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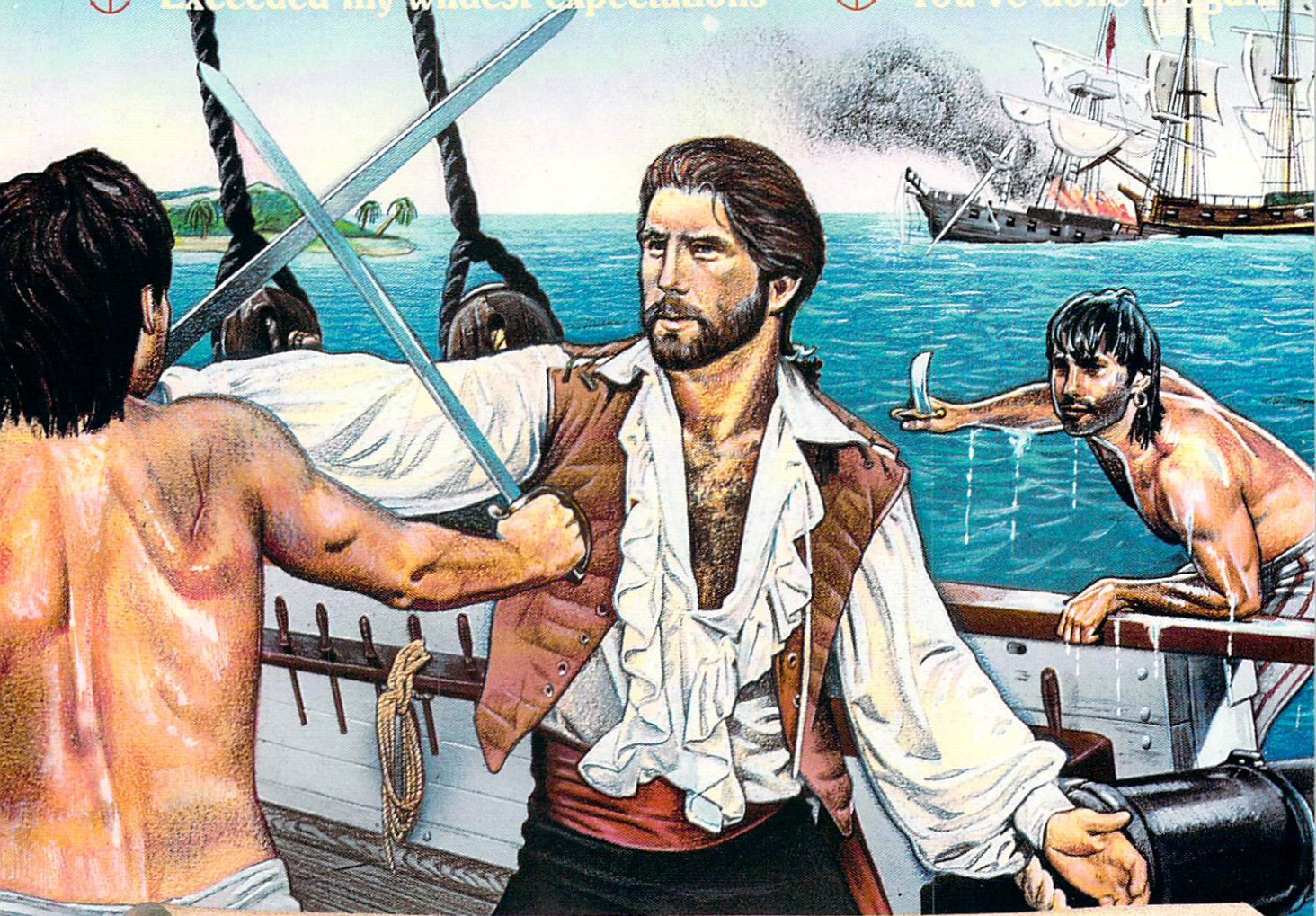
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⚓ "Exceeded my wildest expectations"

⚓ "Magnificent game"

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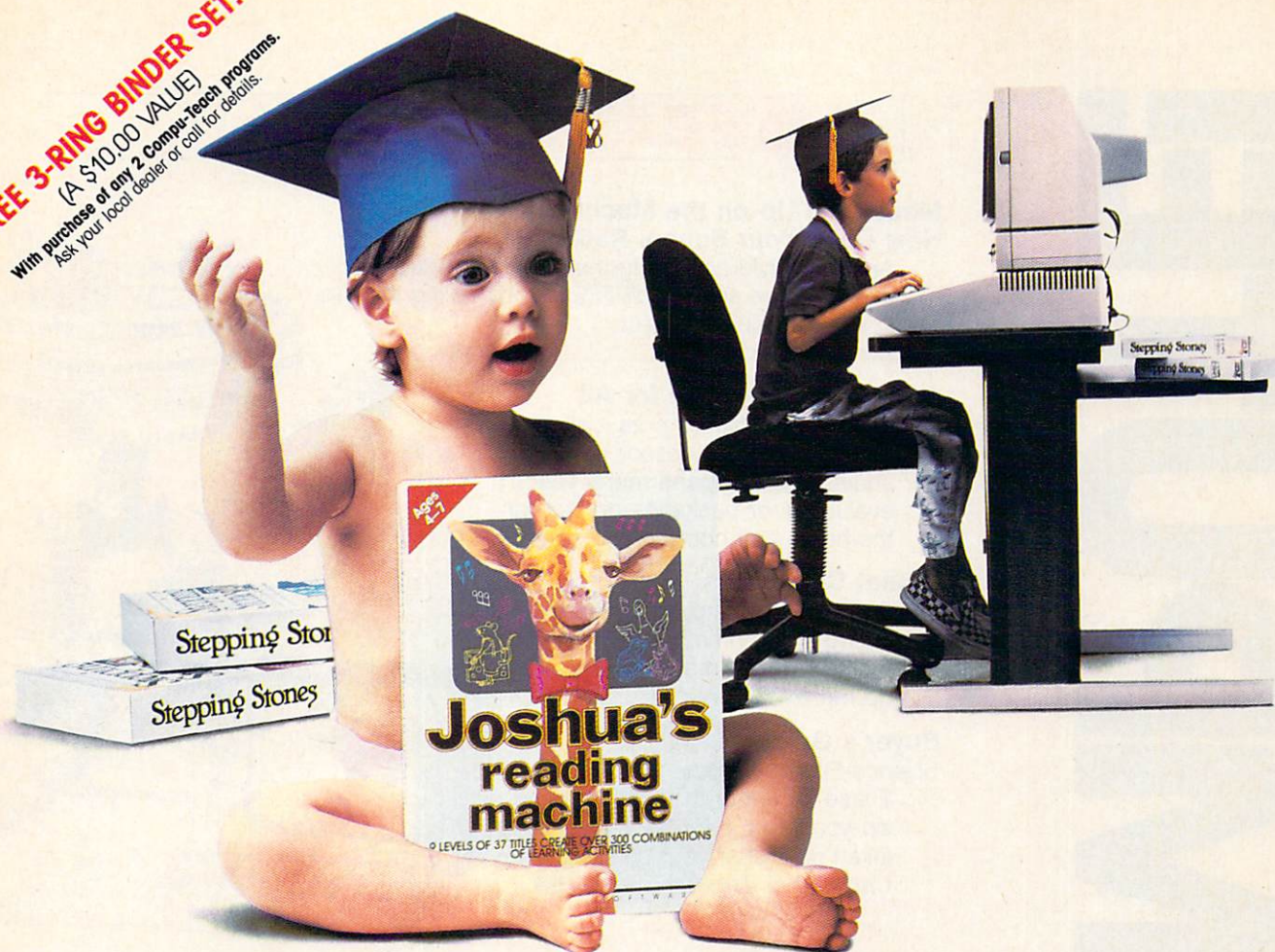
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OCTOBER
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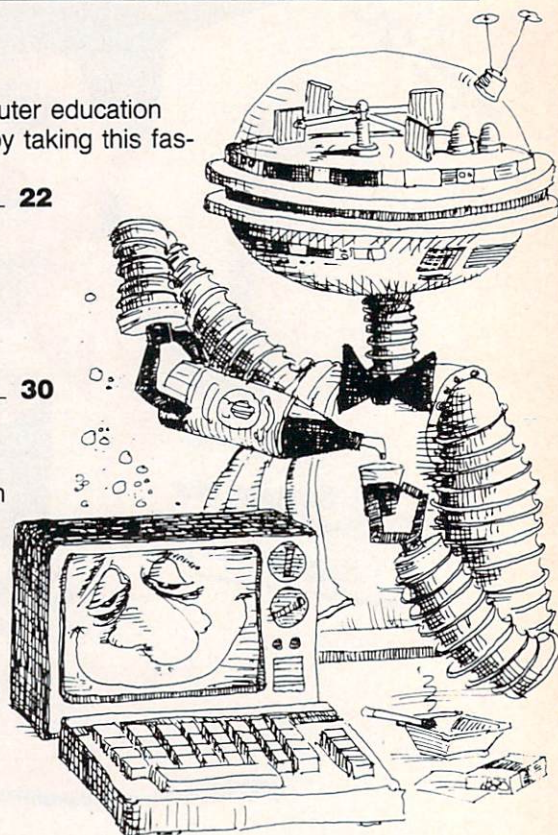
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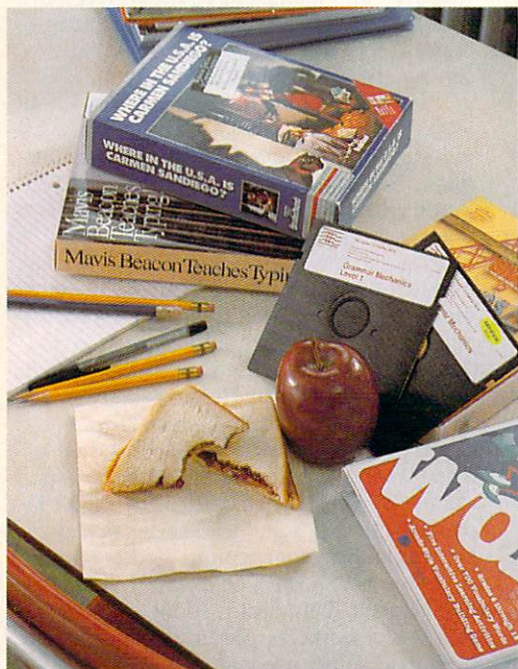
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editorial license

GREGG KEIZER



Put School Computers Where They'll Do the Most Good—On Teachers', Not Students', Desktops

I was once a teacher. It really wasn't that long ago when I was in the classroom, though now it seems an eon or more has passed. I think that's because of computers.

The eighties have been more than the years when personal computers made their assault on America. They've also been a decade that wasn't kind to teachers. The body politic seemed to blame teachers, and the system they worked under, for a variety of ills, ranging from mass illiteracy to teenage indiscipline. Committees studied, reports were issued, and teachers kept teaching. Changes swept the classroom and brought to education such new ideas as teacher testing, master teachers, and teacher accountability.

And something else brand-new found a home in most American schools: the personal computer. At first just a curiosity, then a tool for the select few, the personal computer somehow metamorphosed into the salvation of education. All of a sudden it was being touted as the next best thing to a personalized teacher, one that was forever patient and never demanding.

I missed much of the computerization of the classroom. Maybe that's why school seems so long ago—it was before the computer revolution hit its stride. When I left teaching in the early 1980s, my school, like thousands of others, had just barely begun to take the personal computer seriously. The one computer evangelist brought his Atari 400 into his classroom. It was on his desk, turned on, all the time—cranking out mid-term grade reports, quizzes, and who knew what else while all the other teachers were clustered around typewriters and the copying machine. The computer lab was a miserable little room with half a dozen Atari 800 computers (somehow, my school district hadn't followed most others into the Apple universe). The only kids allowed into the sanctum were those who had shown an aptitude for mathematics. Anyone else, no matter how artistic or creative, was kept out in the computerless cold.

And even when I had my own computer—an Osborne-1, full of 64K and packed with *WordStar*—I only brought it into my room to keep track of names for graduation. I didn't use it to do grades (a hand-held calculator sufficed) or to create class notes for the novels I was teaching. The machine had no impact on my classroom—never would, I thought, since it couldn't get up in front of thirty-five 15-year-olds and talk about semicolons, or sentence fragments, or the grace of prose in

Ray Bradbury's *Martian Chronicles*. If it couldn't teach for me, what good could it do me?

Computers can't teach. I believed that then, and I still do now. Computers are simply tools of the trade (that the trade may be accounting rather than teaching has little significance). Although drill-and-practice software, combined with a computer, can do wonders for thousands of children, it's not what I call teaching.

Teaching is a reaching out, one person to another. It doesn't really matter whether it's one-on-one or one-on-thirty: It's still eye-to-eye contact. And it's a proven system of learning, one that's thousands of years old. Until a computer can deal with as many questions as three dozen teenagers can devise in 50 minutes, until it can wander around a classroom peering over shoulders, stopping here and there to help or prod, it will fail miserably as a teacher.

What a computer can do best, as anyone who has used one can readily attest, is to bring order to chaos—not simply by storing information, but by making it easier to manipulate or retrieve that information. That logic applies to teachers and their desks just as much as it does to midlevel managers and theirs. Once schools recognize this and put computers where they belong—on teachers' desktops—we'll see the real computerization of education.

Give a machine to every teacher—or at least to each one who will take the offering—and let him or her use it to track attendance, keep grades, take notes, or schedule lessons. Better yet, connect all those computers so that English teachers can send messages to the math department, or so that physical education teachers can query the biology instructors. Let teachers view students' cumulative files on the screen in order to trace problems and head off potential difficulties. Give them the same software that makes my business life easier—programs for organizing and producing, such as *AppleWorks*, *SideKick Plus*, and *PaperClip Publisher*. Help them create the blizzard of paper—from tests and worksheets to progress reports and curriculum guides—that every teacher showers on a class. In other words, make them more productive, just as millions of workers in other industries have been made more productive.

Get teachers organized; free up a few minutes here, a half-hour there. Then let them do what they do best. Let them teach.

news & notes



Deep in the Heart of Texas

Four new Tandy computers made the spotlight in Ft. Worth on July 27 amid a major roll-out of hardware, software, and service products from the biggest consumer electronics company in the country. Two of the four machines are perfect candidates for the home, while the second pair are slated for sliding into businesses both small and large.

Tandy's two new models in its low-end 1000 series, the 1000 SL and the 1000 TL, have more memory, more in ROM, and more features than the machines they are replacing. Although they share the same case, one that's sleeker and has a smaller footprint (the space the machine occupies on the desk) than last year's, the SL and TL differ considerably once you raise the hood.

Crack the case, and inside the 1000 SL you'll find 384K of RAM, an 8086 microprocessor that runs at either 4 MHz or 8 MHz; five expansion slots; and a 5¼-inch 360K disk drive.

Look down at the motherboard and you'll see video chip support for Hercules monochrome and enhanced CGA (the latter includes a new graphics mode—640 × 200 resolution with 16 colors). Peer even deeper into the guts of the machine and you'll spot a 512K ROM chip that includes DOS 3.3, the new DeskMate 3.0, various drivers for video and mouse, and an 80,000-word dictionary.

Out front, there's a 101-key keyboard, one with a better feel and better audio and tactile feedback than Tandy's past keyboards offered. There's room for another drive, too, either in 5¼- or 3½-inch format. Glance around the back of the box and you'll see a headphone jack and volume control, a serial port, a parallel port, and, most importantly, a microphone jack.

Total price? For the system unit, which includes the computer and keyboard, \$899; with a monochrome monitor, \$1,049; with a color monitor, \$1,199.

The 1000 TL ("Now, if you have any good ideas what the letters stand for, please,

give them to me," said Tandy's Richard Lawson) differs in its microprocessor, memory, and disk drive. The TL uses an 80286 chip, has 640K of RAM on the motherboard, and offers a 720K 3½-inch drive. Its price is \$400 more than that of the SL: \$1,299 for the base system, \$1,449 with a monochrome monitor, and \$1,599 with a color monitor.

Specs aside, there are some aspects of the SL and TL that are particularly interesting to home and school users. Putting both DOS and DeskMate into ROM is an excellent way to make MS-DOS machines more acceptable to more people. All you need do is turn on the computer, and, within seconds, DeskMate appears. MS-DOS is thus hidden from the first-time user—not a bad idea.

The dictionary in ROM is another good move, especially for classroom users. Standardizing a dictionary—and, more importantly, making it available to everyone—means that spell checking will become even more widespread. Students using a Tandy and a word processor that takes advantage of the dictionary will immediately benefit. It would

be nice to see a grammar-aid program added at some point down the line.

Although they won't have an instant impact since they're heavily dependent on as-yet-unwritten software, the microphone input jack and the machines' sound support are the most dazzling additions to the 1000 line. Sound and speech digitization and speech synthesis are actually practical on the SL and TL with the inclusion of the 8-bit, DMA-driven analog-to-digital conversion and digital-to-analog conversion (ADC/DAC).

DeskMate now includes a sound editor—nothing fancy, but certainly enough to demonstrate the machine's new abilities and to whet users' (and developers') appetites. "The sound is recorded and displayed in a wave form," said Gene Schenberg, who leads the DeskMate team. "It can be cut, pasted, copied—just like you could any other data, just like text could in a word processor. I can cut a section out and paste it into a different sound." You can do sound sampling with the editor, inputting sound through the microphone at one of several rates. The higher the rate, the more often sampling occurs. Once a sound is sampled, it can be manipulated—run backward, for instance, if you're into hearing what Paul *really* said on *Abbey Road*.

With DeskMate and DOS in ROM, upgrades will be more difficult than simply sending away for another disk. That is the disadvantage of the ROM-based approach. It will be interesting to see how Tandy handles DeskMate updates on these computers.


The upper-end additions to Tandy's line of personal computers—the 3000 NL and ▶

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VS

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ONE ON ONE



the 4000—are 286- and 386-based machines, respectively. They're more powerful than the 1000 models, and more expensive. The 3000 NL runs at a clock speed of 10 MHz and with 512K of memory and seven slots (three 8-bit, four 16-bit), the NL costs \$1,699. Add EGA capabilities and a 20-megabyte hard disk and the price comes to \$2,798. That's more than competitive with the full retail price of an IBM 50-21 (\$3,995), the closest comparison from Big Blue. Tandy's 4000 is a new machine, offering a 80386 chip running at 16 MHz; a megabyte of memory; and eight slots. Equipped with a 20-megabyte hard disk drive, the computer costs \$3,498.

These machines are clearly aimed at small businesses and corporations. Home-office workers who require lots of processing power may be another market for the 3000 NL and 4000.

The significance of the 1000 SL and TL computers, however, shouldn't be lost amid the high-end business machines that Tandy is increasingly stressing. The SL and TL offer low-cost simplicity to users and new sound capabilities to developers. It may be a while before educational and entertainment packages push the Tandy hardware hard, though, if you look at the lag time of developers who took on the Apple IIgs's sound abilities.

Tandy's done its part in putting together an impressive hardware platform. Now it's up to the users and developers.

—Gregg Keizer

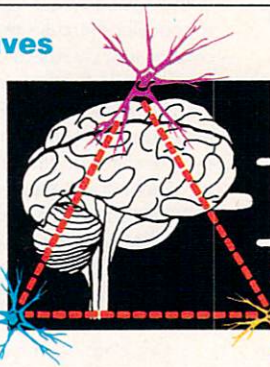
Riding the Brain Waves

Someday, scientists will give computers the equivalent of human intelligence. (Not today, though—don't hold your breath waiting for a program that turns your computer into an independent thinker.) Until then, future brain researchers can brush up on the subject with *The BRAIN Simulator*, a new program from Abbott, Foster & Hauserman.

The BRAIN Simulator illustrates how neuron circuitry works by emulating a small section of the brain. *Small* in this case means 1200 neurons and 5000 synapses. By imitating the electronic function of the biological neuron, the program shows how neurons are incorporated into the circuitry that makes us think.

The program visually represents a network of neurons by flashing each neuron when it fires. You can display, create, or modify sample networks or synaptic connections. Several neural models are provided with the program, including simple switching, memory, pattern-recognition, and learning circuitry. A booklet that explains the operation of biological neurons and how the software emulates them is also included.

Charles Simon, Research Director for Neural Network Laboratory and consultant



to Abbott, Foster & Hauserman, said that *The BRAIN Simulator* is "the first release in a series of products concerned with artificial intelligence." Though based on leading-edge technology, the program is, according to Simon, "an entry-level product aimed at a broad audience." He states the program's main goal: "To

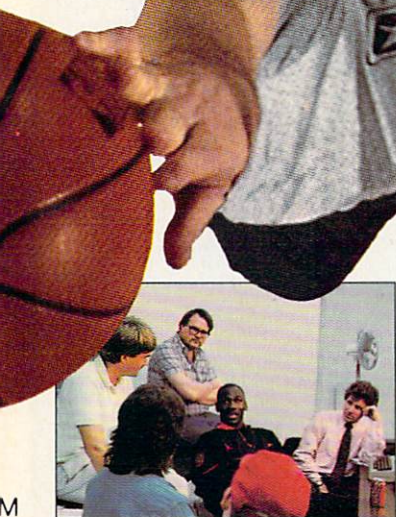
demonstrate that, with a vast array of simple processors, you can create complex things, such as memory, learning, and pattern recognition."

The MS-DOS program is similar to an earlier version that runs on a Sequent, a UNIX-based parallel processing computer. Simon describes parallel processing as a different approach to solving problems. Many scientists agree, seeing parallel processing as an important breakthrough. It allows computers to quickly solve complex problems by assigning parts of the problem to different processors.

If the past is any indication, this advanced technology will rapidly work its way down to the consumer. In the not-too-distant future, you may find that *your* computer has developed a mind of its own.

—David English

M



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The Chips Are Down— Or Are They?

The semiconductor shortage that sent prices for 256K and one-megabyte DRAM (Dynamic Random Access Memory) chips into the stratosphere seems to be easing, but reentry is still a ways off. "Prices have certainly stabilized, but we don't see them dropping in the near future," said Applied Engineering sales manager Tom Milks. Chip prices shot up nearly 150 percent on volume shipments before falling recently to stabilize at levels nearly 120 percent over summer 1987 prices.

The DRAM drought has expansion-board manufacturers such as Applied Engineering feeling the heat. Though Milks hopes for relief in early 1989, he fears that increased demand at Christmas may dry up the supply and raise prices again.

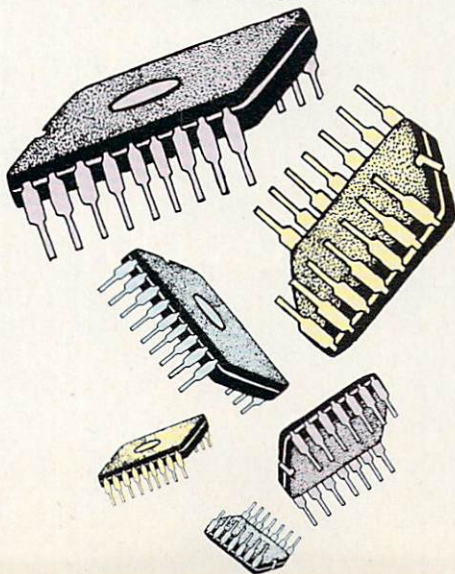
If that happens, vendors could pass on some of those higher costs to consumers, as they've already done in some cases. In the summer of 1987, Applied Engineering paid about \$2 apiece for 256K chips; 12 months later the price was \$10. To defray some of that five-fold increase, the company tripled what it charges for memory—the \$50 product now sells for \$150.

"Somebody has to dedicate some manufacturing capacity to 256K [chips]," said Ed Juge, director of market planning at Tandy. Tandy raised the retail prices for its chip kits several months ago because of the shortage. The firm has so far kept its computer prices

from rising, but Juge couldn't rule out a future price hike.

In-Stat, of Scottsdale, Arizona, tracks the semiconductor market and expects supply to meet demand early next year. Jim Nord, vice president of sales, doesn't think that Christmas will have much effect on the supply. "The semiconductor guys are running as hard and fast as they can," he said.

Nord said that more capacity is coming online at DRAM fabricating plants, which



will boost supplies. But even if the chip supply returns to normal by the first of the year, Nord said it may take another three months after that to fill the pipeline with back-ordered chips. That means price reductions on the retail level are still half a year away.

Tandy is guarding its supply of chips carefully. "We'll squeak through," Juge said. There's no solid evidence that chip supplies will be close to normal by 1989, he added.

The shortage's effects reach past expansion boards, according to Milks. Apple may have a problem promoting software that takes advantage of its IIGs's memory-intensive sound and graphics. The Macintosh might also suffer from a want of wafers. "People can't afford it [the necessary memory] or can't find the chips, period, to run HyperCard," Milks said.

On the IBM side, the release of OS/2, OS/2 Extended, and Presentation Manager are sure to increase chip demand. That could extend the shortage and perhaps even slow developers' and the public's acceptance of those products.

For buyers who want more memory, the message seems to be *Better some chips at a high price than no chips at any price.* "You might not want to wait until the last minute," Milks said.

— Peter Scisco
continued on page 97

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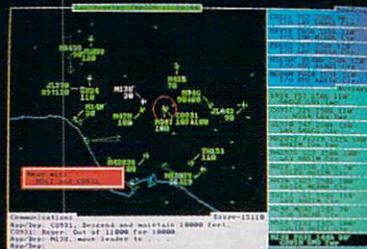
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gameplay

ORSON SCOTT CARD

Don't Treat Computer Game Characters Like Dirt— They Might Turn on You

It was my first visit to the first Atari computer store in Salt Lake City, back in 1980. I stood there for hours playing a new game called *Adventure*—finding the key, catching the bird, figuring out how to get past the snake, getting lost in the maze, and killing dwarfs.

I was fascinated, but even then I was dissatisfied. You see, I thought it was stupid just to fight the dwarfs. I wanted to *talk* to them, to find out what they wanted, to change the relationship. But *Adventure* was a kill-only game. You could see the dwarf and mash it, but that was about as subtle as it got.

A few months later, I read an article in *Byte* about the people who had developed a super text adventure called *Zork*. As the article talked about their efforts to enrich the game world, I realized that these guys weren't dwarf bashers. So I corresponded with InfoCom for a short time, suggesting the features that I thought adventure games needed.

I wanted more than just puzzles, prizes, and enemies in the world of the game. I wanted people there—all sorts of different people—who would respond to me according to my style of play. If I went into the world killing everything that moved, pretty soon the game characters would recognize me for what I was—a homicidal maniac—and band together so they could kill me in self-defense.

So I would soon learn to talk to the people I met, discovering just who they were. There would be thieves and spies, honest simple folk and wise thinkers, true heroes and out-for-a-buck sharpers. The program would keep track of how I treated all these people and build up an image of my character.

If I was greedy and dishonest, some good people would avoid me, while slimy types would gravitate toward me. Depending on whether I was altruistic or gullible or curious or cowardly, various people in the game would gravitate toward, victimize, hide from, or despise me.

When characters were not actually present, they would go on with their lives. Someone who had been slighted or helped by me early in the game might be rich and powerful later, able to avenge a wrong or return a favor.

In other words, I wanted the adventure game to become a real story, where independent characters lived real-seeming lives along with me.

My ideas were impractical at the time, largely because of limited RAM and disk size, partly because of the problem of unpredictable dialogue between the player and the people of the game. But it's been eight years since then, and now we're finally getting some games that move in the direction I wished for.

Star Flight (from Electronic Arts) lets you meet and deal with many different intelligent alien species. How you treat them determines how they treat you, so that learning the difference between different aliens is absolutely vital to surviving—and to winning. Though you deal with aliens as species, not as individual people, the effect is what I had been looking for—the game is different according to who you are.

Star Flight also solves the dialogue problem very cleverly by letting you select the tone and subject matter of your conversation from a list of choices rather than come up with random wordings of your own.

Another game that comes close to my real-people ideal is *Ultima IV: Quest of the Avatar*. The game designers found their own clever solution to the dialogue problem—the characters respond to keywords or ask yes/no questions, which gives a sense of real conversation.

More important, though, is the way the game judges the player's behavior. If you kill anything that moves, you can't win the game. Likewise, you must share with beggars and give blood at hospitals—gifts that really cost you money and strength. The result is a game that, without ever preaching, gradually shapes your behavior until you've turned your player-figure into a well-rounded, decent human being.

Both *Star Flight* and *Quest of the Avatar* are terrific games in every other way, too: They have good graphics, fascinating puzzles, clear and quick combat routines, and tremendous variety and imagination in settings, objects, characters, and possible events. But they feel like real storytelling to me because, as I play, I meet people who seem to have a mind of their own.

I'm still not satisfied, though. I want more depth to the game people, more of a sense of them living lives of their own, pursuing their own agendas, changing and developing over time. The developers of *Star Flight* and *Quest of the Avatar* have barely started on what I believe will be a long and fruitful road toward making the computer game a true storytelling art. □



impact

DAVID D. THORNBURG

As Computers Become More Powerful, We'll Move Beyond Technology and Touch the Application Itself

Educational computing is maturing rapidly. At first glance, one might think that the frantic rush to place computers in the classroom has subsided and that educational technology is not receiving the attention it once did. In fact, we're seeing a maturing of this field as the focus shifts from the technology to its application. This healthy shift in focus has extended into the far reaches of education, even to the fine arts.

During a recent trip to France, I came across a school that illustrates this shift quite well.

The Forum des Halles is a recently renovated shopping area in the heart of Paris. With the ancient church of St. Eustace on one side and the ultramodern Georges Pompidou Center on the other, the Forum is a blend of old and new—a multilevel mall that has blended modern architecture with lacy ironwork from another century.

On the second level of this building, there are studios of the ADAC—the Association for the Development of Cultural Spirit. These art studios are operated through the Paris City Hall and provide workshops and workspace for artists of all kinds.

From the first-floor activities in the areas of flower arranging and printmaking, you can climb a spiral staircase to the second floor, where the focus is on the use of computers in the arts. Artists have access to a variety of computers such as Atari STs, IBM-compatible workstations, and Macintoshes, including the Macintosh II. The blend of different media throughout the studio reflects an important philosophical point: Technology is being used to support artistic creation; it's not an object of study itself.

The ADAC has been in operation for a decade, supporting the acquisition of new skills, and its workshops are open to the public. Because of a long-term commitment to exploring new technologies, the ADAC created workshops in video, electronic music, and computers a few years ago. Computer workshops cover such topics as computer graphics, desktop publishing, computer-assisted music, and computer-assisted comic-strip design.

