed the SL with the CM-11, and I have a CM-5 at home.

The CM-11 displays great hi-res graphics, and the CM-5 offers super color as well—both support Tandy's 16-color palette. If you keep your eyes peeled for a Radio Shack sale, you can pick up a plug-and-play SL color system (no printer) for about \$1,100.

A lot of computer magazines say you need the power of an IBM PC AT or compatible if you want to compute in the MS-DOS world. But word processing, family budgets, home inventories, games, graphics, telecommunications, music, and almost any task you can imagine are possible on the XT and even PC level. And few computers go as far as the 1000 SL in putting that capability right in your hands, right out of the box, right now.

— Peter Scisco

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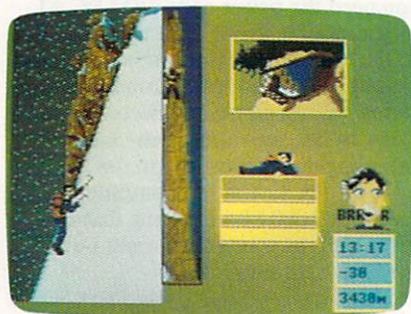
Final Assault

He screams when he falls. A nerve-jarring scream that makes you want to turn down the volume or turn off your computer. You'll hear his scream when you play *Final Assault*, Epyx's new game of mountaineering.

Final Assault isn't a simulation, though it has elements that make it seem so, such as selecting your gear and using it correctly. Instead, this is a deceptively complex action game that depends heavily on your joystick reflexes, your coordination and concentration, and your ability to make instant decisions. The game has enough realism to make you feel the agony of failure, even as it dangles the climber's ultimate reward before your eyes—the summit.

Final Assault puts you at the base of an intimidating two-peak mountain face and gives you six different routes to choose from. Each of the three difficulty levels—beginner, intermediate, and advanced—are represented by two routes. Once you've picked your poison, you get to pack your rucksack, adding or removing gear to get just the right

mix. Pack carefully—don't wait till you're glued to the face of a rock wall to discover you've forgotten the rope. You also get to select your starting time (default is 9:00 a.m.; you may want to start earlier) and choose between summer and winter climbing.



Brave freezing temperatures and slippery slopes during your climb to the top in *Final Assault*.

Every climb has three parts. You first cross a glacier, which may or may not include dangerous crevasses. Walking rhythmically takes a bit of practice, as you must rock the joystick back and forth to simulate your climber's leg movements. Once across the glacier, you'll tackle an ice cliff with your ice axes and crampons (you remembered to bring them, didn't you?). Again, dexterity and rhythm are important, as you move the joystick and press its button in the required pattern. A slip here and you'll likely hear that nasty scream. Once past the ice cliff, the climb's third stage looms before you—a rock wall. Switching gear—getting rid of the crampons, donning soft shoes, and rubbing chalk on your hands—sets you up for this, the toughest part of the climb.

On the wall, your climber must move hands and feet and, most importantly, hold on. Four icons show your holds—if an icon flashes, that hold is unsteady. Select the limb you want to move by repeatedly pressing the joystick button. Move the hand or foot to a more secure hold, and then hope your climber can hang on. Cracks in the rock give you the best holds. Joystick agility and fast decisions are important here. The longer you hesitate, the weaker your hand- and footholds become. Climbing with confidence means climbing quickly, something *Final Assault* usually rewards. Pinning yourself to the wall with your rope is absolutely necessary if you want to stay alive for long.

At various times during the assault, your climber will make demands. Perhaps he's hungry or tired, too cold or too hot. You must feed him, let him

rest or sleep, and dress him for the weather. Ignore his messages, and you could be faced with a fall.

Reaching the top is its own reward, but to spice it up you'll also hear the national anthem and watch a small flag wave from the summit. Soul-stirring stuff. If you fall before you reach the top, you'll see and hear something else—a tumbling, sliding body and that all-too-familiar scream.

Final Assault is probably the only mountaineering game you'll ever see. After all, climbing isn't an Olympic event (but synchronized swimming is—go figure). But that doesn't stop it from being an excellent game. It may, as one writer has claimed, be a contrived game, but it's still a game—a good game.

Some may think the game's action repetitious and monotonous, especially the ice and rock climbing. The pattern of ice ax, ice ax, foot, and foot does get familiar, but that's part and parcel of climbing. Climbing on rock is another matter. It may be frustrating, but, on any level other than beginner, you'll find plenty of challenges.

A more serious problem is that the six climbs lack variety. Although you can group them in pairs or trios, much of the thrill is gone once you've conquered a route. Additional routes or, even better, routes based on actual mountains would be a worthwhile enhancement—can you imagine conquering Everest or the Matterhorn? A more minor change would alter the progress display to show exactly what lies ahead. The display does show how far you have to go to reach the summit, but it gives no information about how much more ice is in front of you or how much farther you must climb until you reach a level spot where you can pitch your tent.

Final Assault is a breath of life in a genre packed with baseball, football, and golf games. Why play *Final Assault*? Because it's there.

— Gregg Keizer

Final Assault

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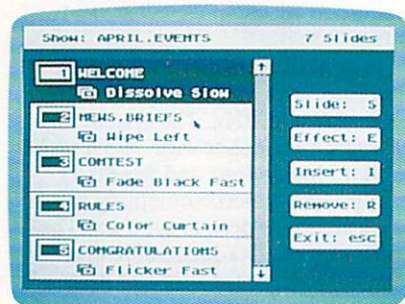
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There are separate IBM PC—version packages for 3½- and 5¼-inch disks.

Slide Shop

Presentation graphics—the latest business buzzword. Companies use the computer to advertise their wares; conventions use it to inform participants of various activities. A lot of these informative presentations are created by professional programmers, far removed from the everyday personal computer user at home or school. But now, thanks to Scholastic, anyone can create personal slide presentations.

There are lots of slide-presentation programs for sale. So what makes *Slide Shop* special? Simply put, it's versatile. It offers great graphics, great sound, and special effects; it comes on either a 5¼- or a 3½-inch disk; it runs on Apple II and IBM PC and compatible computers. This versatility makes computer-generated presentations an exciting possibility for schools and homes alike.

The manual's tutorial gives the user an easy introduction to slide making. *Slide Shop* has plenty of its own background scenes and templates, along with over 70 clip-art ideas. With all these graphics, creating slides is simple.



Use *Slide Shop* to create your own slide presentations.