What makes these workshops different from those I've seen in the United States is that they approach the subject from the arts first and from the technology second. This puts technology in its proper place—as a tool, not as an object of study. This also places greater challenges on the technology;

if the computer can't be used to express an idea in the artist's mind, it simply won't be used at all. The walls of the studio are filled with samples of artists' work—silent testimonials to the unique features that make computer graphics a medium to stand beside, not replace, other media.

Ten years ago, any professional artist who wanted to explore the rich world of computer graphics needed to be close to a major university or industrial research laboratory in order to gain access to a powerful computer.

The pioneering work of John Whitney, Larry Cuba, and other artists all took place with the assistance of massive computer systems accessible to a limited number of people. More recently, artists who could afford it gained access to supercomputers like the Cray to express their ideas. Commercial films like *TRON* and *Star Trek* used the talents of artists who had access to the most sophisticated technology money could buy.

Unfortunately, until the introduction of the new generation of personal computers (the Amiga, Atari ST, and Macintosh, for example), most artists were unable to explore the computer as an expressive medium.

All this has changed. High-resolution color-graphics systems are affordable, and the availability of low-cost computers promises to have a significant impact on the fine arts—not as a replacement for other media, but as an expressive medium in its own right. But as the technology becomes more sophisticated, we encounter an interesting paradox: It takes more technical proficiency to operate a weak computer than to operate a powerful one.

The advances in user interfaces that came with the introduction of the Macintosh were not new—they were developed ten years earlier. The reason they hadn't been implemented is because easy-to-use interfaces require lots of memory and fast processor speed. Alan Kay once said that children need computers that are much more powerful than those used by adults because machines for children need to be easier to use.

Looking at the role of technology in education, it seems that the future is coming into clearer focus. As computers become faster and more powerful, they will start to fade into the background. They will allow their users to move past the computer's technology and touch the application itself.

As one artist said, "I'm not using a computer, I'm painting with light." □

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Letters

More Rude Games

Orson Scott Card's August "Gameplay" column on rudeness in computer games was great. As a freelance game designer (for various magazines), I've always been annoyed at silly design quirks that are easy to fix. Occasionally, it's not the programmer's fault. (Once a second-rate programmer at a magazine reworked part of a utility I had written and consistently spelled some keywords wrong in the output.) Often, though, it's just laziness and lack of concern with the finished product.

To give one example from a commercial game, in the Atari 8-bit version of Electronic Arts' *Racing Destruction Set*, there's a menu item in the construction set part which allows you to erase the track you are working on and start anew. Believe it or not, the menu option is out of the joystick-controlled cursor's range, so it cannot be accessed. I can't believe that a major company would make such a sloppy mistake.

After witnessing scores of other little-league errors, I've concluded that almost no one tests programs for any reasonable length of time. In the EA program above, the only way that error could have been left in was by not even trying out that menu selection before shipping.

Keep up the excellent column. I'm glad that someone is finally taking an intelligent look at computer games.

James Hague
Richardson, TX

Charlotte A. Taylor, of Electronic Arts, responds:

Your reader is correct. We located the same bug, and apologize for the error. Racing Destruction Set was released over 2½ years ago, and since then EA has adopted very rigorous and scientific testing procedures which have changed the process significantly.

Electronic Arts now has a QA [Quality Assurance] department dedicated to software evaluation. On the average, a product published by EA today goes through several hundred hours of testing before it is released.

As for the Racing Destruction Set

bug: Try picking up a blank tile and clearing the editing surface. The whole process takes less than ten seconds and has the same effect as the Clear function.

Commodore Controversy

I found your article "Around the World in 80 Columns," in the July issue of *COMPUTE!*, to be grossly inaccurate in several ways. Commodore may have half the installed units in West Germany, but the number 1-selling computer since early last year has been the Atari ST.

I traveled to West Germany over Easter. Every computer store I went into carried Atari. And most department stores and some appliance stores carried them also. Commodore's popularity seems to be on the decline there.

Frank Stinson
Whitehouse, NJ

The report of Commodore's popularity in Germany was based on several sources, including sales figures published each month in Chip, Germany's leading microcomputer journal.

According to Chip, Commodore is still the number 1-selling computer in Germany.

Balancing Act

In regards to the new format of your publication, I am still debating the pros and cons.

However, one thing that I find is that your publication is contradictory. One example of this is in the May 1988 issue, where Gregg Keizer chooses *Balance of Power* as one of the 20 best computer games, yet Orson Scott Card has the opposite point of view.

This does, however, challenge one's thinking.

Lois Scott
Lindon, CO

COMPUTE!'s editors and columnists are noted for having strong opinions. Indeed, we feel that COMPUTE!'s strength lies in the diversity of its staff, contributors, and readers.

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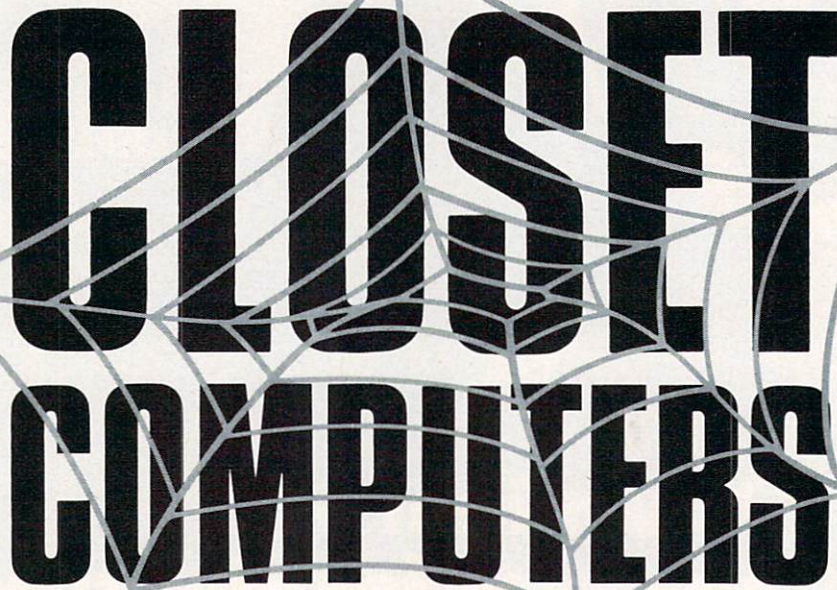
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CLOSET COMPUTERS



Got an old computer stashed away somewhere? It may not be as fast or as powerful as your new machine, but there's still plenty you can do with the machine that gave you the best eight bits of its life.

Tom Netsel

So you finally gave up on your old (*insert the name of your former computer here*) and upgraded to a shiny new (*insert the name of your dream machine*). While the new number cruncher merrily spits out spreadsheets at breakneck speed, your old clunker sits idly in a closet, stuffed between your Hula Hoop and your Pet Rock collection.

Is that any way to treat an old friend? Wasn't it with you as you battled your way through *Zork*? And what about all those letters and papers the two of you turned out on its word processor? Don't they count for anything? Didn't it give you the best eight bits of its life?

There's still life in those microcircuits. Just pull that old computer out

of the closet, dust it off, and put it back to work. It deserves better.

For one thing, you could give the computer to the kids or your younger siblings and let them use it as a game machine. Dealers still have programs for many older computers, and they often sell such software for a fraction of its original price. If you include some productivity programs, the kids may even use it to help them do their homework. That's reason enough to bring a computer out of retirement.

But if you decide to hang on to the computer, try one of these suggestions instead. Since it's no longer your primary computer workhorse, you can dedicate the old machine to a specific chore. How about turning it into a computer that does only one thing—a one-trick pony?

Robotics

Robby the Robot would have been proud.

Gordon McComb, author of several books on computers and robotics, including *Robot Builder's Bonanza*, finds old computers ideal for controlling the robots he builds in his Los Angeles home.

"It's a perfect use for them, and what's the use of computers gathering dust in a closet?" he said.

Older computers are well documented, schematic drawings are easy to acquire, and there's plenty of technical information available to help the hobbyist who wants to merge an old machine with other technologies. The accessory ports or slots found on most computers make it fairly easy to connect robots and computers, McComb said.

McComb uses a Commodore 64 and an IBM PC in his experimentation with robotics. "For a lot of my basic work, I use the Commodore because it's inexpensive and it's easy to program. And if it blows up for some reason, it's not too terribly expensive to fix," he said.

Popular robotics was a fairly dormant hobby in this country until about 18 months ago. With the strong proliferation of low-cost computers, interest is mounting. However, many hobbyists still buy their interfaces and components from dealers in Europe and Great Britain.

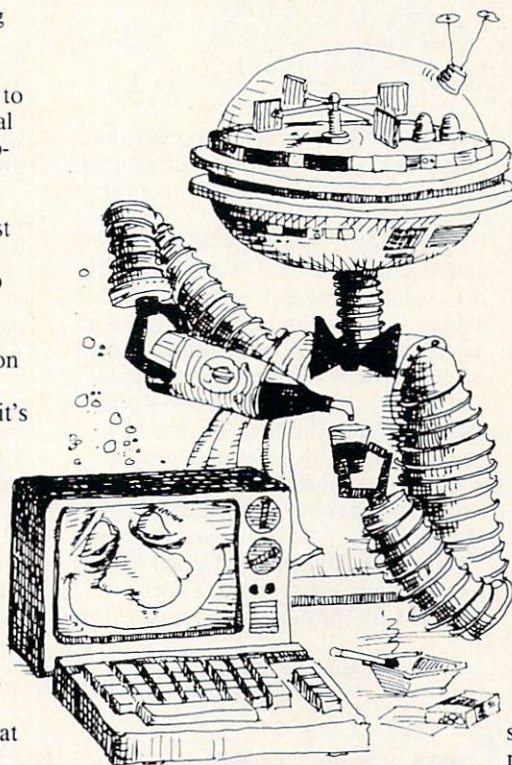
Schools are also taking a look at robotics as adjuncts to regular computer classes. After studying computers for a couple of years, students tend to get bored, McComb said. A logical progression in computer education is to interface computers with the outside world. "And the robotics angle is sort of a real snappy, sexy way of doing it."

McComb uses several robots for mapping rooms and maneuvering around them. One is a stationary robot arm, run by stepper motors. It's a miniature version of what you might see in a Detroit automobile factory. Instructions downloaded from the 64 guide it through a variety of chores.

"I have programmed it to mix drinks," McComb said, "but it doesn't know what it's making, because it

doesn't have a vision system." He's heard of one robot in San Diego which dispenses drinks from a carousel. It supposedly picks up bottles, turns them over, and times the liquid flowing through a spout to judge the correct amount needed to fill a glass.

McComb has built several mobile robots, which range from simple turtle models that crawl around a tabletop to more sophisticated, walking robots.



The latter ones were more complex because of the mechanics involved, but they didn't have much brainpower. One model could walk, and it looked impressive, but that was about all. "It was a pretty stupid robot, actually," McComb said.

McComb devotes most of his time to a robot that has the IBM for a brain. It's about one-third the size of R2D2, the smaller of the two *Star Wars* robots, and it rolls on two wheels. McComb uses it for demonstrations and for teaching. "I wanted something that would be about toddler size," he said. "Kids could come up to it, and it wouldn't be so looming that people would be frightened of it."

He has applications planned for

making a robot perform security checks and act as a fire alarm, but that's the next stage in its development. Weight is a major problem in robot design since each added ounce increases battery drain. Larger batteries provide more power, but they also weigh more.

Much of McComb's actual work with robotics doesn't go into finished robots. McComb uses a PC-controlled test bench that simulates a robot. He uses this setup to develop functions and applications such as a simple vision system and an ultrasonic ranging device.

That's where the fun is for McComb, but most people usually prefer watching his robots go through their bags of tricks. "It's always neat to see your robot creations scoot around the floor," he said, "particularly when you're trying to show your wife where all the money's been spent."

Companies such as Heath and Fischertechnik produce sophisticated robot kits, but McComb prefers assembling his own creations from scratch. "I'm sure I've spent much more money on my robots than I would have on the Heath, but to me there's joy in creating something for myself."

McComb's book, *Robot Builder's Bonanza*, is a collection of plans that show how to build various systems and controls that go into assembling a robot.

It's a basic text that shows inexpensive and simple interfaces for stepper motors, DC motors, and speech synthesizers. McComb likens the collection of robotic building blocks to a computer programmer's collection of subroutines. *Robot Builder's Bonanza*, published by TAB books, is available in most major bookstores.

For further information about interfaces, circuit boards, and robots, contact Alpha Products, 242 West Avenue, Darien, Connecticut 06820; call (203) 656-1806 for technical information, or (800) 221-0916 for orders.

Amateur radio operators are additional sources of technical information, McComb said. "If people are at a loss about how to do something on an interfacing level, they should check out some of the amateur radio uses of home computers. Hams have devised controllers for almost everything." >

Shortwave Listening

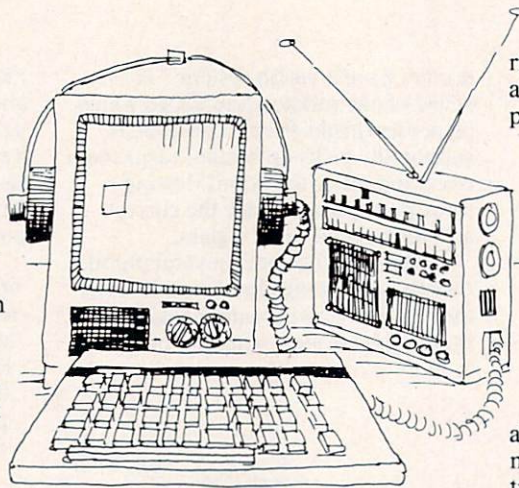
"And ham radio operators are known for being cheap," McComb said, laughing. They practically never throw away outdated electronic equipment. Rather than letting an old Sinclair or VIC-20 gather dust, hams often use such a machine to further their interest in shortwave radio, he said.

While some amateur radio activities require a federal license, you don't need a license to listen to shortwave transmissions. This is an area where computer owners can use older machines and gain an introduction to the world of digital communications.

If you have a shortwave radio, you've probably heard numerous incomprehensible coded tone signals as you've tuned through different wavelengths. Many of these signals are digital data transmissions from ham radio operators, weather services, and news organizations using Morse code or radioteletype.

Unless you're proficient at copying Morse code or you own expensive teletype converters and printers, these signals are just so much noise. But there is a device that will let your computer handle the translations for you.

G and G Electronics sells a shortwave listener cartridge, the SWL, that



automatically converts these electronic beeps to English text which subsequently appears on your computer monitor or printer.

The SWL cartridge (\$64) plugs into a Commodore 64 or 128 and connects to a radio's speaker or earphone jack. It comes with a demo tape and a radio-interface circuit that copies Morse and all speeds of radioteletype transmissions.

Once you start listening to worldwide communications, you may find yourself bitten by the amateur-radio bug. To become a full-fledged ham operator, you have to get an amateur license, which means you need to know Morse code. To help you master Morse, G and G also offers Morse Coach (\$49.95), for the 64. This cartridge tuto-

rial takes you from knowing nothing about Morse code to being reasonably proficient at sending and receiving.

Once you have a license, hang on to that old VIC-20 or 64. The AIR-1 for the VIC-20 is a complete cartridge-based transmitting and receiving system. It originally sold for \$279, but G and G now sells it for \$125. Like SWL, the AIR-1 cartridge takes incoming teletype and Morse signals and converts them into plain text on your monitor; it also handles transmissions. Type a message on your computer, and the cartridge sends it out in Morse code or teletype through your shortwave transmitter.

ART-1 (\$199), similar in function to the AIR-1, comes on disk for the 64. Morse sending speeds ranging from 5 to 100 words per minute can be controlled via the keyboard. Both systems are compatible with CW, ASCII, Baudot, and AMTOR modes of digital transmission.

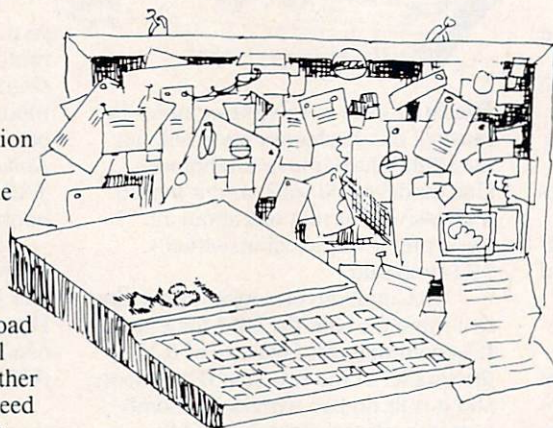
Many hams who don't have computers buy used ones just for their hobby. "You can pick up a used VIC-20 at a garage sale for \$20 or \$30 and dedicate it to your ham radio station," said G and G spokesman Jeff Goldman.

For more information about these products contact G and G Electronics, 8524 Dakota Drive, Gaithersburg, Maryland 20877; (301) 258-7373.

Bulletin Board Systems

Another type of digital communication involves connecting computers via telephone lines. Thousands of people enjoy using their computers to run electronic bulletin board systems (BBSs). There are a variety of BBS programs that let other computer owners read and post messages, upload and download software, buy and sell items, and participate in dozens of other activities. To set up a BBS, all you need is a computer, an autoanswering modem, the appropriate software, and a telephone. You can run a BBS on any brand of computer, even an old model dragged out of the closet.

Bob Cutter uses a Timex 2068 (a long-discontinued computer) and a tape



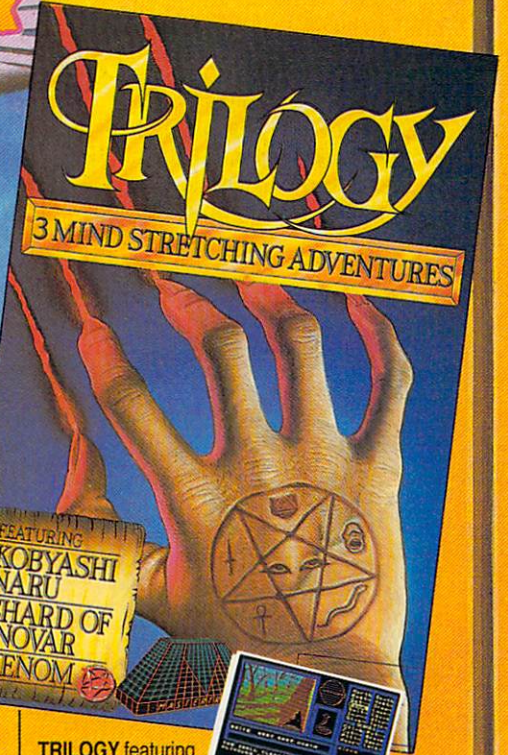
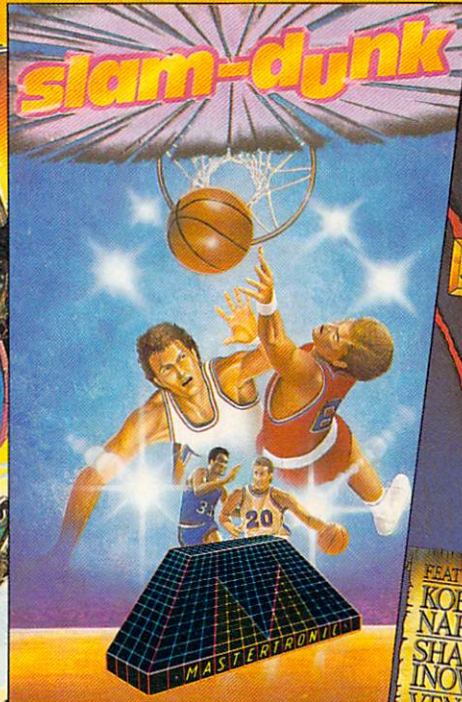
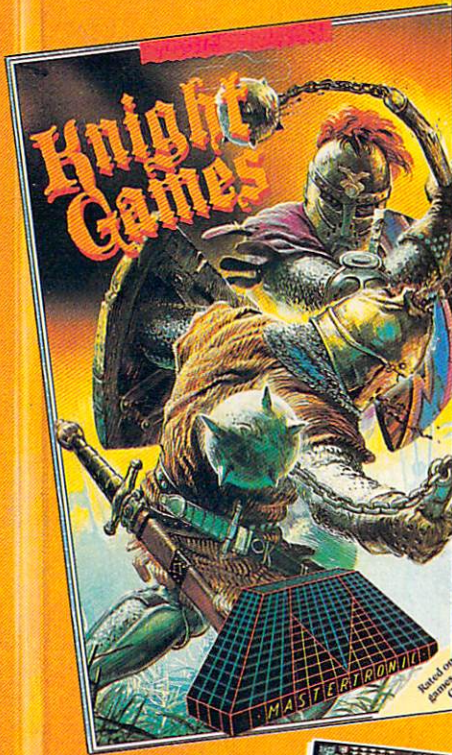
drive with a 2050 modem to run the Flexi-Board BBS in Arlington, Massachusetts. Cutter says his board is "dedicated to all Timex/Sinclair users in America!" If you'd like to get in touch with other Timex users, give the Flexi-

Board a call at (617) 648-7651. It operates 24 hours per day at 300 baud. Cutter has about 28K of memory available for messages, so he doesn't have room for software for uploading or downloading.

If you'd like to exchange public domain Timex programs, try calling the Time Warp in Des Moines, Iowa. It's a larger Timex BBS, run by David Youngquist. Youngquist, who works with emotionally disturbed children in a Des Moines hospital, started his BBS on a Timex 2068 about 18 months ago.

Time Warp runs at 300 baud on a 2050 modem, but Youngquist is working toward boosting its rate to 1200 baud. "There's a lot of real inexpensive hardware kits to build additions for it."

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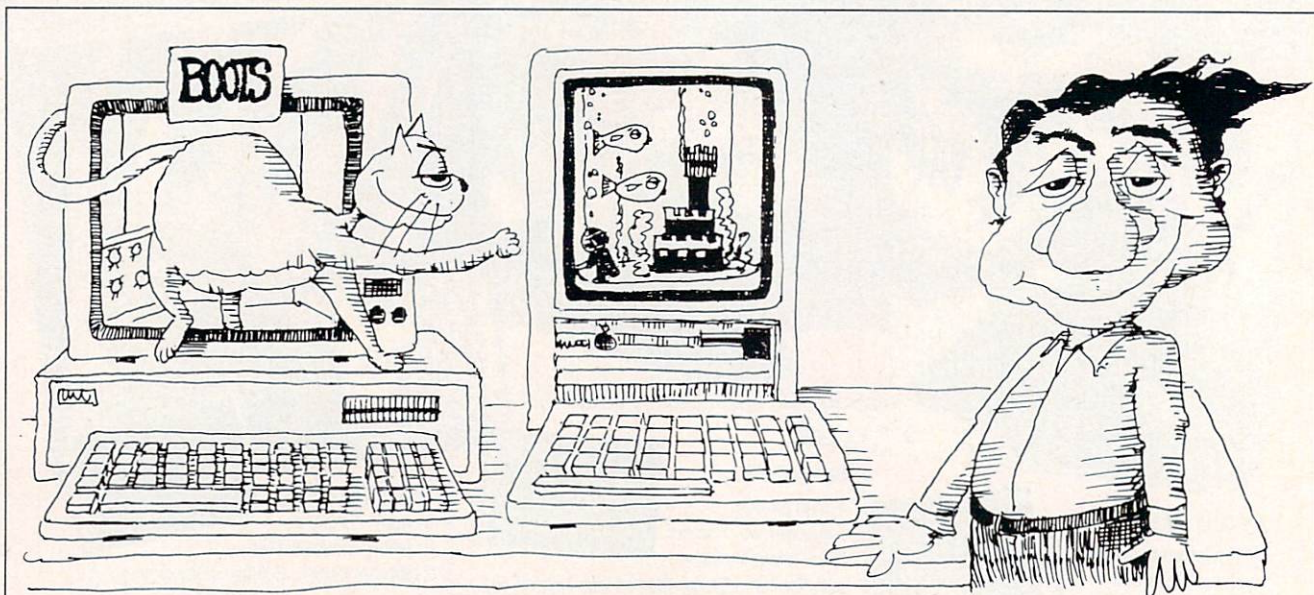
he said. "One of those is a high-speed RS-232, which you can hook up to any standard Hayes-compatible modem to go as fast as you like." Youngquist is building one for his BBS. Other equipment includes a disk interface for two 5¼-inch Mitsubishi disk drives and an EPROM programmer.

Timex owners who would like to learn more about operating their own BBS, those who'd like to download and upload public domain programs, and

those who'd just like to exchange messages with other Timex/Sinclair fans are invited to call Time Warp at (515) 282-4169 and log on with the password *GORT*.

Since the Timex 2068 is a redesign of the British-made Sinclair Spectrum, it accepts plug-in firmware, and Spectrum's ROM is easy to install. With the new ROM, it's possible to run all the European software that's still being produced for the British machine. Young-

quist deals directly with several European dealers, but he also recommends that Timex owners check with Curry Computers, P.O. Box 5607, Glendale, Arizona 85312-5607, (602) 978-2902, for Timex/Spectrum titles, or Sunset Electronics, 2254 Taraval Street, San Francisco, California 94116. A file on the Time Warp board called "Sample of North Shore BBS" contains a listing of Timex dealers, repair facilities, addresses, and telephone numbers. ▸



Old Computers Make Great Pets

Do you need more ideas on how to use your old computer? We found some people who were recycling their oldest machine in *really* unusual ways. If you're brave, you might try some of the following. Let us know how they work out.

1. Car care. Keep two 8-bit computers in the trunk of your car and use them as wheel chocks when you change a tire. If you have two old computers with built-in monitors, use them as ramps when it's time to change the oil in your car.

2. Couch-potato helper. Set up any old computer beside the couch, near the TV. Have the monitor face your kids. To change the channel, type in the request and order your kids to follow the instruction. They'll run across the room and switch stations. You can also use this remote control device to get snacks from the refrigerator.

3. Perfect pets. Did you ever wish you had a maintenance-free pet? Turn that old

computer into an animated aquarium. You can have colorful, tropical fish swimming around, and you won't ever need to clean the tank.

4. Cat nap. Maybe you already have a pet—like a cat. Tear out the guts of your old friend (the computer, not the cat). Sew some cushioning in the empty shell and you have a comfortable bed for your faithful companion (the cat, not the computer).

5. A better mousetrap. You don't have a cat, but you *do* have mice. Find a stick—any stick, nothing fancy. Grab your old computer, preferably a heavy one. Get a hunk of cheese. Prop the computer up on the stick, place the cheese under the precariously constructed lean-to, and wait. Sooner or later a mouse is bound to scurry into the trap. (Mice always fall for the cheese-in-the-trap trick.) In a hurry to get to the cheese, the mouse will bump into the stick. Thump! End of mouse.

6. Time out. Turn your old computer into a digital clock—but not just any digital clock. This clock rings alarms at various times of the day. You can use it as a timer or as a stopwatch. It can even tell you how many hours are left in the workday, how many hours you've been alive, and how many shopping days are left until Christmas.

7. That's prime. For decades, computer scientists, hobbyists, and other misfits have searched for the highest known prime. Controversy about whether the number 1 is a true prime has opened up a whole new search. Reader J. Dren from Sioux Falls sums it up this way: "I used to look for the highest prime, but the numbers barely fit into my VIC. Looking for the lowest prime is more fun." Dren sent us his latest program. "It's not quite there," he says. "But I'm close."

```
10 IF RND(0)<.5 PRINT "LOWEST PRIME IS 1":END
20 PRINT "LOWEST PRIME IS 2"
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— Heidi E. H. Aycock

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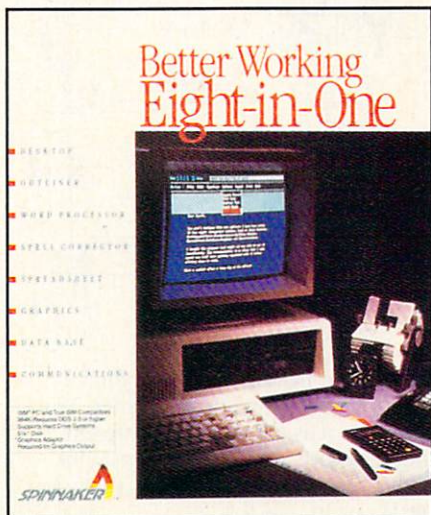
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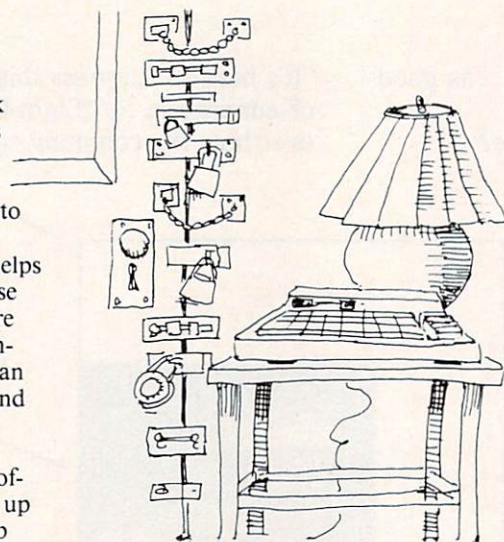
Home Control

Why not put your computer to work making your home secure and a less likely target for burglars? Even if your computer is gathering dust on a shelf, you don't want someone to break in and steal it, do you?

The *X-10 Powerhouse System* helps deter intruders by making your house look more lived in, even while you're away on vacation. Your Apple, Commodore, IBM, or IBM compatible can then turn lights and appliances on and off anytime you like, any day of the week.

It's also handy for turning on coffee pots and stereos so you can wake up to coffee and music. It will even skip the early music on the weekends if you want to sleep in. The *X-10 Powerhouse* will turn on hall lights, adjust the thermostat on your air conditioner, and even dim lights or turn them off entirely.

The *X-10 Powerhouse* controller sends digitally encoded signals over existing household wiring to control lights and appliances plugged into special modules. Modules are available for wall switches, thermostats, and 110- and 220-volt appliances. They respond to



signals sent from a controller you've programmed with your computer. You can control as many as 256 different modules with a PC or Macintosh, 95 with a Commodore, and 72 with an Apple II.

Programming the modules is easy with the *X-10 Powerhouse* software. Using a joystick or mouse, simply point to the room and appliance you want to control. Program different modules to

go on and off at various times on different days of the week, or group modules and program them to go on together. For example, you can have the air conditioning come on 30 minutes before you arrive home from work Monday through Friday, or you can have the dining room light come on Friday and Saturday nights at 8 p.m., dimmed to 50 percent. You can even program a light to turn off hourly if people in your household tend to leave it on when they exit the room.

Once you've programmed the modules, an interface takes over and frees your computer for other uses. The interface plugs into any wall socket and has a battery backup to protect its memory in case of power failure.

An *X-10 Powerhouse* kit includes the home control interface, software, a connecting cable, a programming guide, and an instruction manual. It has a suggested retail price of \$49.95. The price for a lamp module, appliance module, or wall switch is \$14.95.

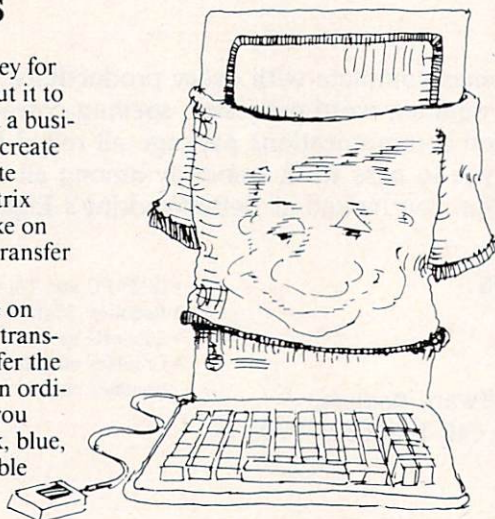
X-10 offers numerous burglar alarms, telephone responders, and other controllers. For more information, contact X-10, 185A LeGrand Avenue, Northvale, New Jersey 07647; (800) 526-0027.

Custom T-Shirts

You probably spent a lot of money for that old computer, so why not put it to work earning a few dollars? Start a business selling custom T-shirts you create with your computer, your favorite graphics program, and a dot-matrix printer. Draw any picture you like on your computer screen and then transfer the image to a T-shirt.

You simply print the picture on regular paper with a special heat-transfer printer ribbon and then transfer the iron-on image to a T-shirt with an ordinary iron—or a T-shirt press, if you have one. Ribbons come in black, blue, brown, or red ink, and are available for most popular printers at prices usually less than \$10.

If you want more realistic images, connect a video camera to a digitizer, such as ComputerEyes, and put faces on T-shirts. Even if you don't do it as a business, you and the kids can have a lot of fun wearing your own creations.



One source of heat-transfer ribbons is Renco Computer Supplies, P.O. Box 475, Manteno, Illinois 60950; (800) 522-6922 or, in Illinois, (800) 356-9981. Prices range from \$4.50 for an Okidata

spool to \$8.00 for a Star NX-1000 cartridge.

Out of the Closet

These are just a few uses for all those perfectly good computers that are gathering dust. Haul that old computer out of the garage, bring it out of the back room, and put it to use. You spent a lot of money on that machine—use it as something better than a paperweight for old newspapers.

There are still plenty of games, programs, and applications for those Ataris, PCjr's, TI-99s, and other machines whose times have come and gone. Check with dealers, bulletin boards, and user groups for commercial and public domain software.

They say you can't teach an old dog new tricks, but you *can* teach old computers. □

Tom Netsel is an assistant features editor with *COMPUTE!*.

WINNER!

Best Educational Program

With *Designasaurus* from Britannica Software your child will see dinosaurs come alive with sights and sounds* that will astound you. *Designasaurus* recently won BEST EDUCATIONAL PROGRAM and BEST PRESCHOOL or PRIMARY PROGRAM categories of the SPA's Excellence in Software Awards.

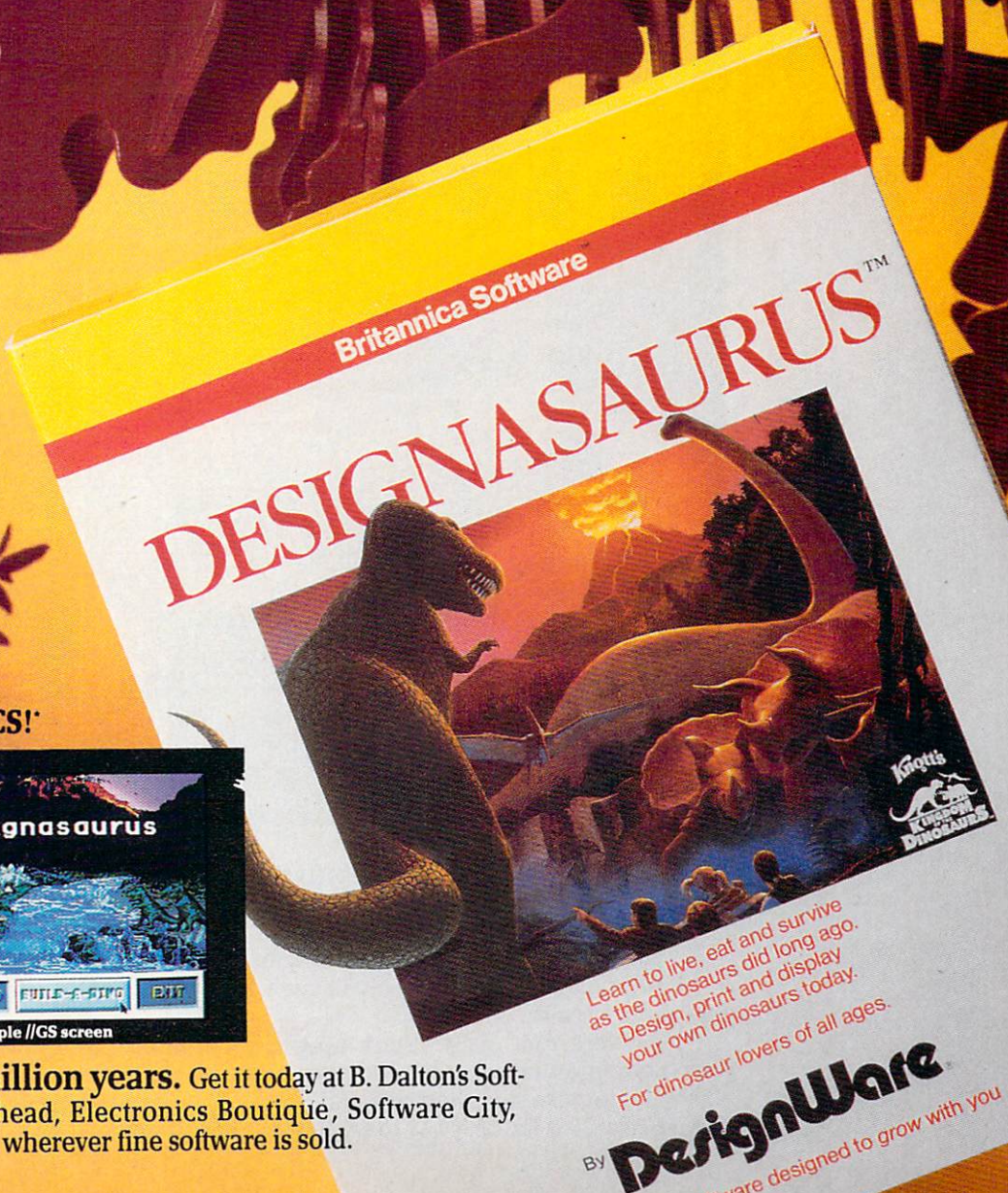
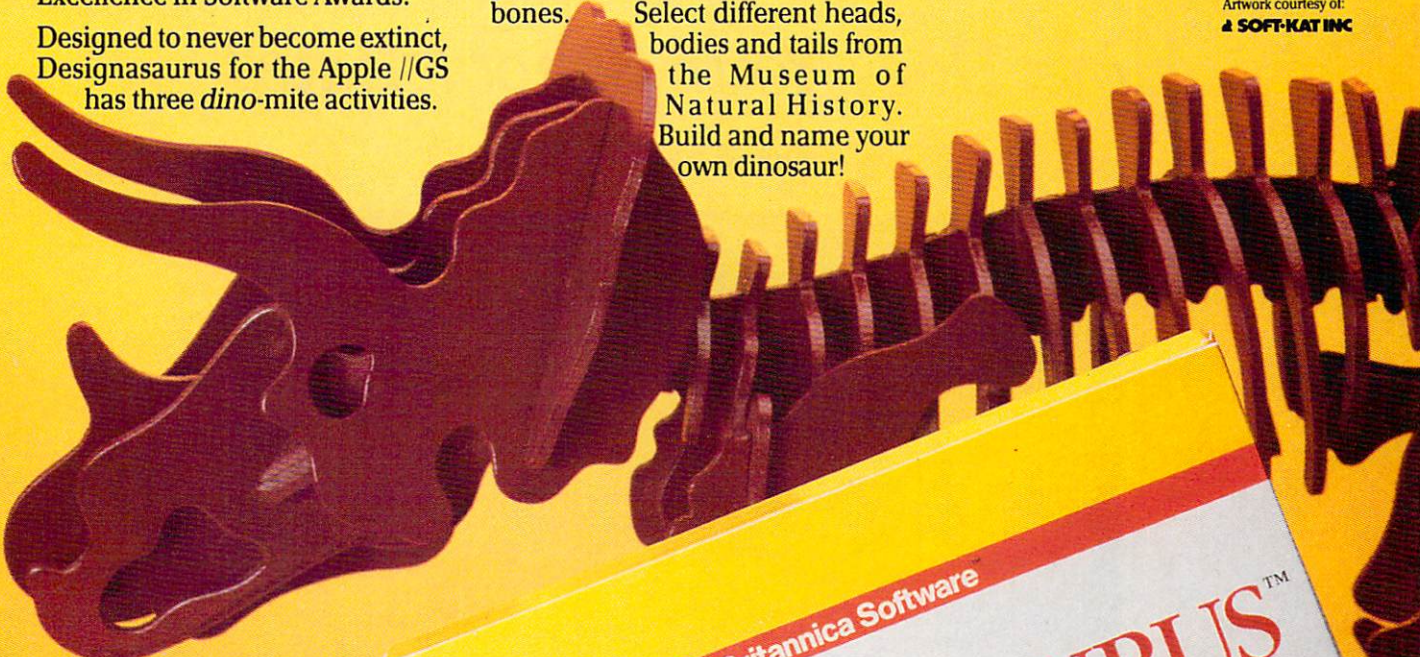
Designed to never become extinct, *Designasaurus* for the Apple //GS has three *dino*-mite activities.

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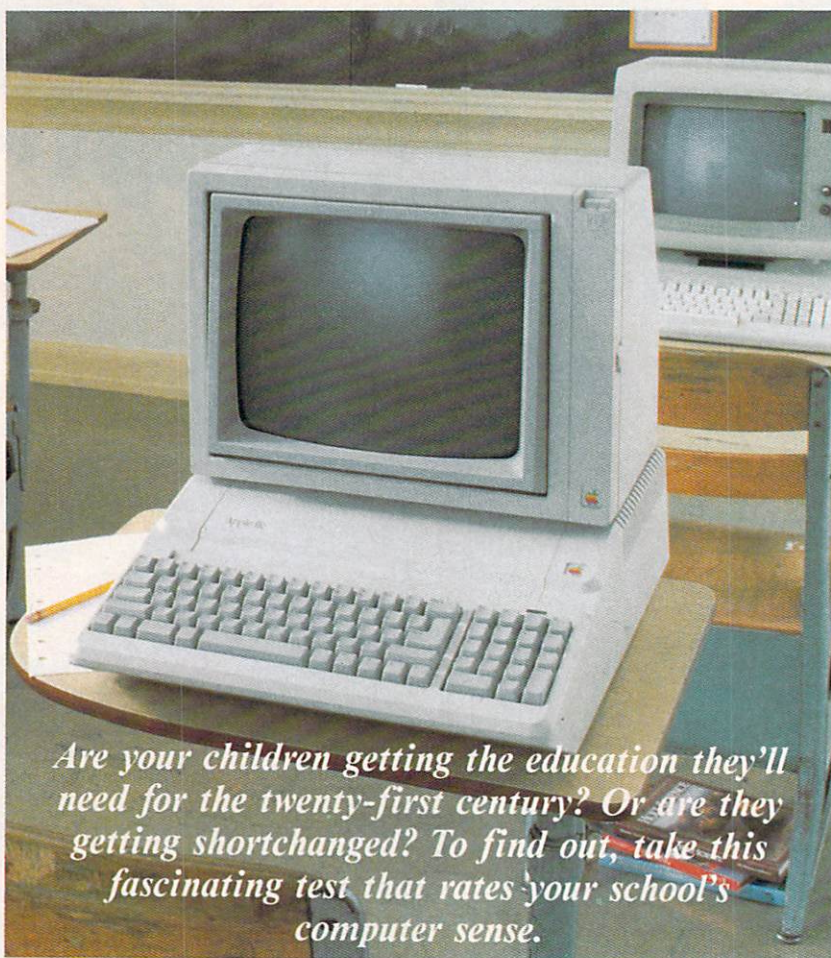
*Apple //GS and Amiga versions only

INCHES 1 2 3 4 5 6 7

Measuring Up on the Machine

How Does Your School Rate?

David Stanton



Are your children getting the education they'll need for the twenty-first century? Or are they getting shortchanged? To find out, take this fascinating test that rates your school's computer sense.


PHOTOS © 1988 BY MARK WAGONER

Sufficient hardware, good software, and careful planning help schools educate children more effectively. In the best schools, technology helps the handicapped, challenges the creative, and makes learning a more rewarding experience for everyone.

Unfortunately, some schools haven't kept pace, and their students may suffer because of it.

How does your district stack up when it comes to computers? Are your children getting what they deserve, or are they getting shortchanged?

Why not take this short test and find out? Short of heading back to class yourself, it's the best way to see how your child's school measures up.



Test Your School

1. How many students must share each computer workstation in your child's school? (Divide the school's enrollment by the number of computers.)

- A. 1-5
- B. 6-20
- C. 21-45
- D. 46 or more

2. What percentage of classrooms have at least one computer permanently located there?

- A. 0%-15%
- B. 16%-50%
- C. 51%-75%
- D. 76%-100%

3. How many computers are available in the school's largest computer lab?

- A. 0-5
- B. 6-15
- C. 16-22
- D. 23 or more

4. Which of the following peripherals does the school own and use? Check as many as apply.

- A. Laser printer(s)
- B. CD-ROM player(s)
- C. Computer projection system(s)
- D. Computer-controlled lathe, robot, or similar device(s)
- E. Modem(s)
- F. Video disc player(s)
- G. Speech synthesizer(s)
- H. Test-scoring unit(s)
- I. Light pen(s)
- J. Graphics tablet(s)
- K. Other (please specify)

5. How many software titles (approximately) does the school own?

- A. 0-25
- B. 26-45
- C. 46-70
- D. 71 or more

6. What arrangement does the school have to provide adequate numbers of copies of regularly used programs? Check all that apply.

- A. Networked lab or mainframe with terminals
- B. Site licenses and similar arrangements
- C. Lab packs
- D. None of the above

7. What percentage of the school's teachers and administrators use computers regularly to assist with record keeping and similar chores?

- A. 0%-15%
- B. 16%-40%
- C. 41%-75%
- D. 76%-100%

8. What percentage of the school district's student population uses computers in the course of regular classroom work for at least two hours per week?

- A. 0%-15%
- B. 16%-40%
- C. 41%-80%
- D. 81%-100%

9. How many nights per year is the computer lab available to the community for adult education and other uses?

- A. 0-10
- B. 11-20
- C. 21-40
- D. 41 or more

10. How do area students feel toward computers at school and at home?

- A. Negative
- B. Neutral
- C. Positive
- D. Very positive

11. Is there a computer coordinator or other knowledgeable individual who closely monitors and directs the school's computer program?

- A. Yes, full-time
- B. Yes, part-time
- C. No

12. Does your district have a specific progression of computer skills that students must master?

- A. Yes, in writing
- B. Yes, but not written out
- C. Don't know
- D. No

13. Which of the following computer applications are taught in elementary schools in your district? Check as many as apply.

- A. Word processing
- B. Logo or other programming
- C. Simple database use
- D. Keyboard skills
- E. Problem solving/logical thinking
- F. CAI (Computer-Assisted Instruction) in core subjects
- G. CMI (Computer-Managed Instruction)

14. Which applications do most secondary students encounter before graduation? Check as many as apply.

- A. Word processing
- B. BASIC programming
- C. Pascal programming
- D. Other advanced programming languages
- E. Business applications (spreadsheets, databases, and the like)
- F. Keyboard skills
- G. Robotics
- H. Telecommunications
- I. Computer graphics
- J. Music composition and other music applications
- K. CAD (Computer-Aided Design)

15. What percentage of the families in your school district own home computers? Make your best guess.

- A. 0%-5%
- B. 6%-10%
- C. 11%-20%
- D. 21% or more



Setting the Groundwork

More important than virtually every other consideration, the availability of sufficient hardware—the raw number of computers on hand—determines the success of any district's computer program. Without proper equipment, schools can't provide adequate instruction. Nothing else can compensate—not a surfeit of teacher enthusiasm, not eager students, not imaginative educational approaches.

The first critical element of an effective plan—and thus, a top-rated school—is the availability of computers.

For some historical perspective, though, step back and consider that ten years ago, microcomputers were virtually nonexistent. True, a handful of hackers had them at home. A few schools proudly exhibited one or two machines, probably in the math or science room. Practically speaking, though, personal computers served merely as interesting curiosities during the late 1970s.

Since then, data released by the National Center for Education Statistics has documented an overwhelmingly rapid acceptance of computers in the nation's elementary and secondary schools. According to that agency, the number of machines owned by schools had grown from 31,000 in 1981 to 630,000 by 1984. Current estimates suggest that U.S. schools now have more than 2 million computer workstations, and that number is projected to increase by roughly 20 percent each year. Divide that into the 40 million pupils nationwide, and the result is an overall student-to-computer ratio of somewhere near 20 : 1.

While some schools and school districts do much better than this average, many do far worse. A few experimental schools boast ratios of 5 : 1. Anything better than 20 : 1 merits respect. Ratios exceeding 45 : 1 reveal a serious deficiency in the school system's attitude toward computers.

Question 1: Give yourself 6 for answering A, 5 for B, 3 for C. If you answered D, take a 0. There's not much computing going on!

How should micros be distributed? In the early 1980s, most schools put them in selected classrooms. There, the few interested teachers got familiar with the machines and students experimented during their free time. This arrangement worked fine when the technology served as an occasional challenge for better stu-



dents and a brief respite from more tedious approaches for students in remediation.

In those days, educators dreamed of a future when each room could have its own microcomputer. The very thought evoked satisfied smiles from the most daringly optimistic seers.

Today, such limited access hardly seems adequate in light of the increased role technology plays in today's classrooms. Nowadays, many envision a computer on every desk. A lucky few have achieved that goal within certain classrooms. Realistically, though, many teachers would still settle for a single machine in each room.

Question 2: Add 6 for D, 5 for C, 3 for B, and 0 for A.

Recognizing the current impossibility of "one on every desk," most schools have discovered that computer labs offer an acceptable alternative. For greatest effectiveness, a lab must be big enough to comfortably accommodate the largest class expected to use it. After all, teachers can hardly leave half the class unsupervised while they take the others to the lab.

Some schools have several labs; others have only one. Student enrollment and other considerations necessitate individual solutions. Nevertheless, no number of smaller setups can replace one class-size computer lab.

Question 3: Take 6 for D, and rest assured that your district is on the right track. Score 5 for C, 3 for B. Sorry, A earns 0. How can you call five machines a lab?

Those who hope to stay in step with current developments need more than just the hardware. After all, personal computers function effectively only when linked to the outside world via input and output devices.

Modems open a world of information to the humblest host. What serious user could do without a printer? Voice synthesizers, MIDI-interfaced musical instruments, and external amplifier/speakers transform the silent world of binary digits into choirs and concerts. Light pens, CD-ROM players, Logo turtles—all provide insight into computer technology. All enhance students' understanding of modern electronic tools.

Question 4: To score this one, count your check marks, multiply by 2, and add that to your current total. (No fair counting disk drives and monitors.) You can't take more than ten points here. (Fewer than four points merits a trip to the principal's office to find out what's wrong!)

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Software Issues

Remember the day you plunked down several hundred dollars for that first machine, a state-of-the-art Kreyfish 9000 complete with TTL and ASCII? It didn't take the family long to discover the importance of software then. Yet many districts continue to fudge on software money.

Pound-foolishness! Like a camera with no film or a car with no gas, hardware without software makes no sense.

According to Talmis, a New York City-based research firm that studies such things, the average U.S. school building owned 55 titles in mid-1987. By the time you read this, that number will have increased to about 70.

Question 5: If your answer was D, smile with pride and take all 6 points. C, B, and A earn 5, 4, and 2, respectively.

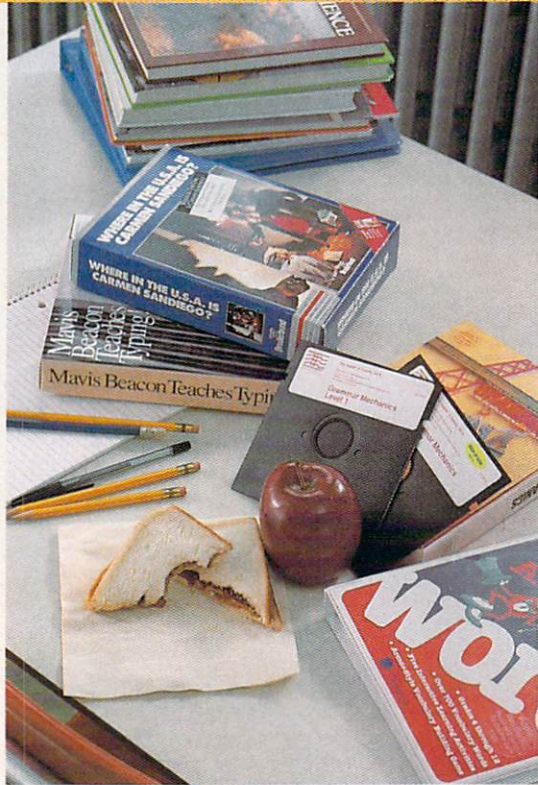
A good computer lab must offer a wide selection of programs, but it must also stock the most critical packages in sufficient quantities to accommodate an entire class. Teachers often present one application to a whole group. As a group, teachers won't tolerate disk sharing, multiple loading, and similar inconveniences. How schools handle this problem doesn't matter much. What does matter is that they *do* handle it.

Question 6: Give yourself 5 points for answering A, B, or C. Take 6 for a combination of two or more (no more than 6 points possible for this one). D gets you 0. Don't expect teachers to compensate with imagination for woefully inadequate materials!

The Human Factor

A school's most valuable asset is the people who work there: its faculty, administration, and staff. Dedicated faculty and staff make education work. Without their support, everything else means nothing. No quantity of hardware and software will do when teachers cannot or will not use it.

Over the past few years, most districts have instituted in-service programs of one sort or another to acquaint



teachers with the benefits of microcomputers. Well-run programs have made converts of thousands of skeptics. Several states require at least minimal computer literacy of all candidates for teaching credentials.

Teachers who understand and use micros themselves will encourage their students to use them.

Question 7: Give yourself 6 for D, 5 for C, 4 for B, and 0 for A.

Equipment that sits idle doesn't do anyone any good. To learn about computers and to gain the potential benefits of computer-assisted instruction, children must have enough time on the machine. When they want to

impress the layperson, teachers call this concept *time on task*.

According to Dr. Henry Jay Becker of Johns Hopkins University, in 1985 the average elementary pupil was given 35 minutes of computer time per week. Secondary students fared better, averaging 90 minutes a week. How much time should each child have? Dr. Becker concludes that "a high school student might profitably use computers for an hour or two per day."

Question 8: Score 6 for D, 5 for C, 4 for B, and 0 for A.

Another important ingredient of any successful educational program is community support. Parental attitudes expressed at home strongly influence children's attitudes at school. Voters who believe in an innovative approach elect school-board members who support educational technology. When you consider the expense of beginning and maintaining significant collections of hardware and software, you realize that no computer program could last long in a district of hostile citizens.

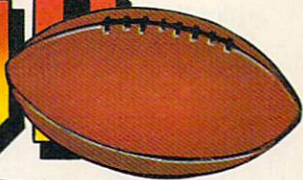
Wise administrators open computer labs to community groups and offer adult education courses whenever possible. In this way, they gain valuable support while further raising the community's level of computer awareness.

When such adult learners discover the potential of computing, they often buy a computer for their home. Owning a machine doesn't guarantee use, but students with easy access are certainly more likely to do assignments on their word processor, spend a bit of extra time on Pascal, experiment with science software, and the like.

Question 9: If you answered D, add 6 and take advantage of the school's generous policy. (You could get to know Apple II's if you work with MS-DOS, or become familiar

John Elway's

QUARTERBACK



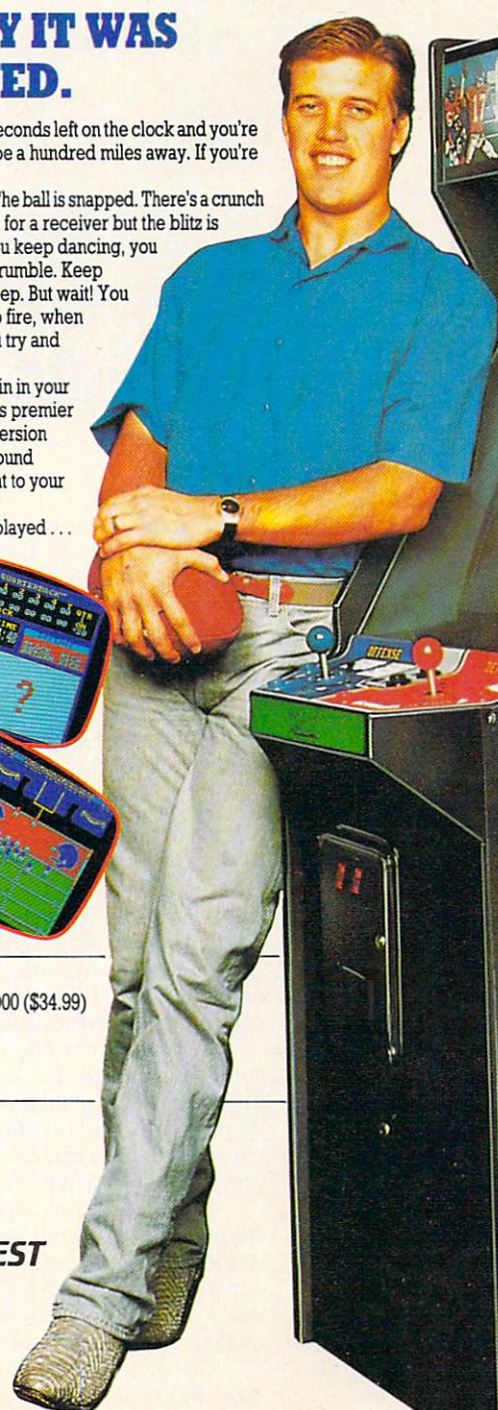
FOOTBALL THE WAY IT WAS MEANT TO BE PLAYED.

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"Yellow-nineteen! Yellow-nineteen! Hut! Hut! HUT!!!" The ball is snapped. There's a crunch of armor on the front line and you drop back. You look for a receiver but the blitz is on in a power sweep from the left! Roll to the right - you keep dancing, you look for an opening but your blockers are starting to crumble. Keep pedalling back . . . you're in trouble now, you're too deep. But wait! You spot an open man down field! You cock back, ready to fire, when suddenly an ugly-looking guard is all over you. Do you try and throw? Or duck and run!

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with MS-DOS if it's new to you.) Take 5 for C, 4 for B. Answering A earns you nothing. Why not contact the administration and suggest evening computer-literacy classes?

Most children enjoy computing and seek opportunities to "play computer games." Given half a chance, they'll work with just about any software.

They see the lab as a video arcade without quarter slots. In the dark recesses of their minds, they imagine that somehow they're putting something over on the system by spending time in the computer lab. Schools that generate such exuberance, harness it, and direct it toward learning know the real secret of educational computing.

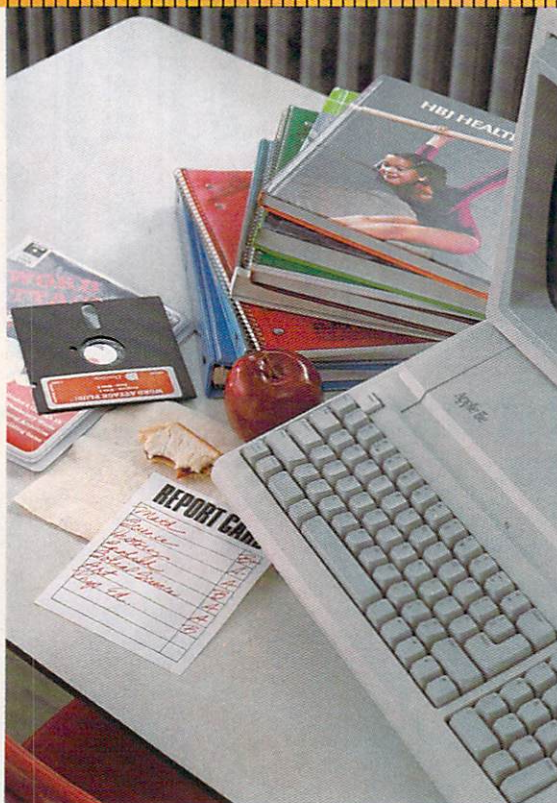
Judging students' attitudes may be a bit difficult, but it isn't impossible. Ask children and teens a few judicious questions, and they'll tell you what they think. Or walk by the lab on those few occasions when you happen to be at school during working hours. Smiles, giggles, and excitement are good. Serious intensity and involvement are fine, too. Looks of boredom suggest problems. (If we want to bore kids, we can do it much more cheaply than with expensive computers!)

Question 10: Count 6 points for D, 5 for C, 4 for B, and 0 for A.

The Plan of Action

Assuming your district has adequate equipment and software, a knowledgeable staff, cooperative residents, and eager students, just one thing remains—a carefully planned and coordinated strategy for making everything work.

For starters, every district and each school within it needs a skilled leader to guide and direct its program. Based upon its "1987 Survey of the States," *Electronic Learning* magazine reported in its October 1987 issue that approximately 44 percent of U.S. school districts employ a full-time computer coordinator. Small districts often fill that position with part-time people. No matter how the situation is handled, computer-using teachers must have access to someone who can answer questions, solve technical problems, and perform other required support services.



Question 11: You get 6 for A, 5 for B, and 0 for C.

Successful schools know where they're headed and how they expect to get there. Action plans provide a vision for the future, and that vision guides decision-makers as they revise, update, and implement those plans. Established lists of computer skills for each grade level reduce duplication of effort and assure meaningful and measurable results. Ultimately, kids progress faster and learn more when there's a plan behind it all.

Question 12: A written list gets 6 points (A). Unwritten but understood lists earn 4 (B). For the rest? Sorry, no points here.

What should sixth graders know about computers? What related skills should they develop?

And how about high school graduates planning to seek employment or go on to college? What do they need to know in order to compete? Nothing forces us to evaluate ourselves, our children, and our schools quite like rows of capped-and-gowned seniors marching to the strains of "Pomp and Circumstance."

Questions 13 and 14: Scoring both is easy. Count your total check marks and add that number to your score.

In 1985, the Office of Educational Research and Improvement, a subdivision of the U.S. Department of Education, joined with the Corporation for Public Broadcasting to do a study of various technologies in U.S. homes. According to their Home Information Technology Study (HITS), 13 percent of the adults surveyed had computers available at home.

Although the study found wide variations among income levels, even the over-\$40,000-per-year families could produce no better than a 26-percent showing. In contrast, 99 percent of all households had a television set, 48 percent enjoyed the conveniences of cable television, and 29 percent had videocassette recorders.

Percentages of computer owners have risen since that study (a more recent estimate, by the Electronic Industries Association, put computer penetration at 20 percent of American households). Still, such low results seem surprising in light of current computer prices, improved software quality, and potential benefits of family computing.

Question 15: For this one, score 6 points for D, 5 for C, 3 for B, and 0 for A.



The Final Grade

Now comes the moment of truth. But first, double-check your responses. Did you answer honestly and accurately? No cheating, please. Wherever doubt exists, take the fewest points and don't complain.

How does your school measure up? You remember the grading system from your school days?

If the total equals or exceeds 90, your school gets an A—it's definitely among the best around. Few will merit this distinction. Excellence in education never comes easily.

Many will have to settle for a B. Scores ranging from 80 to 89 are nothing to be ashamed of, though. Keeping up in such a rapidly changing field takes a heavy toll on administrators, teachers, and taxpayers alike. Besides, you can take comfort in the fact that letting others handle the risky business of breaking new ground saves your school from the costly mistakes the innovators inevitably blunder into.

Alas, most schools must always be average. It's the nature of things. Totals ranging from 70 to 79 rate a C. Extra credit? Okay, those scoring below 70 (and only those) have permission to add 5 for "intangibles," at their discretion.

For the rest, consider the following. Perhaps the test was too difficult. Maybe you had inadequate time to prepare. Possibly the survey asked all the wrong questions. Or it could be that some schools doubt the educational value of these new technologies. Legitimate concerns, all!

But even the most stalwart ostrich could hardly ignore this fact: As businesses increasingly utilize computers, graduates without proper skills will face a competitive disadvantage wherever they go.

Don't we owe our kids a fair chance? □

David Stanton is the computer coordinator for the Bolivar School District in Bolivar, New York. His column in *COMPUTE!*, "Discoveries," regularly addresses the important issues of educational computing in the classroom and the home.

Real Scores

Blue Earth Public School Test Score: 90

Blue Earth, Minnesota, proves that small communities can provide excellent schools. Although only 4000 people live in the town, Blue Earth Public School leads the pack in educational computing.

Of course, taking the lead required more than just a little effort. The campaign began with a firm local commitment to computer technology. Later, the district's selection as one of 15 to be included in Minnesota's Project Beacon gave Blue Earth PS a strong head start. An Apple Classroom of Tomorrow (ACOT) grant in 1985 pushed the school further into the lead.

Now the school's 1200 students share 351 Apple computers, including everything from early Apple II's to IIGs's and Macintoshes. In the six ACOT classrooms, there's a workstation for every student. In addition, all fifth- and sixth-grade students have an Apple IIc in their home.

By the time students graduate, they've gone well beyond "computer literacy." From kindergarten to fourth grade, everyone spends half an hour per week on micros. Fourth graders also spend one hour each day learning how to use the keyboard. Fifth and sixth graders have individual computers constantly available on their desks. From eighth grade through their senior year, English students regularly use word processing to assist them with writing skills.

Corvus networks, software site li-

censes, and lab packs assure easy access to programs ranging from Logo to computer-managed-instruction packages. After school, the computer lab remains open for students who want to use it, and adult education classes encourage those older than school age to get involved and discover the rewards of computing.

Such an extensive implementation of new technologies costs big money. Is it worth it? Marlin Gerds, computer coordinator there, says emphatically, "Yes! Absolutely!"

Take that as a challenge, but realize that catching up with Blue Earth PS will not be easy. Over the next couple of years, they plan to purchase more Macintoshes, make greater use of desktop publishing, and explore the possibilities of CD-ROM.