But *Slide Shop* doesn't stop there. You can also import *Print Shop* graphics and paint them using the tools on *Slide Shop*'s main menu. The paint palette offers 72 different colors and patterns with the Apple version and uses the CGA palette on IBM and compatible computers—it really gives you the feeling of being an artist. You can also get original slides into *Slide Shop* via a roundabout path: Create the graphic in *SuperPrint* (another Scholastic package), export it to *Print Shop* with Scholastic's *Pelican Graphics Converter*, and then import it into *Slide Shop*. For text, you have eight fonts in different sizes and styles. However, you can't add text to the predesigned scenes.

Sound and special effects can spruce up your slide scenes. *Slide Shop* is full of goodies that will help jazz up your presentation. You can add any of

REVIEWS

the 46 short musical passages to your slide. The selections range from patriotic to rock to classical. Thirty-six sound effects can give your slide that special chirp or buzz you need to get your point across. Speech samples are also included; start your presentation with a programmed "Welcome" or friendly "Hello."

After you've decided which sounds to use, you're ready to pull the presentation together with special effects. The large and impressive special-effects gallery features not just the regular wipes and smears, but right and left arrows, checker spirals, up and down slides, and more. You can choose from more than 40 different effects and place them anywhere in the presentation. The up-and-down smear is especially interesting—the colors pour onto the screen in tiny streams and create the slide's text and graphics.

Now that you've designed your slides, complete with graphics, sound, and text, it's time to write the script. Use your script to arrange the slides into a presentation. It's here that you program in the special effects. Decide whether the next slide will just appear or be introduced with an eye-catching transition effect.

After you've written the script, give your presentation a name and save it. *Slide Shop* then offers a menu from which you can define how long each slide should remain on the screen and whether the presentation will be a one-time run or recycled.

There are several ways to present your slides. You can format a *show disk* and run your presentation without a program disk. This lets you send the disk to others, inviting them to parties or conferences. You can also record your presentation on videotape—handy when there's no computer at showtime. (You'll need a VCR, of course.) You can even print the slides to produce handouts and overhead transparencies.

Slide Shop's helpful booklet, "Guide to Effective Presentations," gives you hints on how to organize your information to get the most from your time and energy. It includes many ideas for magical effects that will enhance your presentation. Scholastic has three optional graphics-and-sound disks to make the program even more exciting. *People and Places*, *Science and Technology*, and *Holidays and Special Events* should give you almost anything you need to create a spectacular slide show.

Children can use *Slide Shop* as well; the program isn't so complex that

elementary school-aged children can't put the program to work creating visual reports, party invitations, and seasons' greetings.

Slide Shop offers many avenues of creativity. From business advertisements to school lessons, communication comes of age in a more advanced, high-tech fashion when you have *Slide Shop* in front of you instead of a slide projector beside you.

— Nancy Rentschler

Slide Shop

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AppleWorks GS

The numbers speak for themselves. With more than 1 million copies of *AppleWorks* shipped, it was only a matter of time before the phenomenally successful integrated package was brought up-to-date and handed to the most powerful Apple II computer ever, the IIGS. There's money to be made in them there computers, Claris said, and so gave us *AppleWorks GS*.

Perhaps Claris should have taken a bit more time. *AppleWorks GS* is a landmark program for the Apple IIGS, yet it shows rough edges that tolerant users may find irksome and that those not so patient will find disturbing. Most troublesome for *AppleWorks GS's* future, however, are not its own failings but those of the machine on which it runs. Until the Apple IIGS is beefed up, don't expect satisfactory speed from a graphics package like *AppleWorks GS*.

AppleWorks GS's lineup rivals that of any integrated package: word processor, database, spreadsheet, telecommunications, graphics design, and page layout. Taken singly, the six modules are, with the exception of telecommunications, robust enough to make it on their own as IIGS software. Put them together, make the interface and commands as consistent as possible, add

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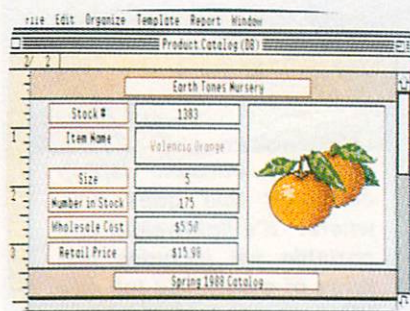
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some interesting integration pathways, and you have the program every IIGS user has been waiting for.

The now-familiar IIGS graphics interface is well adhered to by *AppleWorks GS*. Mouse and menus rule here, and dialog boxes, scroll bars, and what-you-see-is-what-you-get displays maintain a similar look from one module to another.



Make graphics an integral part of your database with *AppleWorks GS*.

A reworking of Styleware's *MultiScribe GS*, the word processor struts a spelling checker, thesaurus, multiple type fonts and styles, an adjustable ruler, headers and footers, and mail merge. The database stores and retrieves information as a form (you design the display) or in a spreadsheetlike list fashion. A special field lets you store pictures in the database, a perfect tool for tracking IIGS graphics files. The spreadsheet will become the IIGS standard by default, for it uses the mouse to select cells, choose from 73 functions and formulas, and format the worksheet. It also offers five charting choices.

Telecommunications is the weakest of the modules, but it does serve the most elementary online needs and includes the Binary II protocol for uploading and downloading complete Apple files. Graphics design is perhaps the most unique module, for it lets you combine bitmapped drawings with object-oriented shapes. The page-layout module, although no *PageMaker*, is enough for simple newsletters.

The strength of any integrated package lies in its ability to exchange data between modules. In *AppleWorks GS*, as many as 14 windows can be open at one time, and the number of active modules is constrained only by RAM (that's a significant limitation for most IIGS users, considering that the program requires a *minimum* of 1.25 megabytes). Cutting and pasting between modules takes only a few mouse clicks or keypresses. Data can even be dragged from one open window to another—no matter which module is represented—by pressing the Control key while holding down the mouse button. Even Macintosh software doesn't have this intuitive (and impressive) feature.

AppleWorks GS isn't flawless, however. The program crashes irregularly and seemingly unpredictably, a problem I experienced and one reported by a number of people on services like GEnie and CompuServe. Whether it's caused by *AppleWorks GS* itself, the new GS/OS operating system, or a combination of the two, is unknown. *AppleWorks GS* also sniffs out memory like a truffle-hunting hog: You won't be able to use all the modules at once with a mere 1.25 megabytes of RAM. Without a goodly amount over that minimum, you'll see the message *Not enough memory to complete that operation* more often than you'd like.

Other troubles stem from the IIGS itself. *AppleWorks GS* really accentuates its lack of speed. I outran the word processor's ability to display characters with uneasy ease, especially when inserting text in the middle of a paragraph. The graphics design module sometimes took so long to redraw the screen after moving an element that I wondered if I should send out for coffee. Database sorts were done with slug-like speed. Long-time *AppleWorks* users will lament this lack of quickness the most, since they're used to the lightning-like response of the old standby.

AppleWorks GS, like all software, doesn't operate in a vacuum. Tied to a system that can't effectively use a graphics-oriented program, *AppleWorks GS* isn't the answer for Apple IIGS users who want it all—productivity and speed. Even so, *AppleWorks GS* is a step in the right direction.

Impressive but inhibited, *AppleWorks GS* shows the promise of the IIGS as a home, small business, and classroom productivity machine. The future of Apple II software isn't here yet, but at least we've had a peek.

—Gregg Keizer

AppleWorks GS

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Times of Lore

Chaos reigns in Albareth: Its ruler has been assassinated; the country's most important magical artifacts are missing; and evil creatures roam unhampered, preying on the helpless inhabitants. It's up to you, as a knight, Valkyrie, or barbarian, to set things right in Origin Systems' newest fantasy role-playing game, *Times of Lore*.

In many ways, *Times of Lore* resembles the classic *Ultima* series. You trek through landscapes, search for objects, accumulate wealth, encounter friends and foes, engage in conversations and conflicts, and survive by being smarter and more skillful in the use of weapons, potions, and spells than your adversaries. But where *Ultima* is a masterpiece of complexity, *Times of Lore* is simplicity itself. Albareth is of manageable size, with six small villages, two forests, one desert, several lakes and rivers, a few small dungeons, a number of landmarks (many hidden), an impenetrable mountain range, and access to the ocean. Also, there are fewer weapons, potions, spells, treasures, and tasks than in a game like *Ultima*.



Times of Lore will have you battling odd creatures and searching for treasure.

Friends and foes are limited in number and, for the most part, are distinguished by type rather than by individual traits. Innkeepers, for example, normally prove helpful and talkative; orcs, rogues, and skeletons are always dangerous and uncommunicative.

Though simplified, *Times of Lore* is more than a scaled-down *Ultima*. On one level, it's a novice-level fantasy role-playing game. On another, it resembles fantasy arcade contests like *Gauntlet* and *Barbarian*. When you encounter enemies, you may avoid or engage them as in most role-playing games. But conflicts are resolved in arcade fashion: one part strategy and one part eye-hand coordination. As you kill more creatures and your score increases, more numerous and more

deadly opponents appear.

Controlling your character's movements and issuing commands couldn't be easier. Use the joystick to manipulate your adventurer's comings and goings (pictured in the top half of the game screen), and wield weapons with the fire button. To enter the control mode, push the space bar, which accesses a series of icons displayed on the lower half of the screen. Move the joystick-controlled cursor over any of the choices. You may talk, examine an object, take inventory, drop an object, use an item, offer something to someone, or select game options.

The game's designers have created graceful and fluid graphics that bring real life to the game. Because you see Albareth, its people, creatures, and objects from above, you get simulated three-dimensional representations—not two-dimensional, flattened drawings. Characters and landscapes are distinctly rendered: You won't confuse an orc with a serf or mistake a bridge for a pathway. And each character type moves uniquely (for example, innkeepers wipe their bars with cloths; the Valkyrie wiggles when she walks).

The game's sound effects are first-rate, from the clump-clump of the adventurer's boots to the birds chirping in the forest. Equally impressive is the musical score that accompanies the opening screens. Each of these panels contains a lovely drawing of some place and/or event from Albareth's history, a written narrative, and a distinctive piece of music in harmony with the painting and the text.

On the downside, it's sometimes difficult to see treasures, particularly in the woods where the green of some of the items blends in with the trees and grass. Also, the command cursor slides so easily that in the heat of battle it's occasionally difficult to select the appropriate icon. A third, more serious drawback has to do with the game-saving feature. Checking into one of many inns for a night's rest saves your character's current position and game score to the game disk. If you start a new game (rather than restore an old one), the saved game will be erased. I inadvertently erased one nearly completed adventure.

The fact that the *Times of Lore* authors have created such a complex world on only one side of a single disk, with no disk access required after the opening screens, is a testimony to their programming excellence. I do wish they had anticipated that users might want to start a new game and keep an older version on disk. Still, for the beginning

adventurer or the arcade player looking for a somewhat different challenge, *Times of Lore* has much to offer.

— Len Poggiali

Times of Lore

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Solitaire Royale

If you're ever stranded on a desert isle with nothing but a pack of cards, there's a surefire way to get rescued. Break open the deck and start playing solitaire. A few minutes into the game, the first kibitzer will show up; within a half-hour, as many as half a dozen will be offering pointers, suggestions, and a foolproof way to win.

Solitaire Royale, a computer version of solitaire, gives you eight different solitaire games, plus three more for children. The game is graphically very attractive, and it plays smoothly and easily. Winning, of course, is practically impossible, but that's the fault of solitaire itself, not this program.

You might well wonder why, when you can play solitaire with a cheap deck of cards, you would need a computer.

The answer is, you don't. But that doesn't stop *Solitaire Royale* from being a very good game with some distinct advantages over cards. For example, if you sit down at the dining room table to play solitaire, within milliseconds you're surrounded by your spouse, your children, your cat, your dog, and a host of other demanding creatures. With *Solitaire Royale*, simply announce that you're doing some programming in COBOL—you're guaranteed absolute privacy.

There's also the lure of learning new ways of playing solitaire. Most of us know how to play Klondike, with its seven columns. But how many are familiar with Corners, a version that doesn't reshuffle the waste pile and which requires piling cards in a kind of circular

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Flight notes



5A

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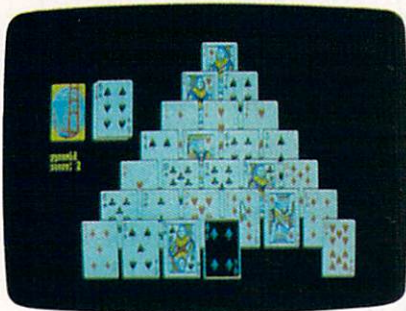
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sequence? Or what about Calculation, which has you build piles by calculating the next card to be played? And don't forget the very difficult Reno, which comes complete with a betting format. Children can opt for Concentration (matching pairs), Pairs (a simpler matching game), or The Wish, a matching game with a difference.