— DS

Real Scores

Buffalo Public School 80 Test Score: 87

Joe Perona talks proudly about Buffalo Public School 80 (Buffalo, New York), where he serves as full-time computer coordinator. His school is just one of approximately 80 that serve the city's large student population. In all, about 450 of those children attend grades K-8 at P.S. 80.

Teachers and students there have good reason to be proud of their school's computer program. From kindergarten through eighth grade, every

student receives more than two hours per week of instruction on computers.

Primary-grade pupils enjoy the school's Writing to Read program, which was developed by IBM and runs on IBM PCjr personal computers. A smaller lab supports remedial programs, and the school's general lab provides 28 Apples, including one Macintosh.

Neither P.S. 80 nor Blue Earth (above) makes a practice of distributing single computers to classrooms. Instead, they seem to feel that grouping provides more effective access.

Site licenses for *LogoWriter*, *MECC* software, and other popular titles assure sufficient quantities to accommodate full classes. The building has some net-

worked machines, and, when necessary, lab personnel duplicate public domain software to supplement other materials.

What is Joe Perona most proud of? He believes the school is especially innovative in its use of telecommunications capabilities to support core-curriculum goals. The school subscribes to several information services, including Dow Jones and Einstein. Students can also download data from the local television cable's information service.

What is his greatest disappointment about their computer education program? "None right now. We haven't really been involved long enough to become disappointed with anything!"

— DS

ALL FOR ONE and ONE FOR ALL



**Make your computer work like you work.
Integrated software mixes and matches basic
computer applications to give you power
without a big price.**



Integrated software is the computer world's answer to the Renaissance man—do everything with competence, if nothing with excellence. Such software is also the answer to every computer user's first question once the machine is uncrated and plugged in. How can I get the basic computer applications I need, yet not end up confused or broke or both?

Confused? Selecting several programs to work together can be daunting in this day of software proliferation. An integrated system does the work for you by giving you an all-in-one collection of workalike programs.

Broke? Few stand-alone applications run less than \$100; some power programs cost several times that. Multiply those figures by four or five times to get the basic computer tools—word processor, spreadsheet, database, communications, graphics—and you've run up a hefty tab. Integrated software can be a much better value—less than \$30 an application in some instances.

Integrated programs also provide something no collection of unmatched software can—the ability to easily share information and data between applications. Moving figures from a spreadsheet worksheet into a word processor document should be seamless, not stressful; in an integrated program, such an operation is normally quite easy. Not so when you're working with a collection of disparate software. If it's possible at all, you're probably forced to save the data in a special format, quit the first application, start the second, and only then load the data from that specially formatted file.

Simplicity is another good reason for considering the one-stop-shopping approach to software. The individual components of an integrated package are usually workmanlike in their power, but they're rarely hard to learn or use.

Put everything together—basic tools, value for your software dollar, ease of use, and data sharing and swapping—and you have the beginnings of a beautiful friendship between yourself, your computer, and your software.

First Choice



First Choice is a low-end integrated program aimed at the first-time user. It combines into one integrated product a word processor, spelling checker, thesaurus, spreadsheet, graphics generator, database with reporting capability, and communications program. While it won't satisfy power users, especially those who've already cut their teeth on programs such as *WordPerfect* or *Lotus 1-2-3*, *First Choice* will get a beginner off to a good start or provide a useful set of tools for anyone with moderate computing needs.

The first thing you'll notice about *First Choice* is its large memory requirement: 512K (the program itself requires about 470K of free memory to run). This means that even on a 640K machine, running DOS 3.3, for example, you may not be able to use all your favorite TSR (Terminate and Stay Resident) programs together with *First Choice*. With a 512K machine, your options are even more restricted.

First Choice's screen design is one that's becoming more and more common in the PC world. The top line is dedicated to a menu bar with selections for Help, File, Edit, Print, Features, and Style. The second line is a status line with your document's name, percentage of memory used, and line and page numbers displayed. Your text goes in a 21-row \times 79-column boxed area. (If your text is longer than 79 columns, the screen scrolls.) A ruler line, which indicates left and right margins, is located on the second-from-the-bottom line. A message line occupies the bottom line.

All *First Choice's* menu selections can be accessed by function keys, or, if you have a mouse, by placing the mouse pointer over the title on the menu bar and clicking. The F1 key is reserved for context-sensitive help. Many selections have speed keys that let you bypass the menu.

The most important module in any integrated package is the word processor. *First Choice's* word processor is adequate for most tasks, but it's limited to editing one document at a time with a maximum length of 30 pages. (Longer documents can be linked for printing.) Individual lines can be as long as 250 columns (the columns after 79 are available through scrolling).

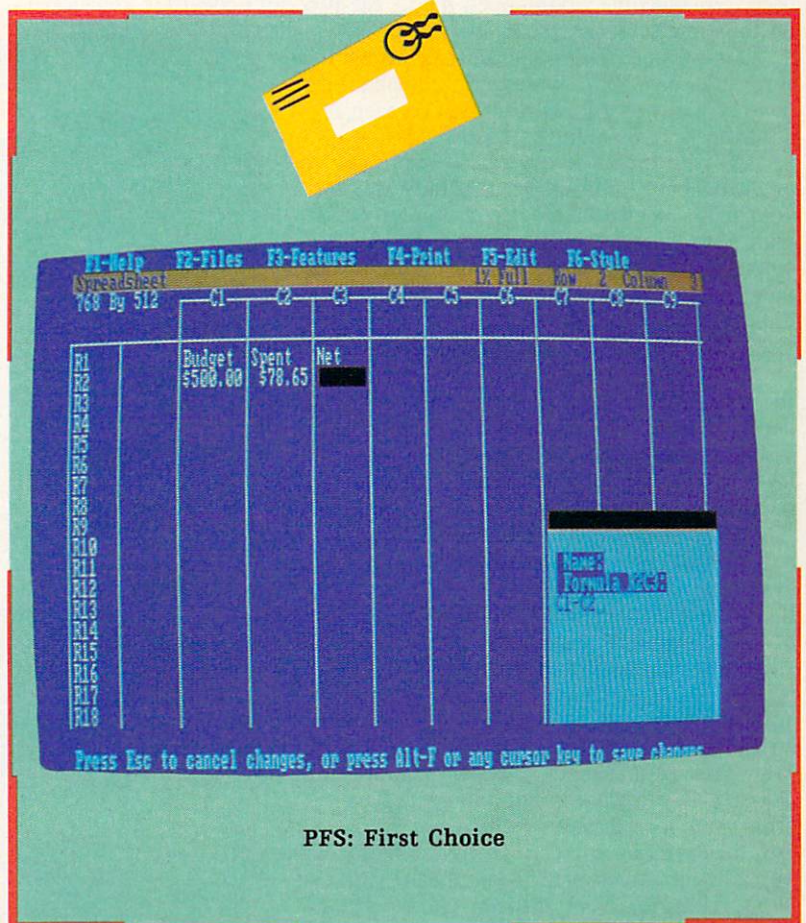
The word processor supports most of the features you'd expect. You can mark blocks of text and then copy, move, or delete them. Text enhancements include bold, underline, and italic. If your printer supports these, they're printed as they should be, although all text enhancements simply appear bold onscreen. Other features include search and replace, headers, footers, automatic pagination, and support for over 80 printers.

When you've finished entering text, you can check your spelling with *First Choice's* 75,000-word spelling checker. (The speller is available not only in the word processor, but in other modules as well.) You can use one personal dictionary with the speller. Special document dictionaries or dictionaries for special areas like law or medi-

cine can be used if they're renamed as your personal dictionary. The online thesaurus, a feature not found in some other integrated packages, contains 20,000 synonyms.

First Choice's spreadsheet has a maximum size of 1024 rows \times 768 columns. The spreadsheet's screen has a distinctive look: Columns are bordered with lines, and areas for legends and labels are already indicated, waiting to be filled in. This makes it easy for a user new to spreadsheets to get his or her bearings.

The spreadsheet has two especially attractive features. First, columns automatically resize themselves when you enter data. If, for instance, one column needs to hold data that is 5 characters long and the next column needs to hold data that is 20 characters long, the program automatically adjusts itself to whatever you type.



PFS: First Choice

The spreadsheet's other exceptional feature is Quick Entry. You can define a cell for quick entry, and the program will automatically put the next logical instance of that cell's information in the next cell. This may sound complicated, but it's really easy to understand. Let's say, for example, that you've typed *January* in one cell of your spreadsheet. You're going to continue with the next 11 months in the 11 successive cells. With the cursor on the cell with *January* in it, you type Alt-Q to start quick entry. When you tab to the right, *February* magically appears in the current cell. The program enters the other months in a similar manner.

Unlike most other spreadsheet programs, *First Choice's* spreadsheet requires you to enter data directly into a cell

rather than in a command area at the top of the screen. This should make perfect sense for a newcomer, but experienced users may find it a little strange at first. The spreadsheet can read and write files in *Lotus 1-2-3* WKS format, but *First Choice* doesn't support *Lotus*-style macros (or any macros for that matter).

You can graph your spreadsheet data with *First Choice's* graphing module. *First Choice* offers a range of graphing possibilities: You can use bar/line, area, high/low/close, or pie graphs. You can also incorporate titles and labels, and you can, in a limited way, change colors. Graphs can be incorporated into word processing documents, but only at the time the document is printed; since *First Choice* is text based and the graphics module uses your machine's bitmapped mode, the two can't coexist on the same screen.

First Choice's file manager is a simple single-file, or flat-file, manager. A database can have as many as 16,000 records, and each record can have as many as 1000 fields.

As with most file managers, before you can enter database information, you must design your record format. This is a simple process with *First Choice*. You just type field names where you'd like them to appear on the screen. After you've designed your record, you can enter data. You use the Tab key to move between fields, and press Enter to enter the record.

First Choice's communications module is the simplest of the six. It offers only one error-checking protocol—XMODEM. There is no script language, but you can generate auto-log-on files simply by telling the program to record as you sign on to a service or BBS.

All of *First Choice's* modules are competent, and some, notably the spreadsheet, have some very nice features, but this package's biggest limitation is its restriction to having one file open at a time. How then, you may wonder, do you share information between modules?

First Choice uses a clipboard to hold information while you switch from one module to another, and it uses a bookmark to keep your place in one module while you work on another. If you want to cut and paste data from your spreadsheet to your word processor, for example, you can define the block of the spreadsheet, attach it to the clipboard, and exit the spreadsheet. Next, load the word processor and copy the clipboard information to your document. To return to the spreadsheet, leave the word processor, load the spreadsheet along with your document, and move to the bookmark. It's simpler in practice than it sounds, but there is definitely some shuffling involved.

First Choice has two notable weaknesses. First, you can't temporarily exit the program and invoke a DOS command-line prompt. Second, *First Choice* has no macro facility. A keystroke macro program, like *SuperKey* or *NewKey*, would add a great deal to the ensemble's usefulness.

For new users or users with moderate requirements, *First Choice* is a good choice. It may not pack the punch of some integrated products, but it has all the power many people need, at a price most can afford.

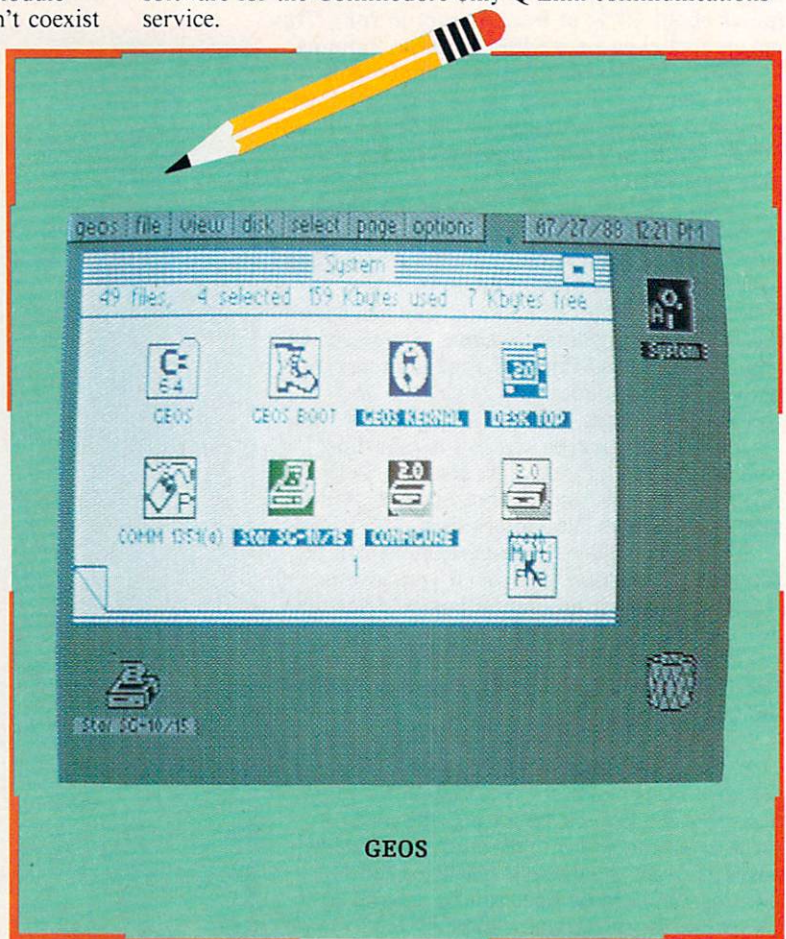
— Clifton Karnes

GEOS



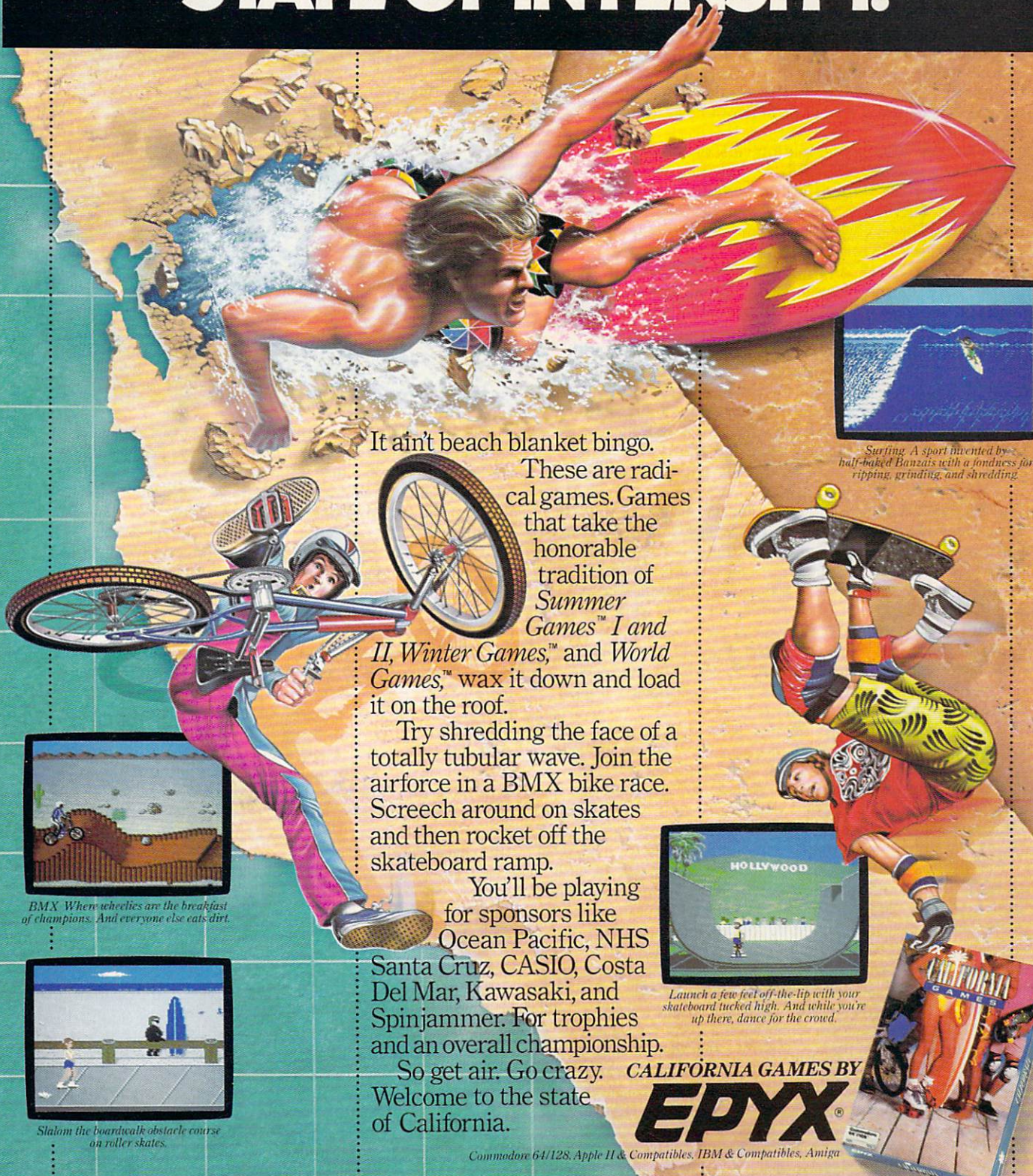
Because of its limited memory, the Commodore 64 has produced few truly integrated packages. Ironically, though, it may well have one of the best for any microcomputer. That package is the system called GEOS.

The original GEOS package comes closest to the typical integrated package. The desk accessories are accessible at any time, and graphics created with *geoPaint* can easily be merged with text from *geoWrite*. Not part of the GEOS system, but included in the package, is telecommunications software for the Commodore-only Q-Link communications service.



Since the publication of the original GEOS, the system has expanded impressively. *geoCalc* appeared as a full-featured spreadsheet program, while *geoFile* answered the system's needs for a sophisticated database. *geoWrite Workshop* (initially *Writer's Workshop*) eliminated the limitations of *geoWrite* itself, adding advanced word processing features and compatibility with Apple's LaserWriter laser printer. Other additions include *Fontpack*, collections of fonts for use in GEOS programs; *Deskpack*, six applications ranging from a text importer to an icon editor; *geoSpell*, a 28,000-word spelling checker that comes with *geoFont*, a font creator allowing font sizes as large as 48 points; *geoProgrammer*, with advanced assembler, linker, and debugger for machine language pro-

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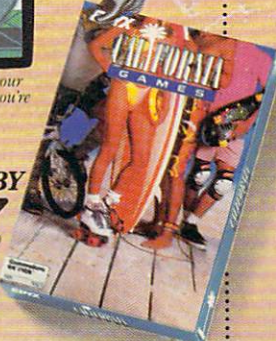
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Slalom the boardwalk obstacle course on roller skates.



grammers; and *geoPublish*, a multifeatured, sophisticated desktop publishing package with LaserWriter compatibility. Recently, all packages have begun the conversion to versions for the 128.

Of course, no integrated package for any micro-computer includes all these things. Most have a word processor, a database, a spreadsheet, a graphics generator, and perhaps a telecommunications package. Except for the Q-Link software, which is limited to the Q-Link service itself, GEOS does not yet offer a telecommunications package.

Thus the GEOS combination closest to, say, *Works* or *AppleWorks* consists of GEOS, *geoFile*, *geoCalc*, and *geoWrite* (or if *geoWrite* is not powerful enough, *geoWrite Workshop*). The four packages would cost about \$160 (less through mail order), which is roughly comparable to integrated packages for other systems.

What makes GEOS ultimately attractive, though, is less its price than its flexibility. For many, the original GEOS might be enough. Apart from a good word processor (*geoWrite*) and a good graphics creator (*geoPaint*), GEOS's desk accessories include a four-function calculator, a note pad of over 100 pages, an alarm clock (with chimes), the ability to cut and paste from the calculator and the note pad, and facilities for transferring text and graphics among the various applications. This last feature is especially important when you're considering an integrated system, because the same facility lets you transfer data to other GEOS packages.

The system shines, though, when the original GEOS is not enough. Those needing a spreadsheet can add *geoCalc*, while those requiring a database can buy *geoFile*. Most integrated programs contain both types of applications, but for many people at least one goes largely unused. For example, I have never, in five years of intensive work with computers, had any need whatsoever for a spreadsheet program, so those I have on integrated programs are wasted. Other people I know work extensively with spreadsheets but would be content with a very simple database, enough to store addresses and phone numbers.

Those who need page-creation software can add *geoPublish* if they wish, while programmers will be more likely to turn to *geoProgrammer*. Thus, the GEOS system lets you customize your integrated package to include exactly what you need. Except for *geoWrite*, *geoPaint*, and the DeskAccessories, which come with the system package, GEOS does not force a predetermined integration.

With this flexibility, though, comes a little loss in ease of integration. While *Works* for MS-DOS, for instance, permits extremely easy movement among its four applications, each GEOS application must be loaded separately, and not concurrently, into the Commodore 64. This means that merging data from *geoCalc* into *geoFile* requires saving the *geoCalc* information, exiting the program, booting up *geoFile*, and then loading the saved information into *geoFile*. Adding a hard drive (or even a 1581 drive), of course, speeds things up considerably, but the concept is still one of separate programs sharing information, rather than information flowing easily from one feature to another within an integrated program. Technically, there is no difference (an integrated program is really a bunch of linked individual programs), but GEOS integration seems less complete. Changing program disks, after all, is always less convenient than simply choosing from a menu.

GEOS 2.0 Offers More Integration

Berkeley Softworks, publisher of GEOS, has announced version 2.0, which offers a number of enhancements and makes changes to the original system.

With GEOS 2.0, you receive *geoWrite 2.1* (part of *geoWrite Workshop*), a much-improved, what-you-see-is-what-you-get word processor. *geoPaint*, also part of the package, has been upgraded, too. *geoSpell*, the spelling checker, is now part of the GEOS package, not a separate purchase. Mail merge has been added and several tools have been bettered.

File operations on the deskTop are more flexible, since multiple files can be selected at one time. Deleted files can be retrieved, and up to three data-storage devices are supported—two disk drives and one ramdisk.

All existing applications—*geoCalc*, *geoPublish*, *geoFile*, and the rest—work with the new version of GEOS.

The price? Only \$29.95 if you own an earlier copy of GEOS; \$59.95 if you're not upgrading.

GEOS 2.0 doesn't make any changes to the basic way its applications interact and integrate, however. You still must quit one application before starting another if you're moving data between applications, for instance. GEOS 2.0's main benefit is that *geoSpell* is now included in the bundle, and that both *geoWrite* and *geoPaint* have been strengthened.

— Gregg Keizer

Transferring data among GEOS's various applications is quite easy, however. The Photo and Text Manager (included with GEOS's desk accessories) allows a clipboard-like manipulation of text and graphics, while most separate packages have additional transfer capabilities. *geoFile*, for example, lets you create form letters with instructions set in *geoWrite* and will merge information directly from *geoDex* (part of *Deskpack*). *geoMerge*, also on *Deskpack*, helps integration even further.

Flexibility, then, is GEOS's keyword. By choosing packages carefully, and by learning how to create efficient work disks, you can customize an integrated environment precisely according to your needs. Serious users will want to consider Commodore's RAM-expansion units, which GEOS fully supports, and add a 1581 disk drive (now also supported) and perhaps a hard drive. Without this hardware, GEOS's usefulness is limited, though not to the degree that buying a different computer is warranted. Ironically, a Commodore 64 with a customized GEOS package might well be superior to integrated packages offered on more powerful machines. Not a bad feat for an old, small computer.

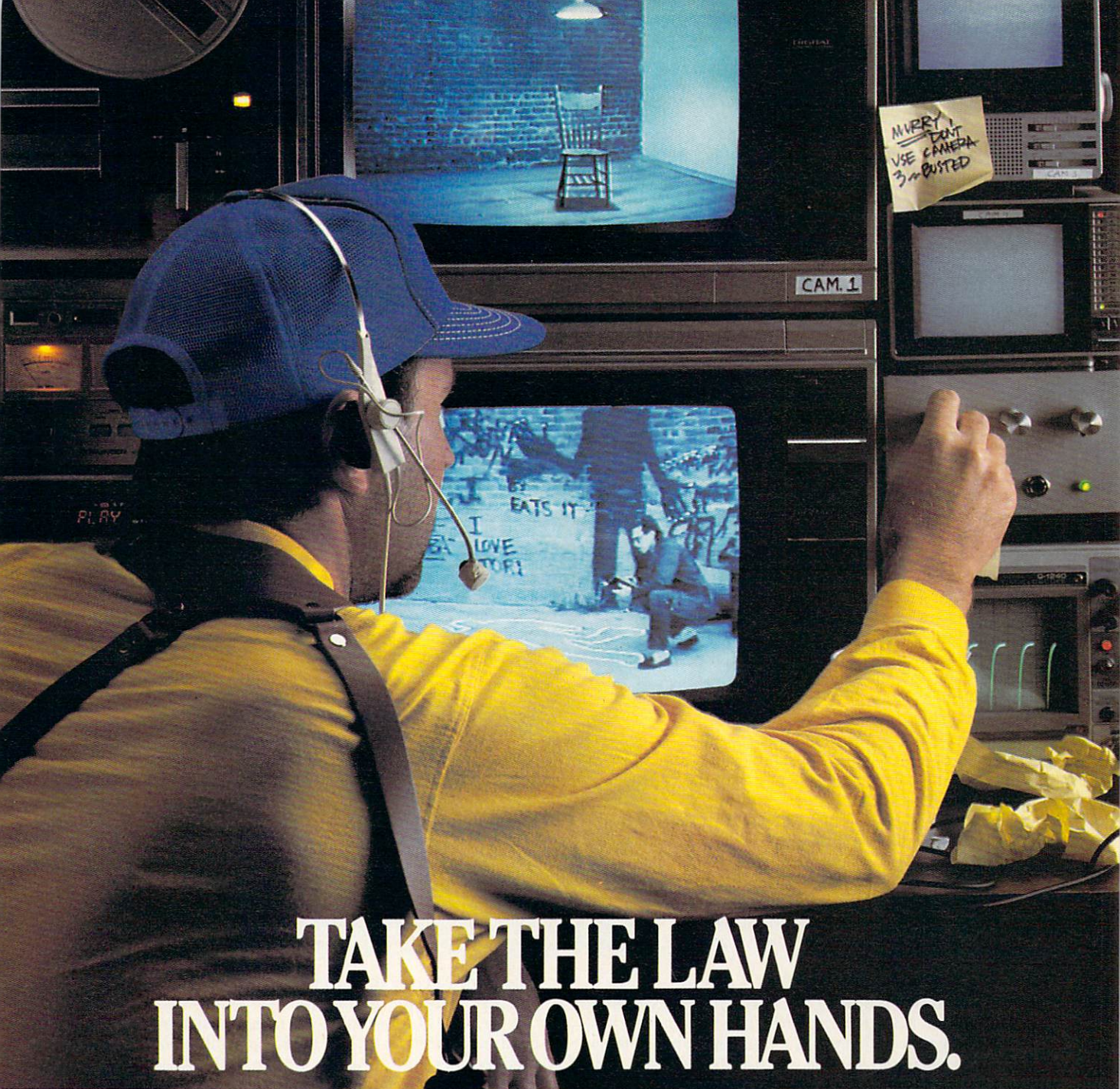
— Neil Randall

AppleWorks



When you buy an Apple II computer, the salesperson will most likely press a copy of *AppleWorks* in your hands, as if there's nothing else you need to get to work today, right now.

AppleWorks is the Apple II program. No other Apple II package can boast the buyers, and the users, of *AppleWorks*. But longevity is the program's best testimonial—no other popular integrated software package has been around as long as *AppleWorks*. First released more than four years ago, the program has stood the test of time



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uncover a major ring bent on distributing an evil synthetic drug.

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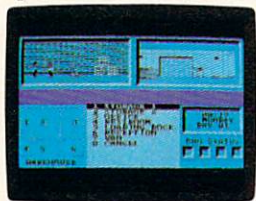
work with. We're talking "rookie" rookie. Zero experience.

You'll need to architect his every move. Watch him photograph clues. Plant bugs. Tail suspects. And question everyone from seedy thugs and crooked chemists to slick international heavies.

You'll also need to draw on every strategy brain cell available.

If you're not thinking every minute, you might just spend all evening waiting on a street corner for a suspect who's never coming.

L.A. Crackdown. If you think your nervous system can handle the surprise action and tricky mental clues, there's only one thing you need to do. Move to L.A.

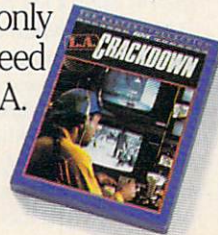


You can bug the thugs and watch the warehouse, both at the same time.

L.A. CRACKDOWN

Commodore 64/128, IBM & compatibles, Apple II & compatibles

BY EPYX®



to become the classic Apple II application.

When you look at *AppleWorks*, now in version 2.0, you'd never guess it had all that much going for it. The Big Three are there, of course—word processor, spreadsheet, and database—the applications that everyone has come to expect as the minimum offerings of an integrated system. There are few bells and whistles: no telecommunications, no graphics, no seamless cut and paste. Instead you have three almost quaint applications that show their age.

The common interface is based on a file-folder metaphor. On the desktop, which is the junction between modules, open menu levels are represented as file folders. The deepest level and the currently active menu is on top. Used to move from one module to another and from one document to the next, you navigate through the menu structure with keyboard commands and cursor keypresses. At most, 12 files can be on the desktop at once; these files are stored in RAM and thus are immediately available. That may sound versatile, but you can actually only work with one file at a time.

AppleWorks is memory dependent, relying heavily on available RAM to hold more—and larger—files on the desktop. Substantial cut-and-paste operations also depend on more than the minimum 128K of RAM. To make best use of *AppleWorks*, you'll need a memory card. For the IIe and IIGS, slipping in a card is simple; on the closed IIc, the same procedure is not impossible, just difficult.

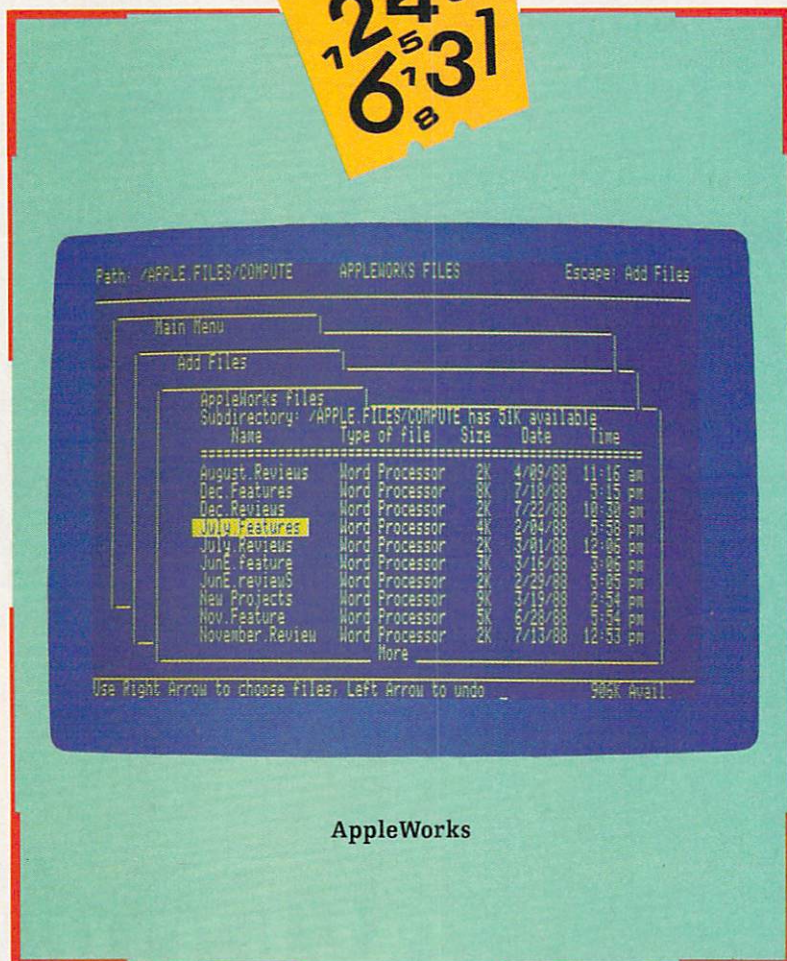
AppleWorks' word processor is an example of an ultrafast, although limited, writing tool. Without additional memory, documents are restricted to about 30 pages.

There is no attempt at WYSIWYG display, the trendy method of showing on the screen exactly what will appear on paper. *AppleWorks* clearly shows its age here. Although it allows for such formats as boldface, underline, superscript, proportional printing, multiple line spacing, and more, none of these are shown on the monitor. Control-key combinations insert boldface indicators, for instance, but the text remains normal on the screen.

The best feature of the word processor is its speed—the best feature of nearly everything in *AppleWorks*. Moving from top to bottom in a long document is nearly instantaneous because the document is always held in RAM and because the program is character-based, not graphics-based as the equivalent *Works* is on the Macintosh. Search-and-replace operations, usually a good yardstick for word processor speed, are almost as fast.

The database is the second-most-used module in *AppleWorks*. This flat-file database can store a maximum of 1350 records when used on a 128K machine, and each record can hold information in as many as 30 fields. As with the other modules, expanding the memory makes it possible to develop expanded database files.

Restrictions abound in the database module, because you can't have long fields. Each can contain only 76 characters. Structuring, changing, and viewing database files in *AppleWorks* is much simpler than in many other flat-file



AppleWorks

managers. Altering the layout of a record, for instance, is only a matter of several keystrokes.

AppleWorks' spreadsheet is huge, at least in theory: 127 columns by 999 rows. On a 128K Apple, that potential is a moot point, since filling cells fills up RAM. By the time you put numbers or formulas in 6000 cells, the available memory in a standard machine is exhausted.

The spreadsheet isn't robust enough for power-hungry accountants or financial wizards, but its simple structure and ease of use more than make up for the lack of power.

The three primary parts of any integrated program are well represented in *AppleWorks*. Each has blazing speed, a help screen available at all times, and enough features to complete most tasks.

Integration in *AppleWorks* is carried out primarily through the desktop and its Clipboard. Unfortunately, the cut-and-paste function—the ability to exchange information between applications that's the hallmark of an integrated program—isn't perfect.

Copying from a spreadsheet to a word processor file or from a database to a word processor file is clean and generally worry free. However, copying between a spreadsheet and a database or from a word processor file to either of the other applications is very bothersome (so much so, in fact, that entire books have been dedicated to work-around techniques).

Integration means more than how well you can move

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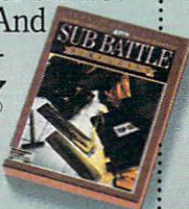
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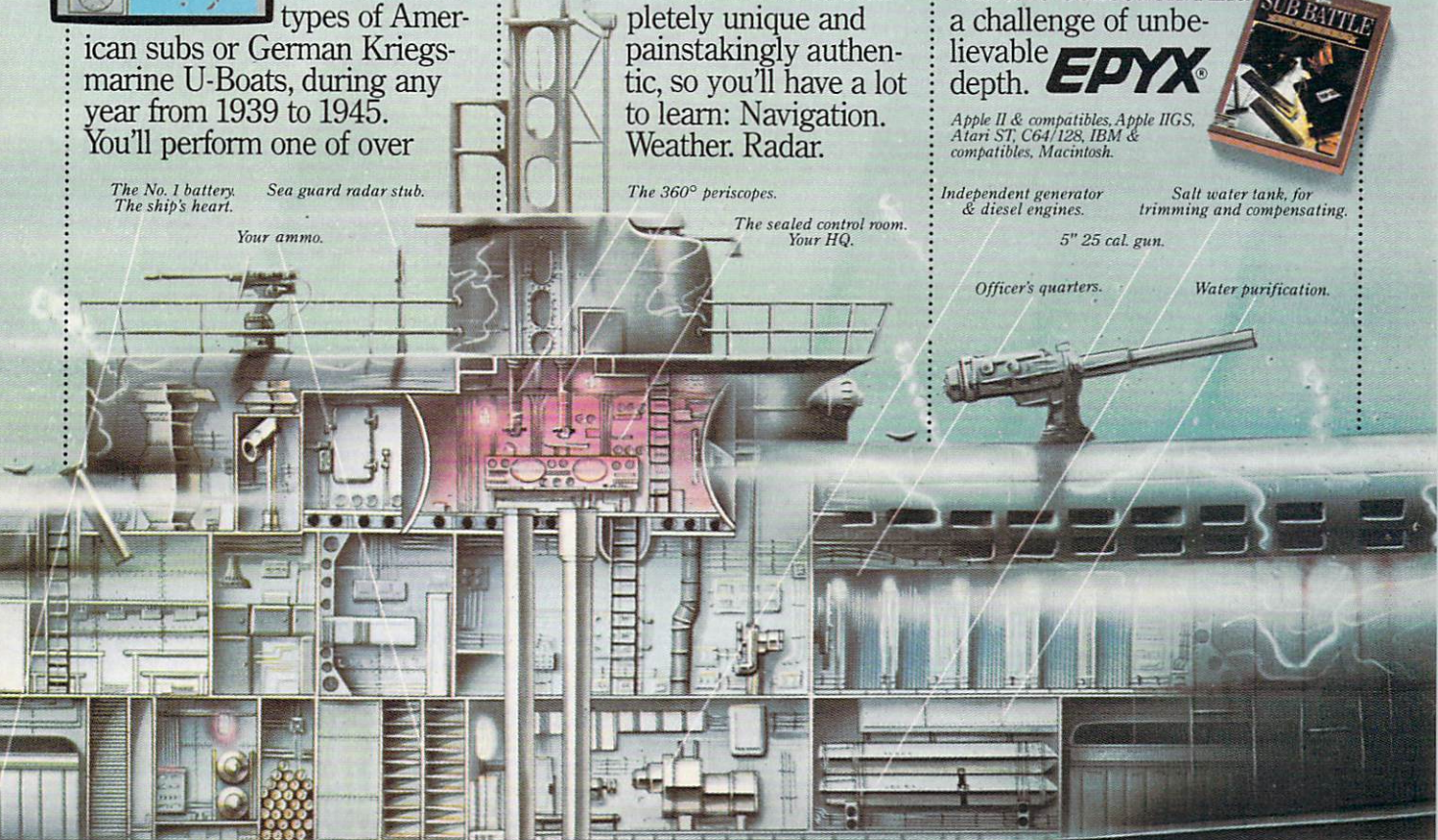
The No. 1 battery. The ship's heart.

Sea guard radar stub.

Your ammo.

The 360° periscopes.

The sealed control room. Your HQ.



The Amiga—An Integrated Computer?

Integrated software packages are the latest rage in software. On some machines, notably the Apple II, integrated software is the top-ranked application.

Integrated software is a natural in these days of software-feature wars. At first, spreadsheets grew like wild ivy as they competed with each other by offering features from word processing and graphics programs. Eventually, true integrated software appeared, offering strong (if not definitive) individual applications tied together with a common user interface and a method of sharing data.

Why has this software revolution bypassed the Amiga, arguably the most powerful of home computers? Because (in theory, at least) every application that runs on the multitasking Amiga is automatically integrated with each and every other application that's currently running.

How does this work? Take a simple application—the NotePad program from the Extras 1.2 disk. NotePad is a simple

word processor. By opening several copies of NotePad, you can transfer portions of text from one document to another. Just select some text in an open NotePad window and cut or copy the text. Click into another active NotePad window and paste.

While it's useful to be able to copy text from one word processor to another, it's more important to be able to transfer data from two independent applications. Suppose, for instance, that you want to transfer data from a bowling league spreadsheet to a word processor. Just select some cells from the spreadsheet, copy, go to the word processor's window, and paste.

The beauty of the system is that it doesn't matter what word processor you're using. It doesn't matter what spreadsheet you're using. Use your favorites.

But, as the worn saying goes, there's good news and there's bad news.

Bad news first: Few Amiga applica-

tions are so agreeable. To support these transapplication data movements, each application must use the system's Clipboard device. Few do, but many companies are promising that their next products will.