The outcome of the game is in the cards with *Solitaire Royale*.

The program uses solitaire's scoring system in its Tour and Tournament games. Tour, also named Aunt Anne's Game, has you play each of the eight games in succession and accumulate the highest possible score. Tour can also be chosen as part of a tournament; tournaments allow players to play against one another, all using the same shuffle. Such a tournament would be unthinkable without a computer.

Use menus to choose your games and options. The Start a New Game and Tournament menus are practically identical, allowing you the choice of the eight games or the Tour option. The Tour menu lets you continue to the next tour game, see your score, or see the high scores. The Help menu lets you start the game over, change your last move, or peek into a pile. The latter two options are particularly appropriate, since solitaire players usually are incredible cheaters. Help can also refresh your memory about what a particular pile of cards represents, give an introduction to solitaire, and describe how solitaire (in general) is played. More specific rules for all eight games are in the How to Play menu.

Children's games are selected from the Project menu. All games can be saved to disk.

Card players are a varied lot, and *Solitaire Royale's* Settings menu recognizes this. You can select from 12 colorful decks. Watch the hands as they're dealt, or select Fast Deal and have it done with. You can click on cards to move them, or you can drag them from pile to pile. Finally, and this shows the

designer's attention to detail, you can use a left-handed or a right-handed cursor.

The game won't let you make a mistake, and you can't cheat by removing cards from some piles and changing the order of others (there goes my strategy). You'll probably find yourself peeking often at the discard pile because, let's face it, you can't be expected to remember everything. And taking back your last move is an excellent way to find out the next card to be played. Remember, this is solitaire—you have only yourself to face in the morning.

Before trying out *Solitaire Royale*, I knew two solitaire games well and one other not so well. After many hours of play, I now know five quite well, and I'm working on the other three the game offers. Furthermore, others in my family have found the game addicting, and these are people who never—and I mean never—sit down with a deck of cards to play solitaire or anything else.

Solitaire Royale is a beautifully designed game, albeit on a somewhat strange topic. Its Tournament option may seem contradictory and not a little ironic, but it offers excellent competition. All I need now is a desert isle with an electrical outlet.

— Neil Randall

Solitaire Royale

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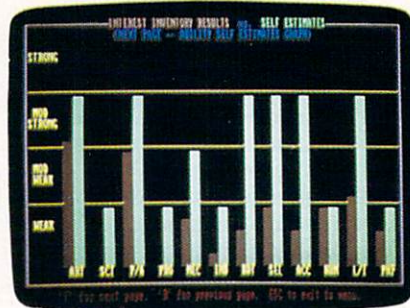
The Perfect Career

New to the work force? Looking for a new career path? Follow the trail laid by *The Perfect Career*, a computerized test of your skills and interests.

Mindscape's program is no *Cosmopolitan* quiz; it's a list of about 180 questions concerning your interests and work experience. For people who have no work experience, *The Perfect Career* tests interests alone. James Gonyea, the test's developer, is an experienced career counselor with many credits to his name.

From your answers, the program creates graphs that show how the results of your extensive Interest Inventory

test relate to the careers you find interesting. In the Interest/Abilities section, graphs show how your interests compare with your abilities. For example, you might be interested in a career for which you have no experience, or you might like a job in the arts, but your test highlights a strong aptitude for science.



The Perfect Career will help you compare your work interests with your skills and experience.

Navigation is menu-driven, which makes the program easy to use. At each crossroad, you choose your next move from a list of possibilities. One hitch is that, to go backward, you must retrace your steps—sometimes that means going back through several pages of text.

After you take your test(s), you must research the suggested occupations. The program provides a bibliography of occupational profiles that you can use to get started. You can also order occupational profiles from the U.S. Department of Labor for a nominal fee; *The Perfect Career* will compile a list of the profiles you want, based on your test results. The manual includes an example of one of these profiles; it's detailed and interesting, and it includes a discussion of salary, required skills, and trends that may affect the job market for a particular career.

Armed with all of this information and the forms provided in the manual, you can compare suggested careers with your interests, your goals, your likes, and your dislikes. Finally, you can define a career goal. The manual provides still another form that you can use to figure out what qualifications you're missing (like certification for certain jobs), to plan how to gain those qualifications, to rank them, and to hit the trail for your new job. Your parents would be so proud.

You won't be disappointed with *The Perfect Career*, but expect limits: It doesn't do all of the hard stuff for you. That's not really a problem; it's just that so many of us wish the job search could be easier. Mindscape could have included a database of more career infor-

mation, but that would greatly increase the size—and price, no doubt—of the program. Instead of the paper forms that come with the package, Mindscape could have stored them as interactive computer forms that compare information and draw conclusions for you. But again, that would have made the program awkward to use.

A more noticeable problem is the program's weak presentation of information. The program doesn't take sufficient advantage of the computer's presentation abilities. The questions are set up well, but in some portions of the program, you read several pages of text with no interaction and no graphics.

Keep in mind also that the main part of the program, the interest and abilities inventory, can become very tedious—it took me half an hour to answer the nearly 180 questions. After a while, you may find yourself spending less thought on each answer, making the second half of the test less accurate than the first. Although the program doesn't suggest taking breaks, it's a good idea to pause after answering a few screens of questions before you go on.

One danger of any standardized test is that you don't define your answers in the same way the scoring system does. This means you might consider a task interesting because you find it curious or unusual, while the computer assumes that you mean it's something you wouldn't mind doing every day. You need to be working with the same definitions. Gonyea tries to define the terms he uses, but they remain unclear. I got the best results when I defined an interesting task as something I would enjoy doing for an extended period.

Using a computer for career counseling has advantages and disadvantages. A computer can quickly calculate your career test scores and doesn't mind if you need to change your answers. However, it can't tell if you've lied about your experience or abilities or if you don't understand its questions. Ultimately, what you get out of *The Perfect Career* depends entirely on what you put into it.

— Heidi E. H. Aycock

The Perfect Career

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Jack Nicklaus' Greatest 18 Holes of Major Championship Golf

I confess. In years past, I've been guilty of golfer abuse. Why spend all that time and money chasing a little white ball over acres of carefully coiffed landscape when you could be fishing?

Then I discovered *Jack Nicklaus' Greatest 18 Holes of Major Championship Golf*, Accolade's newest golf simulation game.

Greatest 18 can make a golfer out of anybody—and not just with its exquisitely detailed courses or its realistic play action. This program does more than bring manicured turf to your screen; it puts that turf under your feet and a club in your hands. It confronts you with the decisions, challenges, and tension that make up the full golf experience. Before you know it, you're hooked.



Tee up with the best in *Jack Nicklaus' Greatest 18 Holes of Major Championship Golf*.

Two of the game's three courses—Colorado's Castle Pines and Arizona's Desert Mountain (Cochise)—were designed by Nicklaus, with all the challenge you'd expect from the master. The third, Jack's Greatest 18, is comprised of Nicklaus's 18 favorite holes from courses throughout the U.S. and Great Britain, such as Pebble Beach, Baltusrol, Augusta, and St. Andrews.

Realistic course conditions include sand traps, water hazards, and the rough that borders the fairways. Cart paths can make your ball take unexpected bounces, even off the flagstick. Since pin placement is random, no hole ever plays the same way twice. If all that isn't enough keep you on edge, Jack Nicklaus himself is lurking in RAM, watching your every swing. ▶

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The two play options are stroke and skins play. Stroke play is the more traditional game, in which you try to shoot the lowest total score over 18 holes. Skins play launches you into high-pressure, high-stakes one-on-one competition. Each hole has a cash prize attached to it, which grows as the game progresses. The lowest score takes the hole and wins the prize. The stakes and the tension rise fast.

Create your own male or female player, and the program responds with appropriate graphics. You can also specify whether you're a beginner or expert and from which tee you'll play. If you're a beginner, the program chooses your clubs, your shots are less troubled by wind, and your slices and hooks are less extreme. Experts get none of these advantages.

You can customize opponents or choose from a menu of nine preprogrammed golfing buddies, including the Golden Bear himself. It's a tremendous temptation to take on Nicklaus, but be forewarned: He's a magician with that golf ball.

Although you can practice your driving and putting on special screens, as well as try out individual holes, the real challenges come on the courses. Before you tee off, a maplike aerial view shows you what you're in for. Thereafter, you get a ground-level view, although you can toggle to the overhead view at any time.

Making a shot is straightforward. An onscreen flagstick shows you where the hole is located with respect to your ball. Aim your shot by moving an "aiming ball" right or left with the cursor keys. This lets you compensate for wind (with the help of an onscreen wind indicator) or, when putting, for the break of the green. (The break of the green is also indicated on the screen.)

Swinging is a three-part operation that makes use of a calibrated power bar. Tap the space bar to start your backswing; when you reach the desired point, press the space bar again to start your downswing. Press the space bar once more to make contact with the ball.

You have a lot of flexibility in your swing. For long drives, you'll want to go for the longest possible shots by bringing your club back to (or even beyond) the 100-percent full backswing point. Chip shots will call for less power. You can even intentionally hook or slice if the situation requires it.

The program isn't copy-protected, but you must answer an onscreen question about the documentation before you can play. Two wrong answers stop the game. The program does work with

monochrome graphics adapters, although a lot of realism is lost and some screens become hard to decipher.

Like all first-class simulations, *Jack Nicklaus' Greatest 18 Holes of Major Championship Golf* builds tension by building realism into every detail. You'll cheer when your shots fly true. You'll mutter when they don't. The only constant is the weather—if the snow's coming down outside, just bring the fairway in.

— Steve Hudson

Jack Nicklaus' Greatest 18 Holes of Major Championship Golf

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AlphaWorks

The integrated-software battlefield is littered with packages too weak to defend themselves from power users' demands and programs too unwieldy to make allies of computer novices. While *AlphaWorks* reigns victorious in some battles, it doesn't quite win the war. It's harder to use than either *Works* or *PFS: First Choice*, both of which can be operated right out of the box. A steep learning curve isn't necessarily a disadvantage, but if it doesn't translate into software power, the tradeoff can be casualties rather than capabilities.

AlphaWorks offers the standard integrated-package lineup and is meant to be the only program you'll ever need. Its word processor boasts page formatting, a spell-checker, and a thesaurus. The spreadsheet and database are compatible with *Lotus 1-2-3* (version 2) and *dBase III* files. Spreadsheet data can be translated to a graph. The communications package has a scroll buffer, which automatically captures each session. You can swap data among the applications.

The program does have one out-of-the-gate handicap: no mouse support. Not every computer user is a mouse user, of course, and many people prefer to use keyboard commands along with *AlphaWorks'* extensive Control key-

combination shortcuts. Still, users should have a choice, and *AlphaWorks'* screen setup is especially well suited to a point-and-click interface.

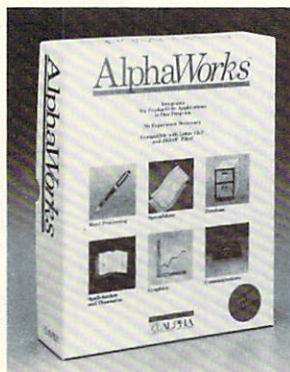
That omission isn't fatal, however, because the program achieves smooth integration and consistency through its keyboard commands. Each module features pull-down menus across the top of the screen that are tied to the function keys. Help is F1, while F10 toggles a series of pull-up menus located at the bottom of the screen. Those menus tell you which files are open in which modules; they also let you work within DOS or exit *AlphaWorks*.

The number of files you can have open at once is limited only by hard disk size, so most users—at least those *AlphaWorks* is targeting—will never run out of space. Of course, the more data that stays in RAM, the faster the program operates. Windows allow separate applications to be on different parts of the screen. This comes in handy when you're learning the program, as the extensive, cross-referenced online help facility can be put in one window and the application in the other. In addition, you can easily toggle between the modules with Alt-function key combinations, taking you to and from exact points in each program. As in *1-2-3*, the / key offers universal access to the menu structure.

Chances are that any single *AlphaWorks* user will favor one module, but the four-way toggle offers versatility, power, and easy control over computing tasks. Because of the consistency of commands, a user with strength in one area will soon develop prowess in another. For instance, if you use the word processor and database together, it won't be long before you master spreadsheet commands.

This characteristic, however, is part of any worthwhile integrated package. In this respect, *AlphaWorks* has no real advantage over *Works* or *First Choice*. If *AlphaWorks* has more powerful spreadsheet and database modules, much of this power will be unappreciated by the average home user who wants to manage simple computing tasks. Pure *1-2-3* and *dBase* compatibility isn't important to someone who wants to build a small database, finance plan, or writing application.