The good news: In many applications, you can save the data to the ramdisk from one application and then load it from another. This works because almost all file handling on the Amiga uses IFF, a file format agreed upon by Commodore and Electronic Arts in the earliest days of the Amiga.

Despite the fact that the Amiga is an integrated computer, and despite the fact that many other computers will someday become integrated computers, too (as their own multitasking operating systems take hold), the concept of integrated software is a powerful marketing force. In fact, two integrated software packages for the Amiga are said to be near completion. Look to the pages of future issues of *COMPUTE!* for more information.

— Rhett Anderson

information back and forth between applications, though. It also means that each application's interface behaves similarly. Part of the reason why integrated programs are so popular and efficient is that their parts often share a common method of operation. *AppleWorks'* three applications share many commands and keystrokes—enough to make learning the basics of one application easier if you've already mastered one of the others.

So what does *AppleWorks* offer?

Simplicity is at the top of the list. You can pick up *AppleWorks* and use it with very little investment in learning or training time. You can write with the word processor or enter information in the database after just a little peering into the manuals. Menus and other aids help beginning computer users but don't get too much in the way of the experienced user. Keypresses and commands are logically arranged and named. Open Apple-Z in the spreadsheet, for example, means *Zoom*. Open Apple-A in the database means *Arrange*.

AppleWorks offers value in other ways as well. Buying three separate applications may give you more power in each program, but the cost—both in time and money—may be daunting even to the expert Apple user. *AppleWorks* presents three canned applications wrapped up with a desktop and the way to exchange information.

You could do worse. *AppleWorks* didn't become so phenomenally widespread because of marketing or support. In fact, until its departure from Apple and arrival at Claris, Apple's software publishing spinoff, *AppleWorks* was rarely promoted and never supported. It's a bargain in many ways for the novice computer user, the person who wants to have a little of everything to get started. But the beauty, and strength, of *AppleWorks* is that it has more than enough to keep people working with it long after they've graduated from the ranks of nervous, first-time computer users.

— Gregg Keizer

Microsoft Works



In 1987, Microsoft released *Works* for the IBM PC. *Works* was already a popular package for the Macintosh, and the PC version is a lot like its older cousin. Ease of use and versatility make this package a good choice.

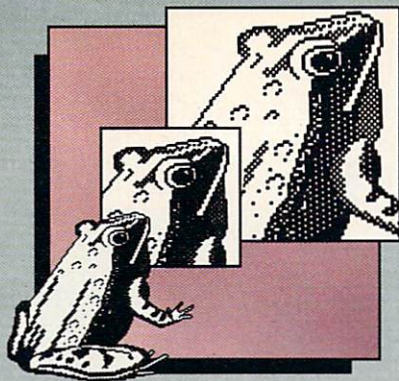
Both versions are very similar—most of the packages' differences are rooted in the disparate interfaces. The PC version of *Works* has some new features which haven't been added to the Macintosh version yet, but you can expect the two to keep up with each other in the future.

Both versions of *Works* have the same tools: a word processor, a database, a spreadsheet, and a communications module.

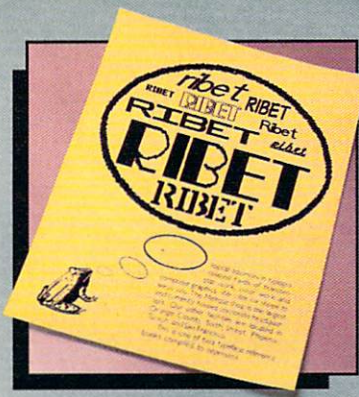
The word processor, an abbreviated rendition of Microsoft's *Word*, has all the editing features you'd find in more advanced packages. Formatting options include four kinds of text alignment, two kinds of line spacing, and several character fonts and styles. Each version of *Works* comes with a spelling checker. *Works* also lets you include graphics in text, but it doesn't go much further than that as far as page layout is concerned.

In the database, you can design simple forms, perform complex searches, sort entries, and generate reports. You can match records by comparative criteria, and you can use *and* and *or* statements to make your searches flexible and specific. The database has space for 4096 records, and each record can have 256 fields.

The dimensions of the *Works* spreadsheet are the same as the database's—4096 rows \times 256 fields. Until you need complicated calculations, one spreadsheet is pretty much like another. *Works'* spreadsheet offers more than 50 functions for mathematical calculations. These functions range



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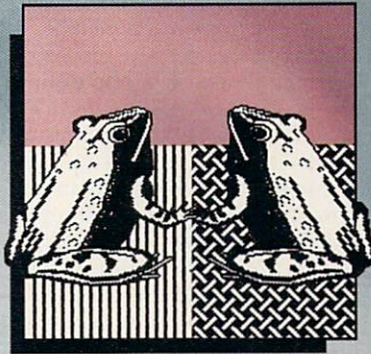
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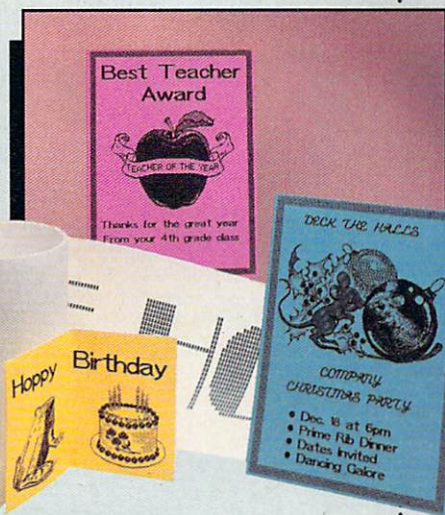
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From the spreadsheet, you can produce seven different graphic representations of numerical data. The charts look terrific, and you can manipulate them in many ways. The PC version's charts are more advanced, partly because they can use color and partly because you can manipulate the elements of the graphic. Through a dialog box, you can change colors and patterns of chart elements. You can also explode portions of a pie chart.

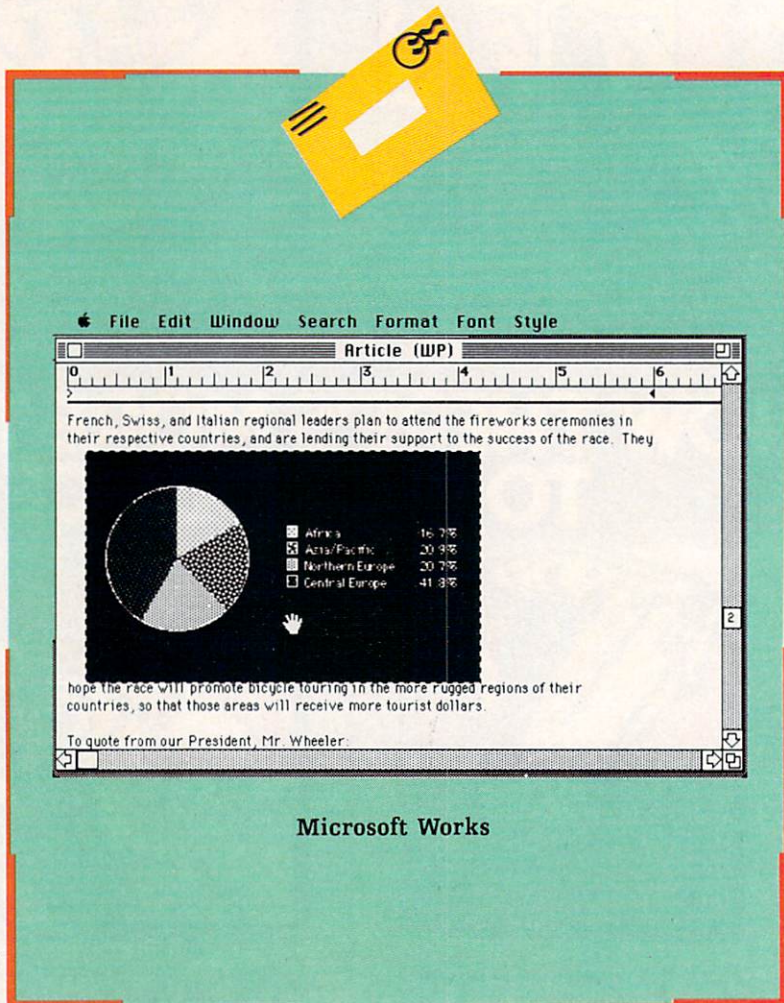
In the communications module, you can store settings and phone numbers for connecting to other computers and online services. Once those settings are stored, telecommunications is a simple process. As with all of *Works*, the procedure is menu-driven, which means you don't have to remember any unusual syntax or commands. It's very easy to use.

Learning to use these applications is simplified by an excellent online tutorial. It's ideal for new users because it introduces each concept as each application is demonstrated.

The interface in *Works*, as in any good integrated package, is the same from one module to the next. The Edit and File menus are also constant. You can have multiple files of any kind open at the same time. A Window menu appears in each application; from there, you can always get to other open files.

To transfer information from one file to another, you use the same editing operations between windows that you use within a window. For example, to copy a portion of a spreadsheet into a word processing document, you simply select a portion of the spreadsheet, choose Copy from the Edit menu,

choose the word processor file from the Window menu, place the cursor where you want the portion of the spreadsheet to appear, and hit Return.



Microsoft Works

Dream On

What would you find in the ideal integrated package? To start with, you'd find a lot of applications. They'd be well-designed, up-to-date applications, and they'd be easy to use. Each one would be designed with all the others in mind; each would seamlessly coordinate with each other; and each would have the power and features of a complete, stand-alone application.

Consider this mythical package: *The Five Musketeers* offers full-powered word processor, graphics, database, spreadsheet, and communications applications. The word processor, for example, not only has all the usual features for cutting and pasting, formatting, and printing, but also has a brilliant, lightning-fast spelling checker that can recognize when you meant to use *than* in place of *then*. The

word processor has a thesaurus, page preview (for seeing how the document will look *before* it's printed), and macros. Dare you dream? It even lets you do interactive page layout with graphics and text.

The graphics application is a paint package that lets you draw complex illustrations. The database is relational, not a flat-file manager, so it lets you link one form to another. The spreadsheet has every statistical and financial formula you'd ever need. The communications package is fast, and it remembers how to connect to your favorite services. Moving between files of different types is only a keystroke or mouse click away, and the package is very easy to learn.

Of course, in a finite universe, you can't have everything. Most good integrated packages offer a majority of the elements that make up an ideal package.

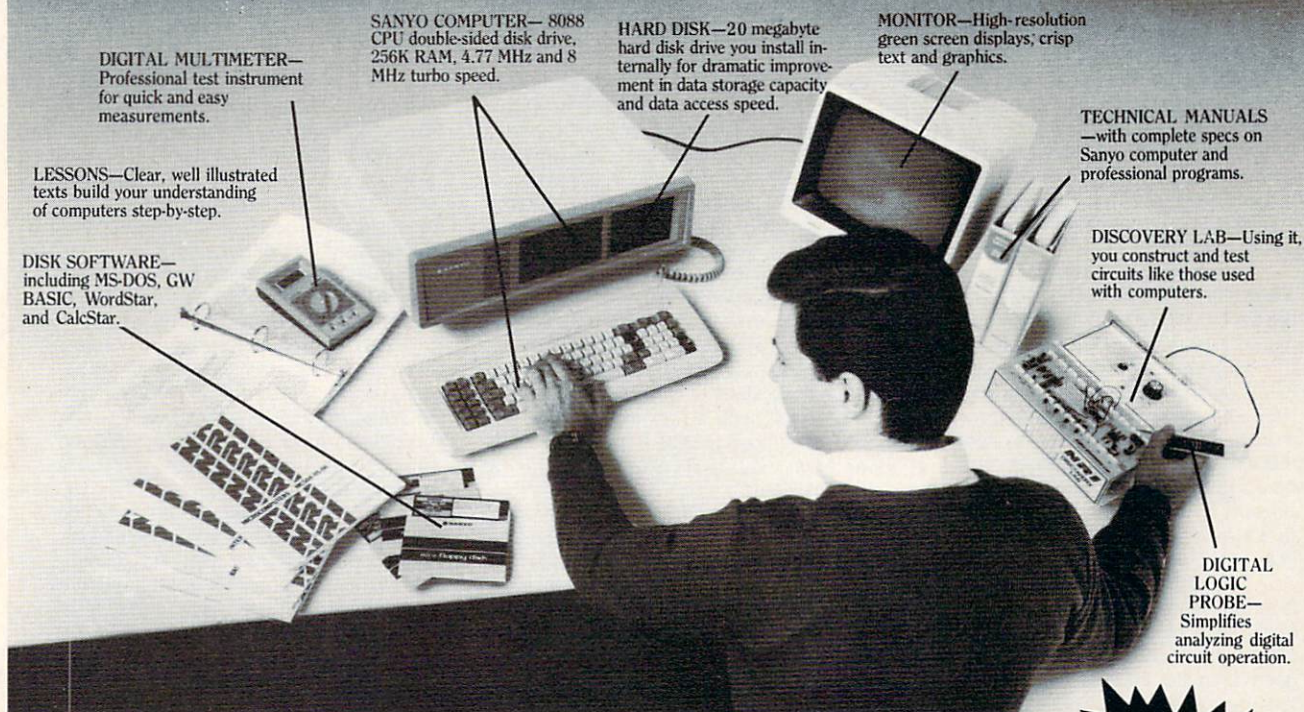
The balances and counterbalances are what make the buying decision difficult.

You must always balance price against features: Would you rather pay less than \$200 or have a thesaurus with your word processing applications? You must always balance speed against capabilities: Would you rather have a speedy spelling checker or a package that checks for usage errors *and* spelling mistakes? You must always balance ease of use against flexibility: Would you rather be working with the program immediately or have the ability to edit fill patterns in pie charts?

You won't find *The Five Musketeers* on any shelves yet. But give the software industry a few years, and you might find that the standard integrated package does *everything*—even make coffee.

— Heidi E. H. Aycock

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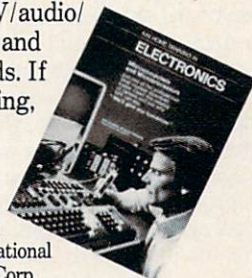
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PCs Get Graphic

Don't think that Macintosh owners have all the fun. PC users who want to get graphic now have three interfaces from which to choose: *DeskMate*, Tandy's newly enhanced environment; *GEM*, DRI's icon-based interface; and *Windows*, Microsoft's high-end environment.

These three graphics environments are extensions of MS-DOS; that is, they all put a friendly face on DOS (and take extra memory for themselves). Each allows you to perform standard file-management functions such as copying, renaming, and viewing; each is easier to navigate with a mouse; and each environment uses your machine's graphics capability to create a desktop metaphor. Perhaps most important is that applications run under these environments present the same interface to the user.

Tandy introduced its *DeskMate* interface four years ago. It began as a simple, text-based environment for the Tandy 1000 computer line. *DeskMate* has undergone dramatic improvement in the last four years and has evolved into a powerful graphics interface aimed at the larger PC community. But *DeskMate*'s creators have never lost sight of their initial goal of providing a comfortable computing environment for the average user.

DeskMate's desktop is distinctive. Al-

though a traditional menu bar lines the top of the screen with headings for Desk Accessories, File, Directory, Disk, View, and Build, the majority of the display consists of application boxes. An application box contains the name of an executable program and its data files. To run an application, you can either point to the application's name and shoot (that is, click the mouse button or press the Enter key) or point to any of the application's files inside the box and shoot.

DeskMate's desk accessories include a calculator, a calendar, a clipboard, a note pad, and a phone list. These accessories are available from the desktop or from any of *DeskMate*'s built-in applications.

When DRI's *GEM* first appeared, it looked so much like the Macintosh display that Apple threatened DRI with a lawsuit. DRI settled out of court, agreeing to make several (mostly cosmetic) changes in the *GEM* interface.

GEM is the only one of these three interfaces to use file icons, which many people prefer to filenames. From the desktop, you can run any executable file (one with a .COM, .EXE, or .BAT extension) by simply double-clicking on its icon. In addition, you can install applications, telling *GEM* the types of extensions you use with each. Thereafter you can double-

click on any file with any extension associated with an executable file, and both will load. For example, if you tell *GEM* that your word processor uses files with extensions of .DOC and .TXT, you can double-click on any file with a .DOC or .TXT extension, and your word processor and the file both load into memory.

GEM's desk accessories are limited to a calculator and clock. A note pad and clipboard would be welcome additions.

Although *GEM* has never made a mark in the U.S. as an interface for the average computer user (*GEM* is more popular in the U.K. and in West Germany), it has become an important force in the desktop publishing world, with many products supporting it.

Microsoft's *Windows*, which is the model for OS/2's Presentation Manager, is the contender for the high-end PC interface championship. Unfortunately, it's power-hungry. To be really useful, it requires an AT-level computer with expanded memory. With this hardware, however, it's a powerful and flexible tool.

Although *Windows* has been available for some time, OS/2 has given a push to developers, and, as a result, applications are becoming increasingly common. As you might expect, these applications are aimed at high-end business users.

— Clifton Karnes

Navigating is one area where the PC version must learn from the Macintosh version of *Works*. The menu interface for the PC version is fairly clumsy without a mouse. You open menus by holding the Alt key and hitting a letter key—one that's not always the first in the name of the menu. Once the menu is open, you press the key which corresponds to a command—with no Alt key this time. You must open a menu every time you want to issue a command. In the Macintosh version of *Works*, you have keyboard shortcuts, so you don't have to point and click at a menu if you don't want to.

The Macintosh version isn't as complete as the PC version—mostly because the Macintosh version doesn't have a macro feature. (Macros are long strings of commands and characters which you can store in single-keystroke routines.) You can use *Works*' macros to reproduce some of the special features of more advanced packages. For example, you can record formatting commands in a macro and use it the same way you would use a style sheet in Microsoft's more full-featured word processor, *Word*. Microsoft would do well to include macros in the next Macintosh version of *Works*.

As with other integrated packages, if you need the basic tools for productivity, you'll get a lot out of *Works*. If you need more advanced features, plan to spend more money on single-application packages.

— Heidi E. H. Aycock □

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Blow Bubbles

Float through a mansion full of obstacles in Accolade's new action-arcade game, *Bubble Ghost*. Players must help a ghost blow his bubble through 35 rooms of a castle.

Along the way, players encounter bubble-popping spikes, knives, pins, needles, scissors, and shears. They also run across many other gadgets and ghouls, but secrets hidden in each room help players keep the bubble safe.

The Commodore 64 version of *Bubble Ghost* requires a joystick and has a suggested retail price of \$29.95. The IBM PC version requires a graphics card and sells for \$34.95. Amiga, Atari ST, and Apple IIGS versions sell for \$34.95, too.

Accolade, 550 S. Winchester Blvd., Suite 200, San Jose, CA 95128
Circle Reader Service Number 200.

Konami for Computers

Konami, one of the leading game producers for the Nintendo Entertainment System, has released two titles for the Commodore 64 and the IBM PC.

In *Contra*, players fight a guerrilla war against Red Falcon in Amazon jungles.

The player assumes the role of a guerrilla fighter in *Rush N' Attack*, too. Armed with only a knife, the fighter must rescue prisoners of war in an isolated camp.

Suggested retail price is \$29.95 for the Commodore version and \$34.95 for the IBM version.

Konami plans to release software for the Amiga later this year.

Konami, 815 Mittel Dr., Wood Dale, IL 60191
Circle Reader Service Number 201.

Commodore's Pro PCs

Commodore Business Machines has introduced its Professional Series III line of MS-DOS personal computers. The new series, designed for educational and small-business environments, in-

cludes the PC10-III and the PC20-III. Both computers are XT-compatible and feature built-in graphics, color, and mouse support.

Each computer features an 8088-1 microprocessor and three clock speeds—4.77 MHz, 7.16 MHz, and 10 MHz. Both computers have one 5/4-inch, 360K floppy drive; 640K of RAM; MS-DOS 3.2; and GW-BASIC. The PC20-III also comes with a factory-installed 20MB hard disk.

Built-in graphics adapters for CGA, MDA, Hercules, and Plantronics Color Plus are included. The package also has video and mouse interfaces and parallel and serial ports. Each machine has a PC 101 keyboard and a real-time clock-calendar with battery backup. You can expand the PCs with three full-length XT-compatible slots, an 8087 math-coprocessor socket, and a BIOS that automatically recognizes installed add-ons.



The Commodore PC10-III is an XT-compatible computer designed for educational and small-business use.

Mickey McLean

The suggested retail price of the PC10-III is \$999, and the PC20-III retails for \$1,499.

Commodore Business Machines, 1200 Wilson Dr., West Chester, PA 19380
Circle Reader Service Number 202.

Human vs. Computer

Microillusions' new arcade-style adventure for the Commodore 64 pits man against a powerful network of computers that control every aspect of society.

In *Main Frame*, a master computer called the TriComplex III heads a worldwide network that tries to annihilate man with a supply of battle-droids. Man's only hope is an uncompleted satellite called Orbiter that has not been linked to the TriComplex network.

The object of the game is to save the world using Orbiter and a sophisticated assortment of assault devices. The TriComplex must be shut down, and to do so the player must find its four main power switches, located below the ocean. During the adventure, players fight droids, assemble power units, and gather fuel. Action takes place in the air, underground, and underwater.

The joystick controls all aspects of the game, including movement, combat, and menu functions. Features include scrolling screens, graphics, and a soundtrack.

The suggested retail price for *Main Frame* is \$39.95.

Microillusions, 17408 Chatsworth St., Granada Hills, CA 91344
Circle Reader Service Number 203.

Huddle Up!

The Melbourne House, a member of the Mastertronic Group Ltd., has released *John Elway's Quarterback*, a computer football game. Translated from the arcade game of the same name, *Quarterback* allows players to participate in the game instead of making them stand on the sidelines coaching.

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The game features all 28 National Football League teams, and all team members are displayed in arcade-quality graphics and animation. Players must rely on strategy and skill, calling their own plays and then executing them.

The Apple and IBM versions of the game feature digitized sound effects.

The Commodore 64 version of *John Elway's Quarterback* has a suggested retail price of \$29.99. IBM PC and PS/2, Apple II, and Apple IIGS editions retail for \$34.99.

Mastertronic Int., Unit 9G, Mesa Business Center, 711 W. 17th St., Costa Mesa, CA 92627

Circle Reader Service Number 204.

Turn It Down!

Archelion Innovations has introduced a computer accessory that controls the volume output from system speakers. The VOLCOM volume control allows you to adjust the volume from a barely audible level to maximum output.

To install the unit, you must plug it in and mount the control knob. The unit draws no power from the system and can be transferred to another computer.

VOLCOM can be used with the Apple II series and IBM PCs and compatibles. The unit won't work with systems that use a PCB-mounted speaker,

such as the PS/2 Model 30. The suggested retail price is \$14.95.

Archelion Innovations, P.O. Box 8055, Blaine, WA 98230

Circle Reader Service Number 205.

Mouse/Joystick Combo

The MACH IV PLUS, a mouse replacement and joystick for Apple II and Macintosh computers, has been introduced by CH Products.

The unit has been engineered for all mouse-intensive applications software, including CAD, desktop publishing, and games. The MACH IV PLUS features an absolute mode and three rate modes of movement. The absolute mode tracks like a mouse, with the cursor following the stick position. In the rate modes, the cursor moves in the direction that the stick handle has followed from its center position. The rate modes are slow, medium, and fast.

By flipping a switch, the unit becomes a multibutton joystick for game applications. The joystick features electrical trims and variable-action controls.

The MACH IV PLUS works with all Apple II computers, but the Apple II and IIG require a mouse card. The unit works only as a mouse replacement on the Macintosh. The suggested retail price is \$89.95.

CH Products, 1225 Stone Dr., San Marcos, CA 92069

Circle Reader Service Number 206.

Broderbund at the Movies and on the Slopes

Broderbund Software has released two new software titles: *Star Wars* and *Downhill Challenge*.

Based on the George Lucas movie and the coin-operated videogame, *Star Wars* is an arcade adventure in which players assume the role of Luke Skywalker. Players pilot an X-Wing Fighter and attack the Empire's Death Star. The Commodore 64 version has a suggested retail price of \$29.95. The game is also available for the Atari ST and the Amiga for a suggested retail price of \$39.95.

Downhill Challenge is an interactive ski racing simulation featuring 3-D graphics. Players choose from downhill, slalom, giant slalom, and ski jumping. In each event, players can select runs for beginner, intermediate, or advanced skiers. The Commodore 64 version has a suggested retail price of \$24.95. Versions for the Apple IIGS, Amiga, Atari ST, IBM PC, Tandy, and PC compatibles sell for \$29.95.

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

Circle Reader Service Number 207.

COMPUTE!

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DRI Takes On MS-DOS; Apples and PCs Share Software; Amiga Goes Browsing; Mac Makes Mystery Files; 64 Gazes at the Stars; and ST Splits Its Personality

MS-DOS

The sixth annual PC Expo in New York, the world's largest computer show devoted exclusively to MS-DOS hardware and software, was held June 21-23 in Manhattan's Jacob K. Javits Convention Center. With over 2000 booths, 500 exhibitors, and nearly 50,000 attendees, this PC Expo turned out to be the biggest ever.

The show focuses on business and productivity products—everything from custom-designed mouse pads to 80386-powered screamers.

Who's Number 1?

There's a battle raging in the PC marketplace for the title *Number 1 Word Processor*. *WordPerfect* is the current leader, and WordPerfect Corporation is determined to keep its crown. At PC Expo, it was giving interested crowds detailed demonstrations of *WordPerfect* 5.0, its newest entry, designed to consolidate its top position.

Microsoft has been challenging *WordPerfect*, but until recently the Redmond-based company didn't have a candidate capable of unseating the mighty *WordPerfect*. Now,

with its recently released *Word* 4.0, Microsoft is ready to give *WordPerfect* a run for its money.

Microsoft's desire to do battle was clear from its emphasis at PC Expo. Despite the largest software catalog in the business, Microsoft was concentrating on two of its products: *Word* 4.0 and *Excel* (its super-spreadsheet intended to unseat *Lotus 1-2-3*).

Into this word processing power struggle comes Borland, the company that started with one product—*Turbo Pascal*—and has become a force to be reckoned with in both the languages and applications arenas.

Borland was demonstrating its soon-to-be-shipping, heavyweight word processor, *Sprint*. Billed as "the Professional Word Processor," *Sprint* clearly has its eye on the top spot on the word processing charts.

Since the first version of *Turbo Pascal*, Borland has made *speed* one of its watchwords, and *Sprint* is cashing in on this tradition. According to Borland, *Sprint* is faster than *WordPerfect*, *WordStar*, *Microsoft Word*, or *DisplayWrite*. *Sprint* is also designed to make it easy to change word processors: It will read and write the file formats used by the above products, and load and save pure ASCII files, as well.

Sprint has all the features you'd expect to find in a world-class word processor—spelling checker, thesaurus, macros, and so on—but perhaps the most impressive attribute is the flexibility of its user interface. You can make *Sprint* behave like most other popular word processing programs—at least at the keyboard level. If, for instance, you like *WordStar's* command structure, you can configure *Sprint* to use it; if you like *WordPerfect's*, you can have that instead. And Borland is initially bundling a collection

of user interfaces for other popular word processors, which makes switching to the program even easier.

Will *Sprint* unseat the giants? It's hard to say, but the program has a lot going for it: Not only does *Sprint* offer the power of the heavyweights; it retails for half the price of *Word* 4.0 or *WordPerfect*.

More Show Stuff

Making Prose Work. Getting a look at Reference Software's new *Grammatik III* wasn't easy. Judging from the activity at its booth, you'd have thought that Reference was giving away \$100 bills. What attracted the crowds, however, was the promise of producing error-free prose.

If you occasionally make grammatical errors (and it's a rare writer who doesn't), *Grammatik III* may be the program for you. *Grammatik* checks for errors in grammar, style, usage, and spelling. The program's most impressive feature is that instead of simply marking errors, it lets you interactively correct them.

Grammatik I (developed in the days of CP/M) and *Grammatik II* (just a year old now) have already made their marks as important tools for writers. *Grammatik III* should be even better.

On a Clear Day, You Can See Genoa. One theme at PC Expo was new graphics boards, with some of the most exciting products showing at Genoa's booth.

For monochrome-monitor owners who want to run both Hercules and CGA graphics, Genoa has an amazing new product, Super Spectrum. The Super Spectrum runs CGA color programs on monochrome monitors by simulating the colors with

shades of gray. The card also supports Hercules graphics on EGA monitors and has an ever-handy printer port. At \$200, the Super Spectrum is more expensive than a plain-vanilla Hercules-compatible card plus a CGA emulator (like *SIMCGA* or *Athena BIOS*), but the gray scaling and improved performance are more than worth the cost.

Color is a must for some people, and for those, Genoa was showing its new Super-VGA HiRes-10 card and its SuperEGA card (with 800 × 600 resolution). The Super-VGA is one of the new breed of wonder cards that, given the proper monitor, can do virtually anything—emulate any graphics mode, and at any time, any place. The card's most impressive feature is a beautiful 1024 × 768, 16-color mode. The SuperVGA HiRes-10 sells for a hefty \$645; the SuperEGA, for \$429.

Desktop Publishing for the Masses. One hot new area of interest in the microcomputer community is 24-pin (sometimes called 24-wire) printers. This was reflected in the booth manned by Epson.

A 24-pin printer combines the convenience and speed of traditional 9-pin dot-matrix printers with a good measure of the quality of laser printers. Epson is pursuing the 24-pin market aggressively, pitching its products as alternatives to lasers for any printing activity, but especially for desktop publishing.

Epson's 24-pin lineup now includes the LQ-500 (\$529), LQ-850 (\$899), LQ-1050 (\$1,199), and LQ-2500 (\$1,449).

RAM Drought Continues. There's very little good news about the shortage and accompanying high price of dynamic RAM chips. Prices in the last year have zoomed from \$70 a megabyte to almost \$500.