AlphaWorks' real advantage is its rich user interface. The top and bottom menus are a good idea, conveniently placing all the functions within the user's control. The ability to mix and match eight foreground and background hues is another clear advantage over *First Choice* and *Works*, each of



AlphaWorks puts six integrated productivity programs under one roof.

which offers an inflexible and unexciting color scheme.

AlphaWorks is a good idea for users who want to increase their computer's versatility. It can patch the gaps in your PC's ability and your own computer skill. It makes more sense to buy it than to purchase a low-end version of any of the singular modules. Still, anticipated updates to *Works* and *First Choice* may close whatever gap there is among these three competitors. Computer novices who haven't yet bought an integrated package will have to base their choice on their individual tastes and needs. As for power users, there's little in *AlphaWorks* to motivate a change from what they're already using.

— Charles Bermant

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Z88

If you've been dreaming of a laptop you can put on your lap without cutting off your circulation (and your checkbook), you can stop dreaming; it's here in the form of the tiny Z88, another offering from computer visionary Sir Clive Sinclair.

The number of small, lightweight, completely self-contained computers is on the rise. They offer enough software and memory to manage your time, let you take notes, communicate with other

computers, and generally do everything your pocket calendar or binder/time-planning system does, but with the added benefits of a computer.

Some cigarette case-size computers have laid claim to the personal-planner market, but they can't do the job because of their small, nonstandard keyboards. It takes a long time to press those little keys one at a time. What you need is a real keyboard—and the Z88 is the first tiny computer I've seen that has one.

The whole computer is smaller and lighter than the keyboard on my desktop PC, but it still has a great feel, lets me type as fast as I can, and is completely silent—no clickity-clack noises that are so obvious and annoying when you're taking notes during meetings.

The Z88's black rubber keyboard looks like one of those exotic prototypes you can see but never touch at trade shows. The soft rubber is silent, yet the feel is good even for fast touch-typists. It's great for meetings, classrooms, airplanes. If you absolutely need the click sound, you can set the Z88 to produce one (I prefer mine silent).

The keyboard design boasts big, easy-to-press keys. And, while they don't make noise, you can feel when you've hit them without wearing out your fingers. There's a giant Return key, plus helpful features like "sticky" Alt and Control keys that keep themselves pressed so that you can execute commands with one hand.

The super-twist liquid crystal display has good contrast, even in low light. It's small, but characters are easy to read. The left side of the screen shows a list of menus; the middle is reserved for typing or entering numbers; and the right side has what's called a "map" of the page: a tiny reduced version of your document that gives an overall view of the page.

Because the Z88 uses RAM and EPROM packs to store data, there are no disk drives to add weight or wear out batteries. The reusable RAM packs retain memory even when the computer is turned off, and the EPROM packs store data even when removed from the unit. In fact, they can only be erased by an EPROM eraser. While this seems inconvenient, it's a safe way to keep data without adding a lot of weight or using a lot of power. And the packs are less prone to damage and loss than are floppy disks and drives.

The Z88 includes word processing, spreadsheet, database, and scheduling software, along with a pop-up calendar, clock, calculator, programmable alarm system, telecommunications program

(VT52 emulation), and even BASIC. Because the word processor, spreadsheet, and database are contained within a single program, you can integrate your spreadsheet inside your word processing file.

While the Z88 isn't MS-DOS-compatible and won't run *WordPerfect* or *1-2-3*, don't underestimate the power of its built-in software, which will handle most of your chores on the road or in your lap. It comes standard with a paltry 32K of memory, but you can increase this to three megabytes. (You can buy 128K of memory for around \$90.)



The Z88 laptop combines the flexibility of a daily organizer with the power of a computer.

An additional program, called *PC-Link*, can be added in an EPROM pack, which makes 9600-bps (bits per second) transfer to and from PC programs easy. *PC-Link* also includes file conversion to *WordStar* and *Lotus 1-2-3* formats. From there you can use your word processor's conversion program, for example, to translate the *WordStar* files into your own word processor's format.

All the programs have the same interface, and most (but not all) have the same commands. When you're learning, you can press the MENU button for a list of all commands and their command-key equivalents. To use a command, use the arrow keys to move the cursor to it; then press Return. Once you've learned the commands, you can bypass the menus. Most of the commands are mnemonic and easy to remember.

Some functions aren't quite so simple. Because the word processor is also a database, breaking a line of text in the middle requires a special command rather than just a return. When you want to use blocks for copying, moving, or deleting, you can only block entire lines, not words or groups of words. Still, the word processor has all the major features you need, with cut and paste, search and replace, margins, justification, microspacing, and even ▶

word count.

The scheduling program is extraordinary. You can enter appointments for any time in the future and easily search for them. You can search for individual words or dates or view and print lists of appointments with a common search word. This can make billing easier by providing a list of all the dates and times you've visited a single client, or it can help you see exactly where you've been and when. The alarm system lets you mark important times up to a year in advance and will alert you even if the Z88 is turned off.

The Z88 has all the flexibility of a paper-based organizer, plus all the advantages of electronics, speed, searching, telecommunications, word processing, and number crunching. The wave of the future is in personal time management—and not just in software like Lotus' new *Agenda*, but in software/hardware combinations like the Z88.

— Daniel Will-Harris

Z88

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continued from page 9

Every Picture Tells a Story

More powerful personal computers, competition from videogame manufacturers, and a desire to expand the pool of buyers have combined to push text-based-game makers toward graphics-based adventures. As a result, game players are increasingly entranced by the sophisticated displays and complexity of recent game releases.

With *Shogun*, Infocom has taken another step in its own journey toward the perfect electronic story. Known as one of the premier publishers of computerized text adventures, over the last ten months the company has added graphics to its adventures. The result, says Infocom, is clearer computer/player interaction with enhanced puzzle solving and deeper story lines.

The company isn't leaving its history of text-based adventures behind, however. Rather, it's building on that tradition with graphics elements that enhance the story without distracting from the action. *Zork Zero* was one of the first graphics-directed stories out of Infocom. That game expanded its context by including graphics puzzles and games, like the Double Fan-



nuc card game, that were only described in previous Zorks.

But Infocom isn't content to rewrite old games or to release sequels. Joe Ybarra, vice president of product development, said that text-based stories and puzzles still make up the firm's main support, but the company wants to expand its horizons.

In the past, Infocom's role-playing games have leaned heavily on fantasy (dragons, dungeons, soothsayers, and such) or science fiction (the only good alien is a dead alien). But the company is eager to expand its inspirational base to other literary genres, and perhaps tap into films as well. Japanese art from the nineteenth century has been used to enhance *Shogun*, an indication of the illustrative role graphics play in Infocom products.

Moving into new story territory is possible in part because of the company's use of outside developers. Until last fall, the firm created all of its games internally, but its *Quarterstaff* and *BattleTech* games both came from outside sources. Last summer, the company hired a graphics art staff to work on illustrating future Infocom releases. Now that the development tools are in place, Ybarra expects Infocom to create its own adventures—of the *Quarterstaff* caliber—this year.

Besides illustrative graphics, Infocom games are also using more menus, a development which Ybarra said offers an advantage over games that use a parser. For one, it allows better interaction between the player and the computer. It also gives Infocom more control over the pacing of the sto-

ry. "In terms of computer storytelling, that's a more realistic approach," he said.

Looking into the near future, Ybarra said the complexity of the next generation of games could be a problem because developers may need a 3-to-5-year lead time to create stories, and user demand might change during the development of the game. "It's a situation of having a huge canvas to fill," he said. From text and graphics to artificial intelligence, designers will have a number of options. Ybarra said users may be looking at games encompassing as many as 10-15 floppy disks.

Infocom is also keeping a close eye on cartridge-game makers like Nintendo, who may one day release their own role-playing games. Only by exploiting the power of the personal computer, Ybarra said, can companies like Infocom maintain their standing in the game market.

But rapid hardware changes, a demanding public, and competition from videogame makers can't take away what Infocom sees as its mission, said Ybarra, which is to tell the best stories it can the best way it knows how. "The game is the story," he said. "The story is the game." □

— Peter Scisico

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Brøderbund, until now only a power in the software industry, has put its hand in a silk hat and pulled out a most amazing hardware hare. U-Force, a nontactile game controller for the Nintendo Entertainment System (NES), lets players fly, drive, and punch without laying a glove on anything. The U-Force controller is about the size of a scaled-down laptop, and when it's opened in an L-shape, its sensors detect movement and velocity within a quarter-sphere about a foot in diame-



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U-Force was created by David Capper, a former Mattel Toys executive; Stan Axelrod, a former electronics engineer from San Francisco's Exploratorium Museum; and Brøderbund. Scheduled for a spring 1989 release, U-Force will carry a \$69.95 price tag,

about the price of two NES game cartridges.

The device works with about 90 percent of Nintendo games, according to a spokesperson, but enhances only about 40 percent of the line. Demonstrations of the controller at the Winter Consumer Electronics Show in Las Vegas in January were impressive, and the teenager who swung fists and twisted wrists seemed to be enjoying himself.

So if you see some youngster convulsing in front of the television set, it's probably just the shake, rattle, and roll of U-Force. □

— Gregg Keizer

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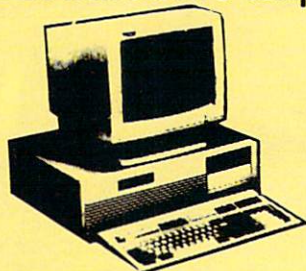
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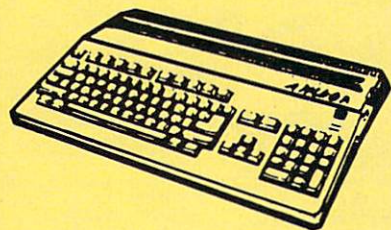
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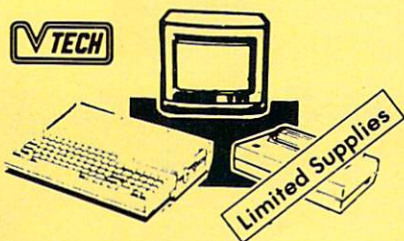
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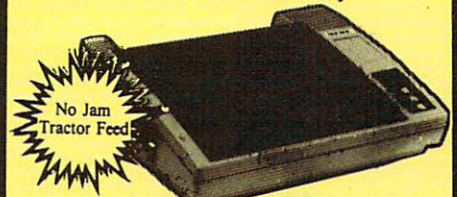
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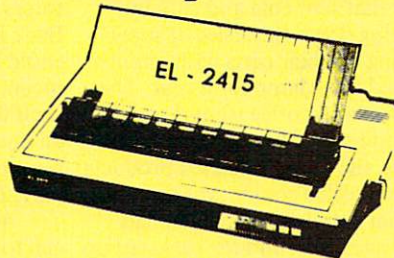


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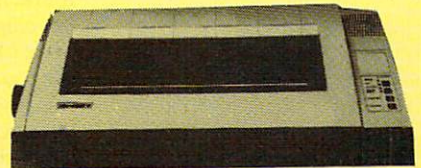
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continued from page 88

carp about this month's pet peeves.

My Macintosh and Amiga have been frequently making it clear that they're not at all satisfied with their measly megabyte of memory. I figure I need at least four megabytes of memory on the Macintosh so that I can replace the machine's various beep sounds with digitized sound bites from my favorite Three Stooges short. But no way will I shell out more than a grand per machine just so I can run killer animation demos on the Amiga or get *Hyper(hog)Card* up under *MultiFinder* on the Mac.

Last year's roller-coaster pricing of memory chips has settled down somewhat, but I remain rather pessimistic about the price stability of computer memory, even though I know in my heart that President Bush will make every attempt to delay any tax hikes so that each and every computing American can purchase his or her own million points of bytes. The entire chip-drought exercise is eerily reminiscent of the great sugar and coffee shortages of the 1970s.

To briefly recap, just before both the coffee and sugar scams—uh . . . shortages—relatively poor cane and bean harvests generated rumors that sent cola and caffeine junkies careening down the aisles of supermarkets, loading up their carts with enough beverage to hold the Alamo for a year. The price of soda pop and coffee went through the roof. The odd thing was that, during the imagined crisis, the price of related products with no sugar or coffee content rose as well. The price of diet soft drinks—which had nary a trace of sucrose—and tea rocketed up right along with pop and java prices. After the dust had settled, prices dropped slightly, but soon stabilized at a relatively high price with no apparent shortage to explain away the new support price. The phenomenon hasn't been limited to foodstuffs, either. An apparently innocuous remark by Johnny Carson about a toilet-tissue shortage triggered another nationwide wave of panic buying and subsequent price increases.

How bad can the price of memory chips get? A lot worse. Think you're paying through the nose for memory? Count your blessings. Be thankful that you don't have an industrial-strength IBM mainframe installed in your basement. For decades, corporate data processing types have been shelling out big bucks for the same silicon that you and I use to boot up flight simulators, spreadsheets, and word processors. Want to add 32 megabytes of main storage

to your \$5 million IBM 3090 processor? The \$270,000 list price seems commensurate with the system's overall price tag until you actually consider the cost of the raw materials involved.