Perhaps the only bright spot in the U.S. is Micron, the lone American manufacturer of dynamic RAM chips. No one spent much time at the Micron booth—it seems no one can afford RAM anymore—but the Micron people were smiling. They're having a good year.

DRI's New DOS

In a lavish combination press conference—and-brunch, DRI told croissant-munching reporters and corporate buyers about several new products, including *Artline*, the latest addition to that company's stable of desktop publishing software. *Artline*, which DRI jointly developed with West Germany's CCP, combines the most important features of drawing and painting programs in one powerful package.

With *Artline*, you can create images freehand—just as you would in a paint program—and then manipulate them with powerful tools previously found only in dedicated object-oriented drawing programs.

Artline works with *GEM Desktop Publisher* and supports .IMG, .PCX, and .TIFF image formats. You'll need 640K, a hard disk, and a mouse to run the program. *Artline* sells for \$495.

Desktop publishing enthusiasts will be interested in DRI's new version of its popular page-composition program, *GEM Desktop Publisher 2.0*. The big news with this version is support for automatic hyphenation, kerning and tracking, internal line-art generation, more typefaces, and additional file compatibility. *Desktop Publisher 2.0*, which, according to DRI President and CEO, Dick Williams, "brings the full functionality of the Macintosh to the MS-DOS world," is aggressively priced at \$299.

One of DRI's most interesting new offerings is DR DOS, an MS-DOS-like operating system that Digital says is not only completely compatible with its better-known counterpart, but also smaller, faster, and more powerful. DRI is selling DR DOS to Far East clone makers to bundle with their computers, so it will be appearing in machines available in the U.S. soon.

There are currently no plans to make the OS available separately, but, according to Bill Beckham, DRI's operating systems marketing manager, that's an option the company is considering.

— Clifton Karnes

64 & 128

Run 5 magazine is the house organ of Australia's Strategic Studies Group (1747 Orleans Court, Walnut Creek, California 94598; 415-932-3019). Designed to support and supplement SSG's popular series of war games—*Reach for the Stars*, *Carriers at War*, *Battlefront*, and *Decisive Battles of the American Civil War*—the magazine is professionally produced and (for war gamers) always interesting. It comes out four times a year, and each issue is accompanied by two scenario disks. A year's subscription to the magazine costs \$15, and an annual subscription to the disks is \$50.

The most recent issue, for example, includes type-in scenarios (also available on disk) for *Carriers at War* and *Decisive Battles*, as well as the new rules for the third edition of *Reach for the Stars* and the first installment of a two-part historical overview of the American Civil War.

The issue also contains an editorial comment that demands a bit of reflection, especially for Commodore 64 owners. Along with the Apple II, the 64 has been the backbone of SSG's product line. It's a bit of an unpleasant surprise, therefore, to read editor Ian Trout's comment on an upcoming Civil War game.

"*Road to Appomattox* goes on," he writes, "although with the imminent demise of 8-bit machines, especially the 64, we have decided to develop this game for the larger machines."

Now, it takes no genius to realize that the 64 is well into middle age. Even Commo-

dore's attention is focused squarely on the Amiga. But with an installed base of over 7 million 64s, "imminent demise" seems a little unrealistic. Even if only a third of those 64s are still being used—the others either shelved or neglected by owners who have upgraded—that's still a worthwhile market to shoot for.

The problem is this: If development for the 64 stops, then the 64's demise will be quick. Witness what happened to the Atari 8-bit computers. But with the 64 still in production and several magazines and publishers still supporting it, there's no reason to stop producing software for the machine. Certainly, I look forward to SSG's efforts for Amiga and Macintosh, but the 64 has served them well, and I hope the company chooses not to abandon it.

Warp 10, Scotty

Meanwhile, the products continue for the 64/128 line.

Warpspeed, from Cinemaware (165 Thousand Oaks Boulevard, Suite 180, Westlake Village, California 91362; 805-495-6515; \$49.95), is a speed-up cartridge for the 64 and the 128. Unlike most cartridges, Warpspeed works in 64 mode and native 128 mode. Its genealogy is clearly through Epyx's Fast Load cartridge, the granddaddy of speed-up cartridges, with which Warpspeed shares a command structure. You invoke the main menu, for instance, by way of the English pound key, the same key Fast Load uses.

From the menu you can view the directory, enter a disk sector editor, give disk drive commands, enter the machine language monitor, or invoke the file and copy utilities. There are two kinds of disk copy. The single copier allows you to copy single- or double-sided disks using one or two drives; the process includes verifying for the original and the copy errors. Most disks can be copied with only two swaps, but the process takes about twice the time that the dual copier takes.

The dual copier, on the other hand, uses two 1571 drives to copy single-sided disks in about half a minute and double-sided disks in a little over a minute. To achieve its speed, the dual copier dispenses with some of the verification techniques.

File utilities include copying files (one or more), deleting files, selecting files, and issuing drive commands. Drive commands, preceded by the at sign (@), allow fast formatting, validation, and file deletion. They also provide a useful reset switch for the disk drive. If you choose not to use the main menu, you have access to a 1571 in double-sided mode, even with a 64. Also available are commands to renumber disk drives, disable the fast loader (but keep the wedge alive), and print the screen.

The sector editor and machine language monitor are integrated. To edit the disk, you can jump from sector to sector, editing text just by typing or editing other values in hexadecimal. At any point, you can edit the sector by invoking the machine language monitor, and you can print the contents of the sector. You can even edit the disk on one drive and save the results to the second drive. The machine language monitor is designed for flexibility with other monitors. With its other numerous features, the monitor contains a full DOS wedge and works with the sector editor.

More Games

Speaking of games, Data East (470 Needles Drive, San Jose, California 95112; 408-286-7074) is establishing itself as a leader in arcade games for the 64/128. Its products translate arcade versions into home computer versions, with offerings such as *Commando*, *Ikari Warriors*, and *Victory Road*.

Data East's latest releases are *Speed Buggy*, *Kid Niki*, and *Karnov*; they sell for \$29.95 each. In *Speed Buggy*, you drive your buggy through a series of obstacle courses, avoiding fences, rocks, and water and trying to balance on two

wheels to get through narrow gaps. Simple, challenging arcade action—this one's a winner.

Kid Niki follows a sword-wielding, young ninja warrior through numerous levels. The goal is to rescue his spike-haired girlfriend from an evil wizard. The action is a little cumbersome, but the interest level is sustained.

Finally, *Karnov* takes the bulky, fire-breathing Russian on a quest for the Lost Treasure of Babylon. He has nine levels to get through, and he can climb, jump, swim, run, and even fly. It takes a while to get through the first screen, but the graphics are extremely good and play is smooth.

Commodore 128 owners should check recent 64-mode software packages to see whether the disks will autoboot in 128 mode. *Speed Buggy* and *Kid Niki* autoboot quickly in 128 mode even though their manuals mention only the 64. In fact, other recent programs do the same, including Infocom's titles and Electronic Arts' *Bard's Tale III*. Like the Data East titles, *Bard's Tale III* makes no mention of this in the manual; in fact, disk access is profoundly improved for this program and the Infocom games when you use a 128 and a 1571.

Seeing Stars

Sky Travel is the newest offering from MicroIllusions (17408 Chatsworth Street, Granada Hills, California 91344; 818-360-3715; \$49.95), and it is stunning. Billed as an all-encompassing astronomy program, *Sky Travel* lets you watch the sky from any point on earth at any time in the past or future 10,000 years. Available for information and viewing are the planets of the solar system (except earth), Halley's comet, the sun, the moon, 88 constellations (with line drawings to show their shapes), and more than 1200 stars.

You can view the sky through a window with a variable width of 72 degrees, 36 degrees, 18 degrees, or 9 degrees. The default width, 72

degrees, gives you a good, wide picture. Focusing through the 36-degree width makes eclipses, transits, and occultations more visible (through the program I learned what these terms mean), while 18- or 9-degree windows are in fact low-power telescopes.

Are there any weaknesses here? Aside from the 64's rather slow redrawing of the sky, I can't find any problems, but I'm also no astronomy expert. The manual is superb, offering not only the terminology of astronomy but also demonstrations of what the terms represent in the sky. It shows you how to switch to September 15, 1186, when Mercury, Venus, Mars, Jupiter, Saturn, and the moon were all within a narrow viewing range of the sun. It offers suggestions on using the program to determine accurate historical dates. And it even takes you back 2000 years, with a possible explanation of the Star of Bethlehem. Add to this a very useful group of appendices, an informative glossary, and an extensive bibliography, and you have a first-class program.

— Neil Randall

APPLE II

It's never been more difficult to decide which computer is best for your home, office, or classroom. Apple II computers, long the darling of home and school users, are being challenged by IBM, its PCs, and the scores of manufacturers putting out PC compatibles

and clones. The pricing of clones is, to say the least, aggressive when compared with Apple's sticker prices—that's forcing many software publishers to come out with a PC version of their new releases *before* they bring out an Apple version. To make it still harder to decide, some software is only available on one of the two systems. *AppleWorks*, of course, only runs on Apples; *Lotus 1-2-3* only works on PCs.

In the best of all possible worlds, all computers would be able to run software of any type. Unfortunately, the best world isn't here yet. But wouldn't it be nice to at least run both Apple and IBM PC programs on the same machine?

A number of people think so, and they've created several solutions.

The best known solution for Apple owners is Applied Engineering's PC Transporter, basically an IBM PC on a card that goes inside an Apple IIe or IIgs. Although it's not easy to install (even with its clear instructions), the PC Transporter does let you continue to use your current peripherals, such as disk drives, monitor, and printer. To run almost all MS-DOS software, you need only the PC Transporter and an IBM-compatible disk drive (Applied Engineering sells these, too).

The advantages of buying a PC Transporter instead of another computer are subjective, however, since the price of the card and drive together is nearly equal to a similarly equipped PC clone. Getting two machines onto one desk is a big plus if you're tight for space; classrooms and school computer labs may be a place where PC Transporters are attractive for this reason alone.

Sharing peripherals, even one-minded peripherals like the ImageWriter, is another of the Transporter's advantages. Exchanging data between Apple and IBM PC format is another reason to consider the Transporter, since the process is much simpler than sending data from one machine to another via modems or direct cabling. Applied Engineering (P.O. Box 5100, Dallas, Texas 75011; 214-241-6060) sells the

COMPUTE! specific

PC Transporter in several configurations. A board with 384K of RAM (256K in PC mode) runs \$519; 768K (640K in PC mode) costs \$759; a single PC-compatible drive is priced at \$269 (the board prices have recently risen due to RAM price increases).

Another solution, one taking the two-computers-in-one-box theme to its logical conclusion, comes from the Korean electronics giant Daewoo, through its U.S. arm Cordata (1055 West Victoria Street, Compton, California 90220; 213-603-2901). Called the WPC Bridge, it's a computer that, for all its ungainly looks, runs most IBM PC and Apple II software. The single plastic case encloses a 12-inch green-screen monochrome monitor, two 5¼-inch disk drives, and the computer itself. The keyboard, which is in the IBM style, is detachable and is the only component not part of the plastic case.

The WPC Bridge is really an IBM compatible with a Trackstar board installed. (The Trackstar, from Diamond Computer Systems—470F Lakeside Drive, Sunnyvale, California 94086; 408-736-2000—sells for \$395 and is almost the opposite of the PC Transporter—it packs the equivalent of an Apple II on a PC board.) For \$1,695, Cordata has built a 512K PC clone with an 8088 microprocessor able to run at the classic 4.77 MHz speed and the faster Turbo XT-like speed of 8 MHz. CGA and monochrome graphics are both supported, although an external monitor is necessary to display color.

The Apple end of things is less impressive, since the Trackstar board contains only 128K and isn't expandable. This restriction can put a crimp in using the Apple II's standard software, *AppleWorks*. The Apple II's various graphics modes are supported and include 40- and 80-column, lo-res, and double-hi-res modes. Again, to actually see color, you'll have to have an external color composite or RGB monitor.

Who, then, would be in the market for a WPC Bridge? The machine seems tailor-made for the education mar-

ketplace; its rugged construction and all-in-one case mean less to worry about when dozens of little (and not so little) hands are on the machine in any one day. Another reason why schools might turn to the WPC Bridge stems from their reliance on software other than *AppleWorks*—software that doesn't require or use more than the standard 128K of RAM. Other potential buyers might be those people who have room for only one machine in their home computer room, but who find it necessary to have both IBM and Apple systems, perhaps because an IBM is used at work, while an Apple helps teach the kids at school.

Neither bridging solution, however, takes into consideration the Apple IIgs. As Apple II software increasingly comes to mean IIgs software, anyone with a PC Transporter (unless it's installed in a IIgs) or a WPC Bridge is going to miss out on the most up-to-date Apple programs.

Franklin Forgotten

Remember Franklin Computer Corporation? It was the company that made the Franklin, an Apple II-compatible computer, in the early 1980s. At first wildly successful (the company's income rose to the \$70-million range in 1984), Franklin had to file for bankruptcy under Chapter 11 in 1984 after Apple won a copyright-infringement case against it.

Apple claimed that Franklin had copied the Apple II's DOS; Apple was awarded a judgment in excess of \$2 million when it won the case, and Franklin was forced to alter its DOS. Even though Franklin managed to change its computer's DOS while retaining its ability to run Apple II software, sales never recovered.

Now, though, Franklin is back making money, but not by making personal computers. Instead, its bread and butter is the Spelling Ace, a small dedicated spelling checker about the size of a paperback.

Four models of the Ace are currently available, ranging in price from \$70 to \$130.

The Ace is attractive because it lets users type in words—close guesses count since the machine looks up words entered phonetically—and then displays the correct spelling on its small screen. Franklin's Ace uses the *Merriam-Webster Dictionary*, a high-quality resource that some of the best personal computer spell-checking software uses as well.

The Spelling Ace is a hot electronic item—600,000 of them have been sold—that has brought Franklin back into the black. This year, according to some estimates, the company will earn \$10 million on sales of \$65 million.

With that much money at stake, competition is heating up. Several other electronics companies, including Seiko and Video Technology (makers, incidentally, of the current Apple II clone, the Laser 128) are planning on releasing similar products soon. Franklin, though, isn't standing still; it's considering other dedicated machines—an electronic Bible, an electronic encyclopedia, and a dedicated SAT preparation computer are some of the possibilities.

Disabled Resource

With Apple II computers so strong in the schools, it's no wonder that they've been the leaders in computerized help for the disabled in America's schools.

One of the reasons for this is the wide variety of hardware that's been developed especially for the disabled, including such landmark products as the Adaptive Firmware Card, a board that allows educators to connect a wide variety of input devices to the Apple computer. Other hardware—and specially developed software, too—can make it easier for the disabled to communicate and learn.

One of the best resources for anyone involved with the disabled and computers is the bimonthly newspaper *Closing*

the Gap. Published in Minnesota, *Closing the Gap* contains news, reviews, evaluations, and hands-on information about computers, other hardware, and software. The most recent issue, for instance, included a feature on the Touch Window, a graphics tablet-like device that acts as a screen overlay compatible with several Apple II programs; the user simply touches the screen instead of positioning a cursor with a joystick, a mouse, or the arrow keys.

Closing the Gap is not an Apple II-specific newspaper—the IBM PC and compatibles have made inroads into education (and elsewhere), so the newspaper brings PC products and peripherals to readers' attention, too.

A one-year subscription (six issues) to *Closing the Gap* costs \$21. You can contact the newspaper at P.O. Box 68, Henderson, Minnesota 56044; (612) 248-3294.

—Gregg Keizer

AMIGA

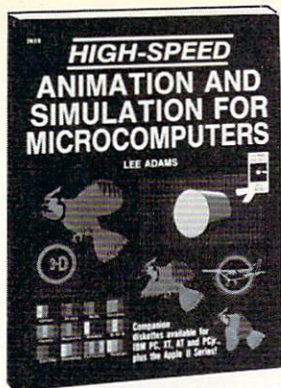
Browser is a public domain replacement for Workbench, written by Peter da Silva. You can use it in conjunction with Workbench to add Browser's unique capabilities to your system or in place of Workbench for a totally new operating environment. You can start Browser by double-clicking the Browser icon or by adding the command *RUN Browser* to your startup-sequence file.

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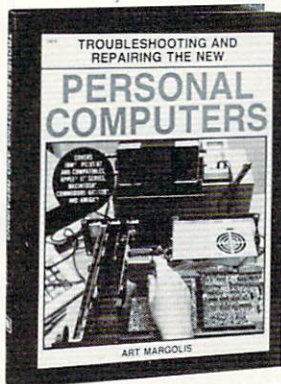
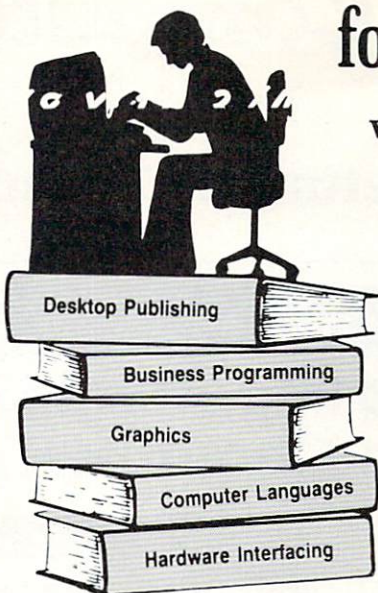
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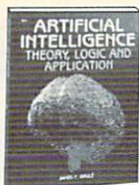
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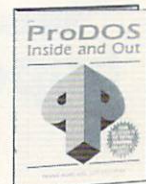
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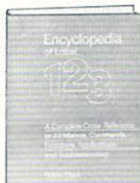
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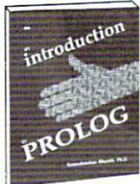
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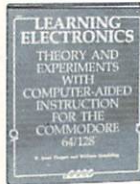
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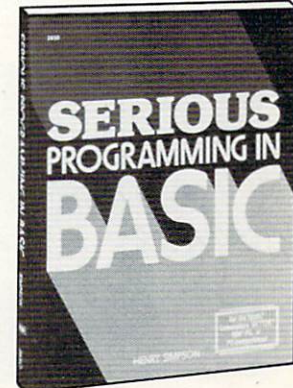
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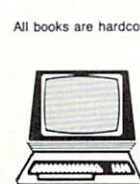
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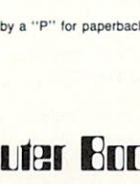
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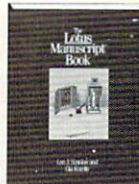
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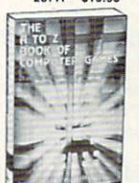
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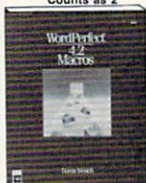
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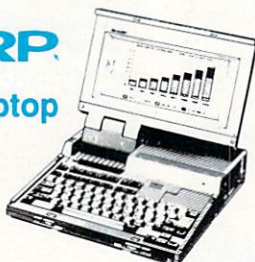
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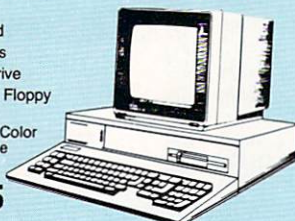
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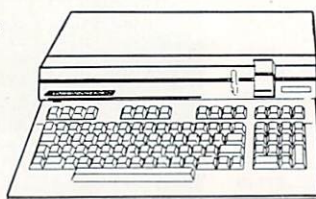
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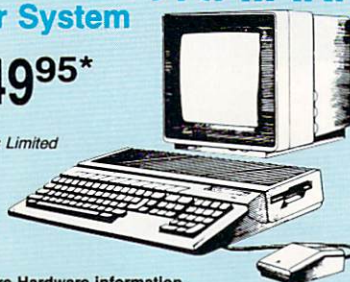


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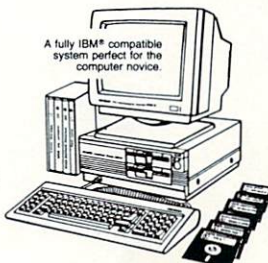
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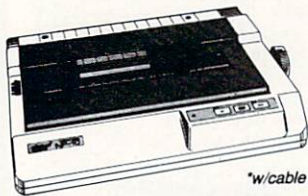


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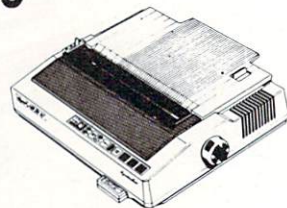
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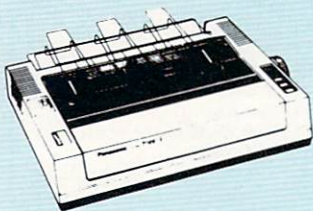
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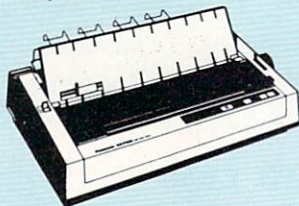
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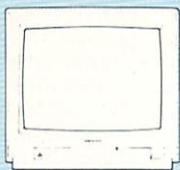
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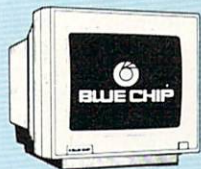
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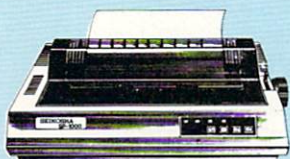
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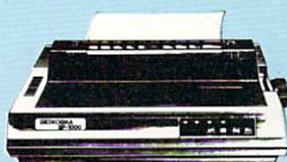


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Please refer to previous pages for ordering information.



continued from page 48

might see *RAM Disk: and Workbench*. Instead of Workbench's icon-oriented environment, Browser shows volumes, folders, and files by name. This display is similar to the Macintosh option Show By Name. On the default screen, folders are red and files are white.

A major attraction of Browser is that all files are displayed—not just the ones with info files. With Browser, you can get to files that previously could be accessed only with the CLI (Command Line Interface). For example, you can drag new files into the *c* (command) directory.

To move through the directory structure, just double-click on a volume or folder. A new window shows the directory you've chosen. The windows are equipped with gadgets for depth arrangement (which brings windows out from behind other windows), scrolling, sizing, and closing.

To launch a program, double-click on a filename. If the program lacks an info file, Browser will ask whether you are sure that you want to run it. Some programs designed for the CLI environment crash the computer when run from the Workbench or Browser. You'll need to use trial and error to discover which ones can be run from Browser.

When a Browser window is active, you have two new menus. The Browser menu lets you Open, Close, and Rescan windows; Delete or Rename files and folders; Make a new folder; or Quit Browser. You can add any executable file to the second menu, Tools. For instance, you can add your compiler and linker, your favorite paint program, and a text reader to Tools, and then start these programs by selecting them from the menu.

As it stands, Browser is a valid alternative to Workbench. The program's author is planning to improve it by allowing Browser to support programs that run only from the CLI. As with any public domain software, you have to look for Browser—it won't be advertised anywhere. Try PeopleLink at (800) 524-0100 (voice) or (800) 826-8855 (modem). You'll also find Browser

on Fred Fish disk #134. For a catalog of Fred Fish public domain disks, send an SASE and \$1 in postage to Fred Fish, 1346 West 10th Place, Tempe, Arizona 85281.

Two from COMPUTE!

COMPUTE!'s Amiga Games Disk should be ready by the time you read this. The disk includes popular games like *Laser Chess*, "Karma," and "Euchre." You'll find a dozen more games on the disk, including three new never-before-published programs.

The disk includes complete documentation for each program. The price is \$9.95. To order, send \$11.95 (includes \$2.00 postage and handling) to COMPUTE!'s Amiga Games Disk, P.O. Box 5188, Greensboro, North Carolina 27403.

The staff here at COMPUTE! Publications is also putting together *The Amiga User's Guide*, a magazine which will include features, reviews, a buyer's guide of the latest Amiga products, and more. *The Amiga User's Guide* will be available on newsstands and direct from COMPUTE! Publications after September 26, 1988, for \$3.95 (add \$2.00 shipping and handling if you're ordering direct from the address above). Watch for more information in future issues of *COMPUTE!*.

For Hackers Only

The second issue of *Transactor for the Amiga* has been sent to subscribers. If you're a serious Amiga programmer, you probably need this magazine. If you aren't interested in programming, or if you still consider yourself a beginner, *Transactor for the Amiga* is definitely not for you.

The first two issues of the magazine read like a Who's Who of Amiga Programming. Rob Peck, Jim Butterfield, Matt Dillon, Andy Finkle, Perry Kivolowitz, Bryce Nesbitt, and John Toebes are some of

the weighty voices contributing to the magazine. Discussions of debugging, common Amiga programming errors, and tutorials of important data structures are the bread and butter of this magazine.

Transactor for the Amiga is published bimonthly in Canada. A one-year subscription in the U.S. costs \$15; in Canada, the same subscription costs \$19. For information, contact *Transactor* at 85 West Wilmot Street, Unit 10, Richmond Hill, Ontario, Canada L4B1K7; or call (416) 764-5273 (Monday, Wednesday, and Friday only).

Better Video

Besides the standard peripherals (disk drives, printers, and modems), NewTek's *Digi-View* is the best-selling Amiga hardware peripheral. *Digi-View* is a small interface that connects the parallel port of the Amiga 1000 to a video camera. The Amiga 500 and 2000 require an inexpensive adapter.

The hardware hasn't changed, but *Digi-View*'s software has just undergone its second major revision. *Digi-View* 3.0's new features read like the wish list of a typical Amiga videophile.

Topping the bill is *overscan*. The border around the standard Amiga screen naturally bothers anyone who wants to videotape the computer's output. *Digi-View* (and other recently released Amiga video products) takes advantage of the Amiga's graphics flexibility to transcend all four borders. Overscan screens stretch beyond the edges of the screen. While this would be disastrous for some applications, such as word processing, it makes pictures look great.

Digi-View was the first product to use the Amiga's special HAM (Hold And Modify) video mode. Digitized pictures in HAM mode take advantage of the entire 4096-color spectrum of the Amiga. *Digi-View* 3.0 adds another video mode—EHB (Extra Half Brite). While the screens made in the 64-color EHB don't rival

HAM screens, the pictures are still very good—much better than those created in the standard 32-color mode. Because of technical differences between EHB and HAM modes, EHB images are easier to manipulate than are HAM images. This should make EHB a popular mode for game and animation programmers. One drawback—EHB is available only on Amiga 500s, 2000s, and late-model 1000s. Those people with older 1000s can upgrade their Denise chips at any authorized Commodore dealer's.

Digi-View 3.0 offers a new line-art mode, which makes it easy to digitize black-and-white line art and logos. This new mode simplifies a process that was a chore with previous versions of the software.

Digi-View (hardware and software) is available for \$199.95 from NewTek, 115 West Crane Street, Topeka, Kansas 66603; (800) 843-8934. A software upgrade to *Digi-View* 3.0 costs \$14.95. There is also a \$3 shipping and handling charge for the package.