Believe it or not, there's no real difference between the chips that we pack into our personal computers and the wadding that's used with the high-priced cannons. You and I can buy boxcars full of one-megabit 80-nanosecond chips for around \$40 each. Since it takes nine chips to make a megabyte (including a chip for parity checking), the raw cost of 32 megs of chips, without any kind of volume discount, is:

$$9 \times 32 \times \$40 = \$11,520$$

which leaves a cool margin of about a quarter-million for the manufacturer. Ever get the feeling you're in the wrong business? To justify that kind of markup, the printed circuit cards used to mount the chips must be die-cast from unobtainium, or be remanufactured Apple I system boards personally autographed by Wozniak and Jobs.

While we're talking about greed, I might as well vent my spleen at the current repair policies of most major PC manufacturers and their "authorized" repair centers. Back in ancient times (1982 or so), you could hand a broken machine over to a technician who would put the machine on the shelf for about a week, finally spend about an hour tracing the root cause of the hardware problem, and then replace the faulty \$2 part. Total cost? Fifty bucks, tops.

As microcomputers became more crucial to performing routine, everyday work, it became obvious that such a service mechanism was clearly out of step with the times. You can forget about bug-shooting down to the discrete component level. Computer service at most specialty stores has been remolded into the likeness of Dante's Inferno. Today, smiling glad-handers take your machine over the counter, toss it into the corner for at least three weeks (or until after your 15th frantic phone call, whichever comes first), and then simply replace the entire motherboard and major functional components at \$300 a crack until things more or less work again. Back at the factory, the real techs fix the broken part and send the board back out so it can be resold for another \$300. One service manager defended the practice as the ultimate in corporate responsibility. "Hey," he explained coolly, "think of it as high-tech recycling."

Right.



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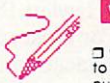
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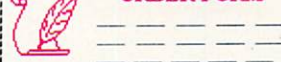


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I Usually Don't Do This, But . . .

Levitations

ARLAN LEVITAN

Even though a warm spell just before New Year's has removed any trace of the dreaded white stuff from southeast Michigan, several earlier freak blizzards and a quick glance at the *Farmer's Almanac* have sent me back to reviewing my elaborate plans for a computer-controlled snow blower. But a recent phone call from my editor unleashed the ultimate weapon against the legendary lateness of "Levitations" columns. "Miss this one, bud, and you'll be explaining to my kid why daddy can't go on vacation." Since explaining the gestalt of writer's block to hysterical three-year olds is a losing proposition, it's once more time to slide into my ergonomic high-back chair—the one that never fails to leave me with a smarting coccyx—and pound out this month's verbosity.

I'm going to try to hold the snappy patter to a minimum this month. Between Dan Quayle and my last few columns, I figure we've all had enough laughs to last until the second page of this column.

Besides politicians, I've grown tired of self-styled microcomputer gurus who write columns that tend to be nothing more than stream-of-consciousness commercials about the virtues of products they receive gratis from hardware and software manufacturers—products they've used for all of 15 minutes. That's why I usually refrain from using this space for hawking wares. Once in a while, though, I run into a product whose utility and value continue to impress, even after extended use.

I recently spent the better part of a week putting a half-dozen high-quality printers through their paces (see "Print That Page," November 1988) and came away from the piece as one of the Hewlett-Packard DeskJet's biggest fans. For those who have spent the last six months vacationing on Callisto, the DeskJet is an attractive alternative to both laser and 24-pin dot-matrix printers. The DeskJet uses ink-jet technology to lay print down on regular-cut-sheet paper: It literally sprays fine globules of ink at the paper to produce nice, tight characters and images with a maximum resolution of 300 dots per inch. Although the \$700 street price (\$995 list) of the DeskJet is decidedly more expensive than most midpriced impact printers, it produces copy that's virtually indistinguishable from the output of \$2000 laser printers.

The DeskJet qualifies as a long-term investment for most computer hobbyists. It can be made to work with just about every popular personal computer. I've personally used my DeskJet on a variety of IBM com-

patibles, Macintoshes, and an Amiga 500—all with excellent results. Apparently the DeskJet is also on speaking terms with Atari systems; I've seen STs laying down impressive stuff on DeskJets at several trade shows. If you want to amaze your friends who own Apple IIs and Macintoshes, hook up a DeskJet to either machine, using one of Orange Micro's Grappler interfaces. The DeskJet is well-supported by most software packages, since it's fairly compatible with the control codes used for the ubiquitous Hewlett-Packard LaserJet laser printer. The DeskJet takes a lot longer to print a full page of graphics than a laser and many dot-matrix printers do, but the image quality, price performance, and flexibility of the DeskJet have made it my favorite piece of hardware.

I recently discovered an extra "feature" in the DeskJet that I'd never run into before. Like some other printers I've tested, the DeskJet comes equipped with both serial and parallel interface connectors. Since the manual clearly states (in bold type, no less) that you shouldn't plug cables into both interfaces at the same time, I had been using a parallel printer switch to allow two computers to share the printer. But I tossed caution and common sense to the wind and hooked up my PC AT clone to the parallel port and my Macintosh to the serial port. I poised my battery-powered Armitron robot arm over the power-strip switch, set it in motion, and stepped back to watch from a safe distance. The robot arm nudged the power on and everything came up gracefully. With growing disbelief, I printed out a couple of pages of text from my PC using *Microsoft Word*. I then knocked out a half-dozen or so pages from *MacDraw* and took turns printing documents from each system for half an hour. To my surprise, the DeskJet faultlessly switched between the two computers automatically, with nary a hitch or wisp of smoke.

Aside from being kind of pokey, the DeskJet does have other quirks. The ink-jet cartridges are only good for about 500 sheets or so of text (about half that if your forte is dense graphic images) and are rather pricey at \$18 a pop. Also, DeskJet ink is water-soluble. A few errant drops of rain or coffee can make your creations look like Tammy Bakker's eyes after a good cry.

Well, anyone who knows me realizes that such an effusive amount of kudos must be balanced by a few brickbats, so let's shift into Andy Rooney mode and mindlessly

continued on page 86

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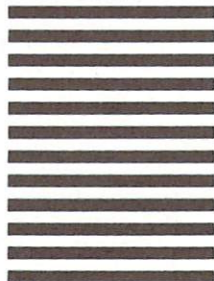
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