Promoting Amiga

Commodore continues its Amiga promotions. The company's latest is directed at user groups. Every registered Commodore user group member who convinces someone to purchase an Amiga 500 or 2000 can earn credit toward the purchase of any piece of Commodore equipment.

Talk someone into buying an Amiga 2000, for instance, and you'll get a \$200 credit. Get someone to buy a 500, and you'll net a \$50 credit.

Contact Commodore (at 215-431-9100) or your local user group for more details.

In a related story, rumors say that the price of DRAMs (dynamic RAM chips) will push the price of the Amiga 500 up by \$100 and will increase the Amiga 2000's price by \$200. If the prices remain elevated during the Christmas season, sales of the less RAM-intensive 8-bit computers will probably hurt Amiga sales.

— Rhett Anderson

MAC

System 6.0 is available. Check with your nearest Apple dealer to get it. Although there are some compatibility problems—some software doesn't work correctly under the 6.0 system—they should all be ironed out by the time you read this. Acius, for instance, is upgrading *4th Dimension* so that it will work with the new system. Many new software packages due out in the fall won't work with anything earlier than the 6.0 set, which consists of System 6.0 and Finder 6.1.

Included with the new system software is Macro-Maker, a mouse-and-keyboard recorder that lets you store multiple keystrokes and mouse clicks on a single key. Macro-Maker is an INIT, so all you need to do is put it in your System Folder and it will appear in the Apple menu.

The Latest Word

Instead of a review this month, we have a preview brought to you courtesy of Microsoft. I don't like to just reword press releases, and usually I wait until I see at least a beta version of a program. This information, however, is interesting enough to pass on now. Here are some of the features you can expect in *Word 4.0*:

- WYSIWYG (What You See Is What You Get) document windows. If you create multiple columns, you'll see multiple columns, and you can edit in that view. *Word* will proba-

bly approach this in an it's-your-choice fashion, letting you select WYSIWYG editing that's a little slow or current text-display editing that's faster.

- A different way of handling graphics. Currently, a graphic is treated as a text character. If you type more text, the graphic moves accordingly. The new *Word* lets you glue down a picture in a specific spot on the page and then flow text around it. Microsoft's only illustration of this shows text flowing around a rectangular graphic. It's not clear whether text can flow around an irregular object, but if it could, Microsoft would probably say so.

- Automatic repagination. Finally. Page breaks change as you edit the document, not just when you manually repaginate.

- Table editing. Goodbye tabbed columns! Finally, a spreadsheet-like table function within a word processor.

- Practically total control over menus and keystrokes. You can assign your own keyboard equivalents to any menu command. And you can edit menus even more than you could in the previous version.

- A reworking of the outliner function. It was in dire need of revision.

- Warm links between *Word* and *Excel*. Change part of a spreadsheet document that's been pasted into *Word*, and the changes are reflected in the *Word* document. These warm links also work between *Word* and *SuperPaint*, using the current QuickSwitch feature that works with *MacPaint* and *MacDraw*. But that means you'll be using Switcher instead of MultiFinder, which might bring another set of problems.

Then, there are the little things that mean a lot, like a word-count feature and *smart* quotation marks. Smart quotation marks replace straight ones with typesetter's quotation marks, which face left and right. In the previous version, you could get the fancy quotation marks with Option-left bracket and Option-shift-left bracket. *Word 4.0* is really bundled, too, with *SuperPaint*

from Silicon Beach: *Word Finder*, the online thesaurus from Microlytics; and *Auto-Mac*, a macro recorder.

Sounds like a package worth waiting for. That's just what Microsoft wants you to do: wait. How long? Probably until the end of the year, since the company is aiming for an October release.

System Folder Mystery Files

Have you taken a look at your System Folder lately? Found any mysterious files in there, ones you *know* you didn't create? Well, don't assume your system's been attacked by a virus; there are many innocent, necessary files in your System Folder. They're created by other programs. Don't throw them out unless you know what you're doing.

First, there are preferences files. Programs that can be customized, such as *Word 3.0*, need to store the custom information someplace, and that place is the System Folder. *Word's* preferences file is called Word Settings. If you throw it out, *Word* reverts to all its original settings, such as Short Menu instead of Full Menu.

If you throw out the preferences file created by *SuperPaint* and you're using the 1.0 or 1.1 version, you can't run the program at all. *SuperPaint* looks for the file and can't go any further if it's missing. Later versions of *SuperPaint* create a preferences file if one can't be found, which is the way good software is supposed to behave. If any file in your System Folder has an application's name on it, you can be relatively sure it's a preferences file. You can be absolutely sure it belongs to the named program and is necessary to its smooth operation—except . . .

Except if you find working files in your System Folder, such as the old *MacPaint 1* and *MacPaint 2* or the current *Word Temp.x*; you can get rid of these safely. Normally, you wouldn't see them at all. Many

programs create temporary working files to keep track of things you do during a session or while working on a large document. Without these temporary files, it would be difficult to undo actions or revert to previous file versions. If there were no temporary file for storage, huge chunks of memory would be needed to keep track of everything. A well-behaved program erases its working files when it quits. However, if you suffer a system crash or reset the computer without quitting the program, or if anything else happens that interferes with a program's housekeeping, the working files might be left in the System Folder. You should get rid of these by dragging them to the trash.

Microsoft News

The leading Macintosh software publisher deserves its own section this month because it has a lot going on.

As I write, Microsoft has four major upgrades underway: *BASIC*, *Works*, *File*, and *Word*. The first two are much further along than the others and will be out before the *Word* upgrade. As yet, though, there is no official announcement about *BASIC* or *Works*.

On the other hand, Microsoft has been touting the *Word* upgrade, releasing all sorts of information about it. Companies normally do this as a kind of preemptive strike. If you know a terrific new *Word* is on the way, you'll hesitate before buying . . . what?

What does Microsoft see as its major competitor in the word processing field? *Full-Write Professional*, a program that needs a minimum of two megabytes of memory to run at a decent speed? That speed is calculated without MultiFinder running. Of course, it remains to be seen just how much memory the new *Word* will require. Or is it *WordPerfect* that's keeping Microsoft on its corporate toes?

Microsoft *File* is another program with official leaks of information: macros, better report generation, more speed

(thank goodness!), and a lot of label and form templates.

Microsoft's Mac people must be working overtime. *Excel 1.5* and *PowerPoint 2.0* shipped within weeks of each other. It sure doesn't sound like Microsoft is holding any grudges about that look-and-feel lawsuit.

— Sharon Zardetto Aker

ATARI ST

Antic Software's Cyber family of products continues to grow (Antic Software, 544 Second Street, San Francisco, California 94107; 800-234-7001). It started with Tom Hudson's *CAD 3-D 2.0* (\$89.95), a three-dimensional modeling package that allows complex shapes to be built from simpler ones.

Cyber-Control (\$59.95) addressed the problems of animation. With this desk accessory, you can create a script written in a BASIC-like language that automatically controls animations. Once a script has been debugged, the animation is generated.

Jim Kent's *Cyberpaint* (\$79.95) lets you generate two-dimensional animations or take *CAD 3-D* animations and add backgrounds, touch up each frame of the animation, or use some outstanding special effects (including manipulation of the entire animation while it's running).

A series of construction disks (\$29.95 each) is available, making it possible for those of average artistic ability to use the Cyber products. Each disk contains various

CAD 3-D objects that you can use in your own animations. Disks include *Future Design*, *Human Design*, and *Architectural Design*.

Also available from Cyber is *Cartoon Design Disk*, which contains several whimsical characters and *Cyber-Control* demonstration files. The *Cartoon Design Disk* requires a double-sided disk drive, but even with the large storage capacity, some of the files are compressed (ARCD). Also, you'll have to print no less than six files to get a complete set of documentation (no printed manual is included).

The Cyber family's automatic animation techniques are being used by a variety of professional organizations both for final products and for inexpensive previewing. Some organizations have even admitted to buying an ST so they could run Cyber products.

Publishing Wars

The desktop publishing wars on the ST are heating up. Timeworks' *Publisher ST* (Timeworks, 444 Lake Cook Road, Deerfield, Illinois, 60015; 312-948-9200; \$149.95) has most of the features you'll need, including direct graphics and text importing from popular packages, a spelling checker, multiple fonts and point sizes, WYSIWYG (What You See Is What You Get), style sheets, master pages, automatic kerning and hyphenation, a full text editor, automatic text flow, and laser printer support (Apple LaserWriter, H-P LaserJet, and Atari).

Graphics can be edited right in the document. Finally, the product's well-written manual will get a novice off to a strong start.

Not to be outdone, Softlogik (11131 South Towne Square Suite F, St. Louis, Missouri 63123; 314-894-8608) has released *Publishing Partner Professional* (\$199.95). In addition to cleaning up the bugs in the original *Publishing Partner* (which is still available for \$89.95), the new product allows graphics and text importation from various pack-

ages, full text editing, object rotation, up to six documents to be open at once, automatic kerning and hyphenation, WYSIWYG, multiple fonts, and style sheets. It also includes a spelling checker and laser printer support.

The program still doesn't use GEMDOS, though this means that output can be faster than packages that do use it. Unfortunately, this also limits the number of fonts that are available.

SoftLogik has also released *Partner Forms* (\$29.95). This program consists of samples of 40 different types of business forms (invoices, purchase orders, applications, receipts, and so on) for use and modification with *Publishing Partner*.

Two STs in One

Switchback, a new hardware product from Alpha Systems (1012 Skyland Drive, Macedonia, Ohio 44056; 216-374-7469; \$69.95), allows you to split the memory of your ST into separate partitions (provided you have at least one megabyte of memory) and run a program in each partition.

Switching back and forth between two applications is as simple as pressing the button on the Switchback device, which plugs into your printer port. When you press the button, the application in progress freezes; with a few keystrokes, you can save the current state of the application to the other partition, restore the same or a different program from the other partition, switch between the current program and the program stored in the other partition, or save the other partition to disk.

In theory, you could use this device to save a game (or other program) in any state in one partition and return to that state at any time.

There are some serious caveats, however. If you're thinking of using this product as a pirating tool, forget it. To use Switchback, you must run its software first. Thus, this product won't work with any program that autoboots

(doesn't allow access to the desktop), and, since it saves a file to disk by saving an image of memory, any program that checks the disk for its protection (or accesses the disk in any way after initial boot-up) will fail.

Alpha's advertising is misleading in this regard. The program also crashes with many applications, including the popular word processor *ST Writer*. But, it's worth the money to be able to switch between the applications that do work and to save games that allow access to the desktop.

More Mega

With the continuing memory-chip shortage, Atari has been promoting the Mega ST2 instead of the ST4. This makes sense, since twice as many ST2s can be built with the same number of the scarce chips. In fact, Atari has been offering a special package deal with the Atari Laser printer (it's rumored that dealers can get the two for \$2,100).

If you do buy a Mega, there's one thing worth noting: If you normally autoboot from a hard drive, you may be surprised the first time you go to boot from a floppy disk. Usually, you can boot from the A floppy drive by holding down the Control-Shift-Alternate keys simultaneously and turning on the computer. This works well with earlier machines, but *not* with the Mega.

According to the technical support at Supra (makers of popular ST hard drives), the problem is that the Mega handles keyboard input differently from earlier STs, and thus is unable to recognize that you're holding down the keys. The solution is to wait until the internal floppy drive light comes on and then press the three-key combination. This disables the hard drive's autoboot.

Because of the differences between the Mega and the ST, many programs don't work properly on the Mega. If at all possible, then, try out potential software purchases on a Mega, not an ST.

— David Plotkin □

buyer's guide

Science-Fiction Games

Looking for an escape into the future? Got wanderlust for the stars? Longing for the power of a world leader, the courage of a spaceship commander, or the cleverness of a hacker? Whether you're looking for futuristic adventure on Earth or in the heavens, there's a science-fiction game listed in this buyer's guide that will take you on a fantastic voyage.

Alien Fires

Paragon Software
Amiga, Atari ST, Commodore 64, IBM PC and compatibles
512K, Kickstart version 1.2 required for the Amiga
\$39.95 (Amiga, Atari ST)
\$29.95 (Commodore 64)
\$34.95 (IBM)
Distributed by Electronic Arts

As Time Lords, players search for Samuel Kurtz, who has created a time machine that must be destroyed. They can create characters by defining strengths and weaknesses in several areas. The game features a digitized rock sound track, scrolling 3-D graphics, and speech synthesis.

Aliens: The Computer Game

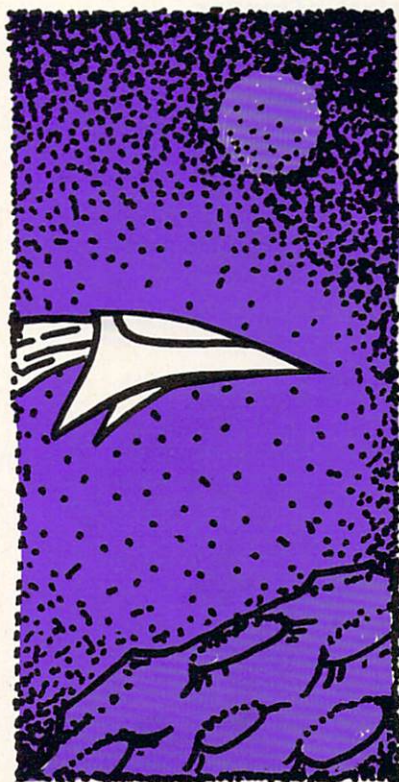
Mediagenic
Apple II, Commodore 64
\$14.95

Based on the movie, *Aliens* reproduces many of the elements in the motion picture, using simulations and arcade-style game features.

Arcticfox

Dynamix
Amiga, Apple II, Atari ST, Commodore 64, IBM PC and compatibles
\$29.95
Distributed by Electronic Arts

Arcticfox is a high-tech, high-speed snow tank which is Earth's only defense against aliens in the South Pole. Players ward off alien attacks with the heavily armed tank. The 3-D polar landscape includes mountains, crevasses, ice fields, and tundras.



Autoduel

Origin Systems
Amiga, Commodore 64
Joystick required
\$39.95

In the twenty-first century, players must carry out an FBI courier mission by building the biggest, most heavily armored vehicle possible using a variety of weapons.

Carrier Command

Rainbird
Amiga, Atari ST, IBM PC and compatibles
\$44.95 (Amiga, Atari ST)
\$34.95 (IBM)

In June 2166, players must populate a series of volcanic islands in the Southern Ocean before the enemy takes control. They control an aircraft carrier, a fighter squadron, and an amphibious-assault division. Arcade-style action takes place in 3-D graphics.

Colony

Mindscape
Macintosh
\$49.95

As a space marshal, the player investigates the disappearance of a space frontier colony, exploring labs, computer rooms, halls, offices, and homes. The game features hidden-surface 3-D animation, digitized sound effects, and six levels of play.

Dan Dare, Pilot of the Future

Electronic Arts
Commodore 64
\$19.95

Dan Dare searches for his cohorts on an atomic asteroid. Dan must rescue his friends and stop the as-

Caroline D. Hanlon

teroid from destroying Earth. The game features sound, animation, and 3-D graphics.

Deep Space: Operation Copernicus

Sir-Tech Software
Apple II, Commodore 64, IBM PC and compatibles
256K, CGA or EGA card required for IBM
64K required for Apple
\$39.95

In 2123, players pilot a Katana warship on its way to protect Earth's interests in the Asteroid Belt. Four missions in this space-combat program test flying and fighting skills. The game features 3-D graphics, and the ship's instrument panel is displayed onscreen.

Delta Patrol

Electronic Arts
Commodore 64
\$19.95

An elite police squadron patrols the Delta Sector, where it must terminate enemy forces. More than 200 alien attacks in more than 30 levels of competition will hinder players' progress.

Dream Zone

Baudville
Apple IIGS
\$49.95

Players become imprisoned in their own dreams. Escape requires logic, imagination, persistence, and a sense of humor. Players encounter magic riddles, strange beasts, a floating castle, and the Department of Information.

Echelon

Access
Amiga, Apple II, Atari ST, Commodore 64, IBM PC
\$44.95

Echelon is a twenty-first century, top-secret military facility where pilots learn to fly the Lockheed C-104 Tomahawk, a space-combat and -exploration vehicle. The player patrols a new zone and investigates strange events. Features include a bidirectional teleporter unit, 3-D screens, and the LipStik, a voice-activated headset used to give commands to the spacecraft.

Elite

Rainbird
Apple II, Commodore 64, IBM PC and compatibles
\$24.95 (Apple II, Commodore 64)
\$29.95 (IBM)

Elite tests combat, navigational, and entrepreneurial skills as players command a Cobra spaceship. Players earn money through legal and black market activities to equip their ships. No matter how the money is earned, the player must continue through space, destroying aliens and pirate ships along the way.

Empire

Interstel
Amiga, Atari ST, IBM PC and compatibles
512K required for Amiga and Atari ST
\$49.95
Distributed by Electronic Arts

Players must send forces to distant planets to build armed forces, form nations, and gather resources. The object of the game is to gain influence and control of the galaxy. The game features more than 30 commands.

Facing the Empire

MVP Software
IBM PC and compatibles
\$29.95

When the evil Morte Star Empire attacks the peaceful people of Lyra, the player steps in as Lyra's battle commander. The player builds Lyran fleets, develops defense and attack strategies, protects eight Lyran planets, and destroys the Morte bases and headquarters.

Fire and Forget

Titus Software
Amiga, Atari ST, IBM PC and compatibles
CGA or Hercules card required for IBM
\$39.95

As commander of the Thunder Master, the world's ultimate fighting machine, the player must protect Earth from the Inter-Galactic Liberation Organization, which is threatening to destroy the planet. A second player commands the magnetic levitation unit, Thunder Cloud. There are three levels of six conflicts ranging from guerrilla warfare to global war.

Force 7

Datasoft
Apple II, Commodore 64
\$19.95
Distributed by Electronic Arts

Players command a Special Forces unit sent to the planet Karis to rescue humans. The problem is that only one crew member at a time may be transported to the planet.

Galactic Frontier

Free Spirit Software
Commodore 64
\$29.95

Players explore space on a tour through stars, planets, and moons of the Milky Way galaxy. The program includes scientific data on each star and planet. Players seek stars and planets where an advanced race might be found.

Hacker II: The Doomsday Papers

Mediagenic
Apple II and IIGS, Commodore 64, IBM PC and compatibles, Macintosh
256K (IBM)
\$14.95 (Apple II, Commodore 64, IBM)
\$19.95 (Apple IIGS, Macintosh)

The object in this sequel to *Hacker* is to break into a computer and recover stolen government documents known as the *Doomsday Papers*. Only a few instructions are provided, including the MSFM Operational Manual, which contains top-secret, intelligence-gathering information.

Hitchhiker's Guide to the Galaxy

Solid Gold Software
Apple II, IBM PC and compatibles
\$14.95
Distributed by Mediagenic

Arthur Dent's house is going to be bulldozed to make way for a highway. This same fate awaits Earth. Players take part in a series of intergalactic adventures while trying to salvage their homes.

Impossible Mission II

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

In the twenty-fifth century, malicious mastermind Elvin returns to take over the world. He is based in a high-tech office complex filled with dark tunnels, surveillance cameras, human-seeking suicide robots, and time bombs. Players must collect secret code numbers to access the control room and defeat Elvin.

Jet Boys

Accolade
Commodore 64
Joystick required
\$14.95

Galactic terrorists try to prevent the jet pack-equipped commando from entering and deactivating a reactor room. One or two players can play this horizontally scrolling, arcade-style game.

Lunar Explorer

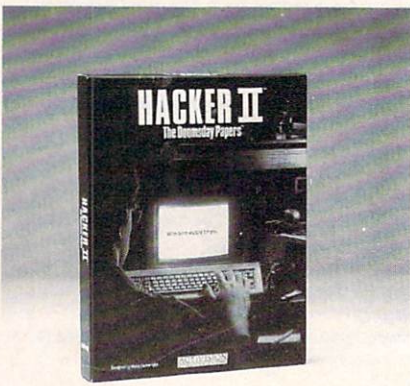
Spectrum HoloByte
Apple II, IBM PC and compatibles
48K required for Apple; 128K required for IBM
\$29.95

In *Lunar Explorer*, players pilot a lunar landing vehicle. Views include the moon base, lunar landscape, refueling stations, constellations, and the *Apollo XI* landing site. After training, the player circles the moon or skims over the lunar surface in the lander. There are also search-and-recover missions.

Magnetron

Broderbund
Commodore 64
\$14.95

The player pilots a photon fighter and battles Magnetron Generators, magnetic-force weapons that push, pull, and swirl the fighter. The player must destroy 50 alien war bases. There are 50 levels of increasing difficulty, and a game generator allows users to design enemy forces.



Players save the world by breaking into a computer file and retrieving stolen government documents in *Hacker II*.

Manhunter: New York

Sierra On-Line
Amiga, Apple II, IBM PC and compatibles,
Macintosh
256K and graphics card required for IBM
\$49.95

Two years after an alien invasion of New York City, players must track human activities and report them to the alien dictatorship. Players can choose between good—supporting the human underground—and evil—hunting humans and remaining loyal to the aliens. Features of the program include split screens and advanced windowing capabilities.

Neuromancer

Interplay Productions
Commodore 64
\$39.95
Distributed by Mediagenic

Neuromancer takes a renegade hacker into Cyberspace, an electronic dimension through which all computers are connected. The hacker tries to break into various computer systems using special weapons. The systems are tightly defended. The game features a digitized, original soundtrack by Devo.

Oo-Topos

Polarware Software
Amiga, Apple II, IBM PC and compatibles
\$29.95 (Amiga)
\$17.95 (Apple II)
\$19.95 (IBM)

The player must deliver a serum to Earth in time to save the planet from total annihilation. Along the way, the hero is taken prisoner on the planetoid Oo-Topos. The player uses text commands to guide the adventure, and the computer describes the action and locations with text and graphics.

Parallax

Mindscape
Commodore 64
\$29.95

An evil computer intelligence on a faraway planet plots the demise of Earth, and the player must stop it. The player must fight aliens and mad scientists before destroying the computer. The program features 3-D graphics.

Project: Space Station

Avantage
Apple II, IBM PC
256K, color graphics card required
\$14.95
Distributed by Accolade

Players design, build, operate, and manage a space station using a space shuttle. The person in charge must carefully budget finances, select a crew, and choose materials. Then the player can launch the shuttle and pilot it to the station.

Rad Warrior

Epyx
Apple II, Commodore 64, IBM PC and compatibles
\$24.95

In the year 2500 A.D., warrior Tal saves the human race from invaders by finding an antiradiation suit, traveling to the invaders' base, and destroying their power source. Along the way, Tal encounters mutated wildlife, acid rain, and enemy drones. This adventure is part of the Maxx-Out series, designed especially for 10- to 14-year-old players.

Reach for the Stars, Third Edition

Strategic Studies Group
Amiga, Apple II, Commodore 64, IBM PC and
compatibles
\$39.95 (Amiga, Apple II, Commodore 64)
\$44.95 (IBM)
Distributed by Electronic Arts

One to four players compete to colonize and populate empires in space by by improving industry, cleaning the environment, and building warships. Game options include natural disasters, solar debris, and xenophobes. A tutorial is included.

Roadwar 2000

Strategic Simulations
Amiga, Apple II and IIGS, Atari ST, Commodore 64,
IBM PC and compatibles
48K required for Apple; 512K required for Amiga,
Apple IIGS, and Atari ST; and 256K, CGA required
for IBM
\$39.95 (Amiga, Apple II, Atari ST, Commodore 64,
IBM)
\$44.95 (Apple IIGS)

In the year 2000, the United States is threatened by bacteriological warfare. The player must locate eight scientists and take them to a secret underground lab, where they will develop a lifesaving serum. Dangers include hordes of mutants and rival road gangs. *Roadwar Europa* is the sequel to this game.

Roadwars

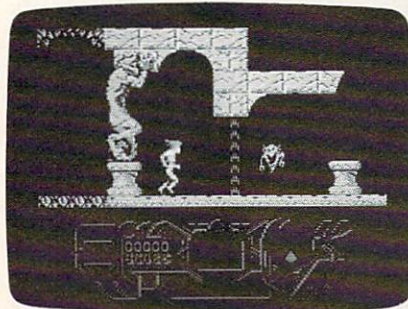
Arcadia
Amiga, Commodore 64
\$34.99 (Amiga)
\$29.99 (Commodore 64)
Distributed by Electronic Arts

In the twenty-fifth century, computers and robots do all the work. Computers control roadways which connect several moons. When one of those computers malfunctions, the player, commander of a battlesphere tank, must repair the roadway and clear debris. A laser cannon blasts barricades and aliens.

Rubicon Alliance

Datasoft
Apple II, Commodore 64, IBM PC and compatibles
Joystick required
\$19.95 (Apple, Commodore)
\$29.95 (IBM)
Distributed by Electronic Arts

When the planet Nono attempts to destroy the eight-planet Rubicon Alliance, the player takes the role of Hawkins, a Starfox space fighter, and embarks on an eight-stage mission to save the Alliance.



A futuristic warrior named Tal saves the human race from invaders in *Rad Warrior*.

Science Fiction Classics

Infocom
Commodore 64, 128
\$44.85

Science Fiction Classics is a collection of science-fiction games that includes *The Hitchhiker's Guide to the Galaxy*, *Planetfall*, and *A Mind Forever Voyaging*.

S.D.I.

Cinemaware
Amiga, Apple IIGS, Atari ST, Commodore 64,
IBM PC, Macintosh
\$49.95 (Amiga, Apple, Atari ST, Macintosh)
\$34.95 (Commodore 64)
\$39.95 (IBM)

Two young lovers—a general with the U.S. Strategic Defense Initiative and a Russian commander—must save the human race. As the general, the player must defend the U.S. against a sneak KGB missile attack and battle KGB rocket fighters in a 3-D flight simulator.

Sentinel Worlds

Electronic Arts
IBM PC and compatibles
EGA, CGA, or Tandy graphics card required
\$49.95

Raiders harass the player's three-planet system. Using onscreen maps, the player explores starships and planets. Screen display features a first-person view of the terrain, 85 animated characters, radar scanner data, and information on weapons, communications, and combat. Throughout the game, players can talk with the characters.

Silpheed

Sierra On-Line
Apple II, IBM PC and compatibles
256K, graphics card required for IBM
\$34.95

Controlling a Super Dogfighter, the ace pilot of Silpheed must defend the United Universe from an evil empire. This arcade-type game offers 20 levels of action, nine original musical compositions, and more than 30 enemy types, plus animation and rapid-fire action.

Skyfox II: The Cygnus Conflict

Electronic Arts
Commodore 64; IBM PC and compatibles
384K and color graphics card required
\$29.95

Players use the warp-speed space fighter, Skyfox, to fight for the Federation in the Cygnus Constellation. Skyfox's weapons include neutron disrupters, photon pulse bombs, antimatter mines. Seven scenarios cover more than 50 star bases. Action takes place in 3-D graphics at a fast-frame rate.

Slaygon

Microdeal
Amiga, Atari ST
\$39.95

Players must send Slaygon, a sophisticated military robot, to destroy the Cybordynamics Laboratory and thwart their plans to rule the world. Robot defenses include a cloaking device, a short-range scanner that warns of danger, and shields that absorb destructive energy. An information panel shows energy level, direction, and an overhead map view.

Technocop

Epyx
Atari ST
\$39.95

An elite police force protects the city from the international crime family, Death On Arrival. The crime computer is housed in the V-Max, a technologically advanced auto. Weapons include a computer wrist-watch, a criminal-radar locator, a snare net gun, and an .88 Magnum.

Terrorpods

Psygnosis Limited
Amiga, Atari ST
512K required
\$39.95
Distributed by CSS

A scrolling, 3-D playing field provides the background for this arcade-style space adventure. Traveling undercover, a Federation agent must find the secret of the Empire's war machine, Terrorpod. Before long, the Empire discovers the agent, and the player must find a way to survive—by mastering the trading style of Terrorpods. The game can be played in a variety of European languages, British English, or American English.

Time Bandit

Microdeal
Amiga, Atari ST
Color monitor required
\$39.95

As the Bandit, the player travels through space in search of treasure. Players can pilot the starship Excalibur and find its missing crew, bring peace to a western ghost town, or play in a high-stakes card game in the dungeons of Castle Greymoon. The dual-player mode allows two players to travel through more than 3000 screens.

Tracker

Rainbird
Atari ST, Commodore 64
\$44.95 (Atari ST)
\$39.95 (Commodore 64)

Tracker combines artificial intelligence with action and graphics to create a space-adventure game. The player defends against invading Cycloids by controlling eight skimmer craft. The Cycloids try to remember the player's strategy so it cannot be used again successfully.

Trinity

Infocom
Commodore 128
\$14.95

The last day of the player's London vacation is the first day of World War III. An H-Bomb will vaporize the city, and the player must escape to a secret universe to explore it and learn to control its power.

The Twilight Zone

First Row Software Publishing
Amiga, IBM PC and compatibles
\$39.95

As seemingly unrelated stories progress, they merge into one plot with a twist. Modeled after the television series, the program includes the "Twilight Zone" sound track as well as the characteristic prose style of Rod Serling.

Universe III: The Traveller's Return

Omnitrend Software
Amiga, Atari ST, IBM PC and compatibles,
Macintosh
512K required for Amiga, Atari ST, and Macintosh;
320K required for IBM
\$39.95

In this one-player, animated adventure, the player assumes the role of an emissary for another world. A mouse/keyboard parser is used to communicate commands as the player talks, trades, and sometimes fights with many characters. Two other packages are available in this series: *Universe I* and *Universe II*.

Visions of Aftermath: The Boomtown

Mindscape
IBM PC and compatibles
512K, CGA or EGA required
\$39.95

One to sixteen players attempt to survive and flourish in a post-nuclear war world. Computer-controlled variables help recreate the conditions of a radiated planet, including terrains, scenarios, and mutants. There are four win conditions, seven terrains, four scenarios, and five difficulty levels.

Wasteland

Electronic Arts
Apple II, Commodore 64
64K required
\$49.95 (Apple)
\$39.95 (Commodore)

In this role-playing science-fiction game, players attempt to survive in the postnuclear, radioactive southwest desert in the year 2087. As desert rangers, players protect other survivors from wandering mutants. Each player carries as many as 30 items and develops skills and attributes. There are more than 100 hours of gameplay, and the game can be saved at any time. □

Publishers of Science-Fiction Games

Access Software
2561 S. 1560 W
Woods Cross, UT 84087

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

Baudville
5380 52nd St. SE
Grand Rapids, MI 49508

Brøderbund
17 Paul Dr.
San Rafael, CA 94903

Cinemaware
4165 Thousand Oaks Blvd.
Westlake Village, CA 91362

Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404

Epyx
P.O. Box 8020
600 Galveston Rd.
Redwood City, CA 94063

Infocom
125 CambridgePark Dr.
Cambridge, MA 02140

Final Frontier Software
18307 Burbank Blvd.
Suite 108
Tarzana, CA 91356

First Row Software Publishing
900 E. 8th Ave.
Suite 300
King of Prussia, PA 19406

Free Spirit Software
905 W. Hillgrove
Suite 6
LaGrange, IL 60525

Masterplay Publishing
8417 Sun State St.
Tampa, FL 33614

Mediagenic (formerly Activision)
3885 Bohannon Dr.
Menlo Park, CA 94025

Microdeal
576 S. Telegraph Rd.
Pontiac, MI 48053

Mindscape
3444 Dundee Rd.
Northbrook, IL 60062

MVP Software
1035 Dallas SE
Grand Rapids, MI 49507

Omnitrend Software
P.O. Box 733
West Simsbury, CT 06092

Origin Systems
136 Harvey Rd.
Building B
Londonderry, NH 03053

PAR Software
P.O. Box 1089
Vancouver, WA 98666

Polarware
1055 Paramount Pkwy.
Suite A
Batavia, IL 60510

Psygnosis Limited
Distributed by CSS
2150 Executive Dr.
Addison, IL 60101

Rainbird
3885 Bohannon Dr.
Menlo Park, CA 94025

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

Simon & Schuster Software
A Gulf + Western Company
One Gulf + Western Plaza
New York, NY 10023

Sir-Tech Software
P.O. Box 245
Charlestown Ogdensburg Mall
Ogdensburg, NY 13669

Spectrum HoloByte
2061 Challenger Dr.
Suite 325
Alameda, CA 94501

Strategic Simulations
1046 N. Rengstorff Ave.
Mountain View, CA 94043

Strategic Studies Group
1747 Orleans Ct.
Walnut Creek, CA 94598

Titus Software
20432 Corisco St.
Chatsworth, CA 91311

////// ■ fast looks

**Make Music;
Publish on
Paper; Revolt
Against
Redcoats; Save
a Sea Monster;
Handle a
Helicopter; Get
Going with
GEOS; Conjure
Up Comic Books;
and Write the
Right Word**

Each month, "Fast Looks" offers up snapshots of the newest software and hardware for the Amiga, Apple II, Atari ST, Commodore 64/128, IBM PC, and Macintosh lines of personal computers. These capsule reviews look at notable programs and peripherals, products which have just arrived in our offices and which haven't yet been fully evaluated.

"Fast Looks" gives you glimpses of important and interesting software and hardware *now*, not next month.

VCR Companion

With video cameras and camcorders showing up at everything from Little League games to weddings, it was inevitable that computers would somehow figure into videotape. One of the recent releases in the burgeoning area of computer/video software is Brøderbund's *VCR Companion*, a video-titler program.

Brøderbund hopes *VCR Companion* will do for videos what its popular *Print Shop* does for paper—create an impressive product using a collection of ready-made elements. The program can make titles, credits, endings, and more for video productions of all sorts, turning that tape of little Katie into something more than just a collection of video vignettes.

VCR Companion uses a menu interface similar to *Print Shop's* and includes several ready-to-use sequences that can be customized. Illustrations, borders, type, and animation are also available for people who want to build titles from scratch. Various scene transitions can be selected, or an editor can help in designing others.

Considering the hardware involved, the end result is impressive and most appropriate for home and school use, although the cartoonlike quality of the illustrations and graphics might find a use in some business video productions.

— GK

Apple II with at least 128K—\$49.95
Brøderbund
17 Paul Dr.
San Rafael, CA 94903-2101
(800) 527-6263

Blockbuster

Blockbuster is a fast-paced version of *Breakout* with several state-of-the-art enhancements. There are 80 levels of play and 48 levels set aside for you to design with the *Blockbuster* level editor.

You must destroy bricks to advance to the next level. Several obstacles hinder progress, such as a relentless group of dive-bombing aliens. Some aliens deflect your ball, and others drop tiny stun bombs that briefly paralyze your paddle. Other obstacles include invisible bricks, multi-hit bricks, indestructible bricks, and speed-up bricks.

Certain bricks release gold, U-shaped tokens that you must catch. Use these to purchase weapons which make your work easier. Cost of the weapons ranges from one to nine tokens, depending on the destructive power of the weapon. Weapons include a speed reducer, a magnet, a ball splitter, a paddle enlarger, a torch, a laser, a smart bomb, a missile, and a force field.

Blockbuster features digitized sound effects and colorful background screens. Animated characters, like the alien creatures, add nice touches. *Blockbuster* is fun to play and a great game to add to your collection.

— TT

Amiga—\$39.95
Atari ST—\$39.95
Commodore 64/128—\$29.95
IBM PC and compatibles with CGA or EGA; mouse recommended—\$34.95
Mindscape
3444 Dundee Rd.
Northbrook, IL 60062
(312) 480-7667

Make Any Computer Do Exactly What You Want With McGraw-Hill's

Contemporary Programming & Software Design Series



From Writing Your Own Programs to Modifying Existing Software, Here's the New, Easy, and Low Cost Way to Unlock the Secrets of Your Computer

Whether you use computers for business, for personal applications, or for fun, off-the-shelf programs will never do everything you want them to do for you. That's because they were written by programmers to satisfy what they perceived as the needs of the greatest number of potential users—often missing some or many of your specific needs.

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Each module includes an easy-to-understand guide PLUS a 5¼" floppy disk containing typical programs and interactive instruction that you can run on Commodore 64 and 128 computers, IBM PCs and PC compatibles for hands-on experience.

In the first Module, for example, when your sample program (Declining Interest Loans) appears on your screen, you'll find errors on certain program lines. You'll also see that the program is only three-quarters completed.

Now comes the fun part. You'll discover how this program is built, and in the process you'll learn how to identify and correct errors. And by the end of Module 1, you'll actually have completed this program yourself.

But there's more. Special graphics on your screen work in conjunction with the accompanying guide to amplify, illustrate, and deepen your understanding of software design principles.



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While the Series includes interactive disks that run on specific computers, everything you learn you can apply to any language or machine. Why is this possible? Because McGraw-Hill knows programming is far more than coding a program into the computer using a specific language. In the real world of computers, 95% of the programming process is carried out using design techniques that are independent of specific language or machine. It is this crucial 95% that you thoroughly understand and master in the Series.

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Jam Session

It's the dream of every tin-eared, bop-besotted individual in the world to sit in with fine musicians and jam without error. *Jam Session* makes it possible on the Macintosh, and it's a strange, entrancing thrill.

This program offers 19 songs, with names like Jam-aica, Django Djam, and Jamoque. You select one, and an image fills the screen to set the tone. You might see musicians on a stage set for rock-'n'-roll or heavy metal, a bassist and guitarist in a smoke-filled jazz club, a pianist in a concert hall (with snoring patron in the seventh row), or even a band in a barnyard, fiddling and plucking as chickens peck the dirt.

The music begins, and you join in by pressing keys on the keyboard. A key generates a single note or a short arrangement, called a *riff*. The Shift key opens up a whole new array of keyboard choices.

The sounds are digitized samples from real instruments, and they sound surprisingly good on the Macintosh. They really bloom on stereo speakers. Although the sound can't equal the audio finesse of, say, the Amiga, *Jam Session* may reveal potential that Mac owners didn't think they had.

The program teems with extras that give it real depth. For instance, you can record your jam session and play it back. You can speed up a song or slow it down. You can issue a panoply of sounds, including lifelike rap voices and hen clucks. You can play more than one instrument at a time, and you can interrupt one riff with another. You can also change the preset instruments for each song. If you select Auto Play, the band will perform random riffs. This option not only generates background music for such tedious chores as cleaning your desk, but it also affords psychological gratification since you can usually play better.

Jam Session is not all jam. It also has a synthesizer you can play—a bonus almost as pleasurable as the jam itself. You can control the tempo of a rhythm accompaniment. The synthesizer offers 21 different instruments, including clarinet, metal guitar, timbal, bassoon, and awesome snare, which sounds like a drum the size of Mars.

The synthesizer has several special features. It turns a single keypress into a run of a chord with its Arpeggiator feature. The Bouncer plays one note, jumps an octave higher, then returns to

the original. And the Drop slides you down the scale. You can record your work as well.

Jam Session simply begs comparison with the popular *Instant Music* on the Apple IIgs and Amiga. Both let you jam, but there are significant differences between the programs.



Join a rock-'n'-roll band on stage when you play along with *Jam Session*.

Instant Music has almost no learning curve. In about 1½ seconds, anyone can jam perfectly. You regulate pitch by moving the mouse up and down, and the software takes care of everything else. This program has an idle, narcotic charm, and you'll find yourself sitting in front of the screen for hours. At the same time, *Instant Music* lacks real depth. There's not much else you can do with it.

Jam Session demands a little more attention. It's like learning a real instrument. You can't master it at once, and you don't get the feeling of sudden, magic power over the musical domain. You punch in each note or riff separately, so you must learn the layout of notes on the keyboard, which differs for each song. Also, you must determine the length of individual notes.

But the flip side of these apparent difficulties is control. *Jam Session* is ultimately the more rewarding program because it has more features and lets you participate in the music more fully. For instance, it gives you power over several instruments at once. You can punctuate your guitar riffs with cymbals or jump back and forth from bass to saxophone without missing a beat. Instead of drifting along with the melody, you become a one-person band—an impossible feat on *Instant Music*.

Jam Session is also more flexible, letting you enter riffs whenever you like. You may make a few errors—the program isn't really goofproof—but you also gain more freedom. The software will play riffs at the proper places in the music if you like, but it's more fun to issue them at will.

Moreover, *Jam Session* lets you edit riffs you think are inferior and devise your own, displaying your creative skills. You can also generate tunes on *Studio Session* and import them to *Jam Session*, or vice versa. Unfortunately, *Jam Session* doesn't support MIDI.

This software does have a few irritating qualities, mostly in the default settings. For instance, unless you specify otherwise, the program terminates each song after two cycles—a mere tick of the metronome for the serious jammer. In addition, it hides the piano keyboard, so you miss the feedback of seeing your notes punched in. You can override both options easily.

You may never be an Oscar Peterson, but *Jam Session* lets you play better than your talents would ever allow.

— Dan McNeill

Jam Session

For . . .
Macintosh with at least 512K—\$49.95

From . . .
Broderbund
17 Paul Dr.
San Rafael, CA 94903-2101
(800) 527-6263

And . . .
Two disk drives or a hard drive and speakers or headphones are recommended; the disks are copy-protected.



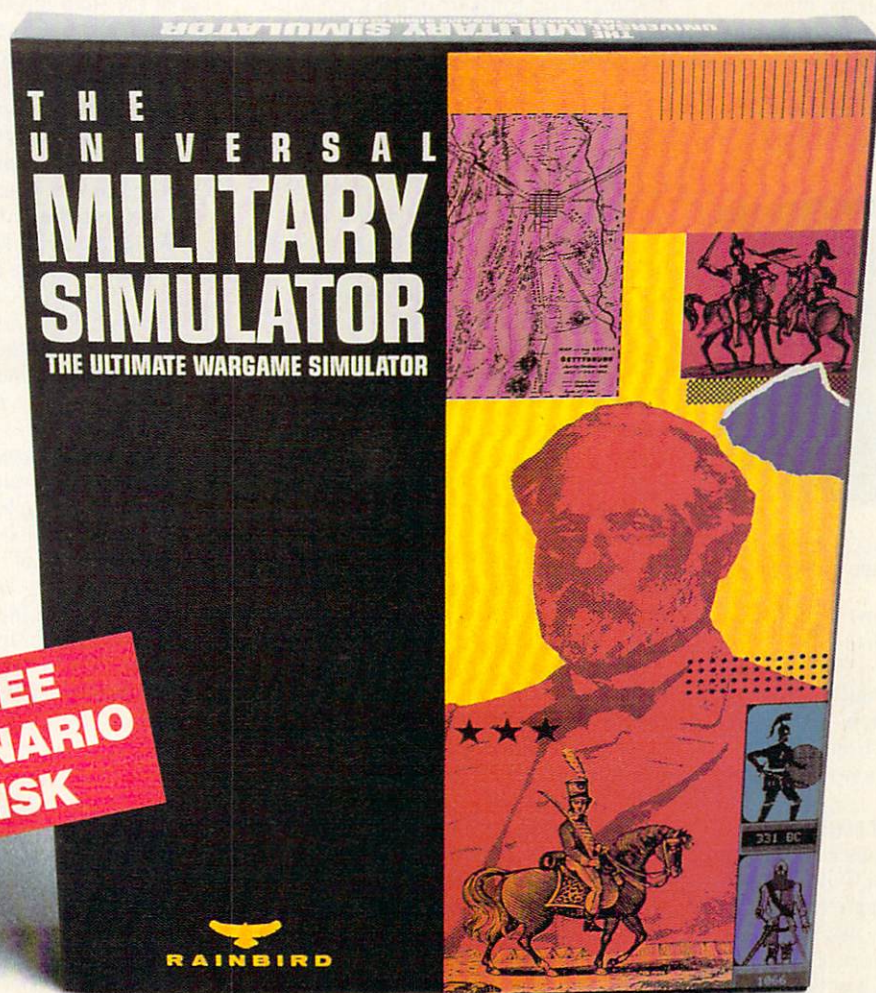
PaperClip Publisher

If anything in recent months has inspired envy in Commodore 64 owners, it is desktop publishing. Until recently, the perception among computer users was that only advanced microprocessors could handle desktop publishing applications.

But if we've learned anything in this unpredictable business, it's that the 64 has more power than anyone originally thought. When desktop publishing threatened to separate the computers from the toys, the 64 took it personally. The result: desktop publishing on the Commodore 64.

PaperClip Publisher is a new page-layout tool for the 64, from the Batteries Included line of Electronic Arts products. To produce a document, you define a page size, then place text and graphics boxes wherever you desire on that page. You can embellish page elements and manipulate size, position, and appearance pretty much however

Enter a World of Battle Strategy You Never Dreamed Possible!



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Offer expires December 30, 1988.



RAINBIRD

P.O. Box 2227 Menlo Park CA 94026 415/322-0900

ID Intergalactic Development Incorporated

HOW TO ORDER: Visit your software dealer, or call (800) 227-6900 from U.S. or Canada, for Visa, MasterCard, Amex or C.O.D. To order by mail, send check/money order: Rainbird, P.O. Box 8123, San Francisco, CA 94128. CA add 6% sales tax and TX add 7.5%. Shipping/handling is \$4.50. 2-3 weeks for delivery.

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you want. When you've finished, you print the page, using one of several graphics printers.

The program's means for getting started is its weakest element. Before using the software, you must create a work disk. A program on the master disk copies fonts and other files to another disk. The process is slow and interest-sapping, even when performed with two 1541 drives. Including a prepared work disk would have eliminated the annoyance.



PaperClip Publisher gives Commodore 64 users the power of desktop publishing.

Thanks to the well-written manual, learning *PaperClip Publisher* is easy. The manual takes you on three guided tutorials. The first introduces you to what you see on the screen, with short explanations of the functions of each icon. Then it teaches you how to use the page-layout tools.

The second tutorial leads you through some less obvious features: the Hide Margins, Hide Box Outlines, and Magnify tools. Next you go through Quickview and Preview, two features that help reduce the time it takes for the 64 to redraw the page. Then the tutorial introduces you to the Artboard, ways to use linked boxes (for column-to-column text), and ways to enlarge the box contents.

The most extensive tutorial guides you through the creation of a newsletter. Using graphics and text from the master disk, you create headlines, columns of text, and a graphic in the bottom right corner of the page. In the process of creating the page, you learn how to manipulate box sizes and attributes, how to use different fonts, how to layer boxes for graphics effects, and how to print the page.

The *PaperClip Publisher* screen displays a full page or, using the Magnify tool, an enlarged portion of that page. *Publisher's* menus run along the top of the screen, and you access them by pressing the mouse or joystick button. The Department menu lets you choose

the text or graphics editor. You can use both editors to create material, but more often you will use them to import material from another source. To complement this menu, *Publisher* includes a separate program for converting text, graphics, and fonts from packages such as GEOS, *The Newsroom*, and *PrintMaster*.

Using the Page menu, you change the formats of the current page or of all pages. Attributes include paper size, vertical and horizontal margins, number of columns (to a maximum of 15), and width of columns. Similarly, the Box menu lets you adjust the attributes of the current box. These include Border Style, single line, double line, and so on; Border Type, which sides you want the border on; Background Pattern; five fonts; *x* and *y* magnification, for changing the size of graphics; text alignment; margins; and leading and tracking, which control space between lines and space between characters.

PaperClip Publisher is extremely easy to use, and I can recommend it highly for anyone producing amateur newsletters, cards, forms, and so on. For more serious users, those involved in the higher levels of desktop publishing, *PaperClip Publisher* is missing some important features. Primary among these is laser-printer support. Its printer list is limited to nine-pin dot-matrix printers and the Commodore 1525.

While these produce good copy for classroom use, they are not acceptable for anything resembling business use.

For those familiar with the 64's first desktop publishing package, *geoPublish*, a comparison is in order. Both programs operate at about the same speed, struggling with the complicated task of redrawing screens. Simply put, *PaperClip Publisher* is easier to use, while *geoPublish* offers more options.

I have had some success working with my eight-year-old child on *Publisher*—none on *geoPublish*—and the reason is quickly obvious. *Publisher* is a powerful, but basic, desktop publishing program; *geoPublish*, on the other hand, has many of the features—and the complex terminology—of the desktop publishing programs for more powerful machines.

For example, with *geoPublish*, you create a master page template that controls all the pages in your document. With *Publisher*, you work page by page. *geoPublish's* system allows more automation and consistency because all of your pages are basically designed automatically, according to the template. By leaving out the template, *Publisher* has

been made a little easier to use.

Also, *geoPublish* uses snap-to-grid, ratcheting, and gutters—tools and terms familiar to desktop publishing users. *Publisher* foregoes some of these options in favor of ease of use. In the case of the snap-to-grid option, which automatically lines up graphics and text with a grid, the developers have made an unfortunate omission. Strangely, *Publisher*, not *geoPublish*, lets you control leading, which is spacing between lines, and kerning, which is spacing between characters. These controls are usually considered advanced features.

As far as the final output goes, results are similar on a dot-matrix printer. *geoPublish* prints a page in about half the time *Publisher* takes—compare 9 minutes to 17 minutes for a two-column page printed on a Panasonic KXP-1091i. The quality is almost identical, though.

If Electronic Arts is serious about promoting a very welcome—and highly useful—product such as *PaperClip Publisher*, it should consider developing an advanced version of this package. As is, *Publisher* is perfect for casual work, for classrooms, for children using the computer, or simply for learning desktop publishing. It's by far the friendliest desktop publishing program I've ever seen.

— Neil Randall

PaperClip Publisher

For . . .
Commodore 64/128 with a 1541 or 1571 disk drive and a mouse or joystick—
\$49.95 (\$3 for shipping and handling)

From . . .
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
(800) 245-4525

And . . .
Disk is not copy-protected.



Sons of Liberty

A friend of mine is a survivor of Vietnam, and when it comes to combat, it takes a lot to get his attention. He has, he says, seen it all. He has personally felt the tight gut and sweaty palms.

Recently, though, he saw me playing a game on the computer and was completely transfixed—but not because I was battling unseen foes in the jungles of Southeast Asia. Instead, I was fight-

ing the British at Saratoga, nearly 200 years before Vietnam. I was taking my time, carefully planning each move. My palms were sweaty, and my stomach quivered.

The game that held us both in its grip was *Sons of Liberty*, a Revolutionary War simulation from SSI. It places you on three different battlefields—Bunker Hill, Saratoga, and Monmouth—in the role of either British or American commander.

If you're more accustomed to battling squawking aliens than intelligent British, the electronic battlefields of *Sons of Liberty* will at first seem a little strange. This program doesn't offer the usual future-tech landscapes, but it transports you to a detailed, historically accurate eighteenth-century battlefield. The onscreen maps reflect not only geographic features, but elevation as well, the high ground being the most desirable.

To help you make your moves, the maps are divided into grid squares. These squares do not show up on your monitor—that would mess up the eerie neatness of the onscreen battlefields. They are drawn out on cardboard battlefield maps that are supplied with the program.

As commander, you have at your disposal a force made up of individual units. These may be infantry, artillery, infantry/artillery, or cavalry, either in fit form or routed. As the units under your command gain combat experience, their efficiency changes. Fatigue effects show up following movement or combat, and morale is a reflection of both experience and fatigue. All of this is tracked by the computer for each unit, with each unit's tally reported onscreen.

Sons of Liberty offers three different levels of complexity for each of the battles. The basic game is ideal for getting the player accustomed to the battlefields. It offers simplified troop movement and a fair degree of computer intervention in areas such as fire control.

The intermediate and advanced levels offer more realism. At the intermediate level, your combat units can face in any of eight directions. Intermediate units can deliver defensive fire through their flanks, if necessary, and can march double time, although with a corresponding increase in fatigue. The advanced level offers the realistic touch of unit leaders who perform best when close to their units. The advanced level also gives each unit a finite supply of ammunition and makes resupply more difficult. >

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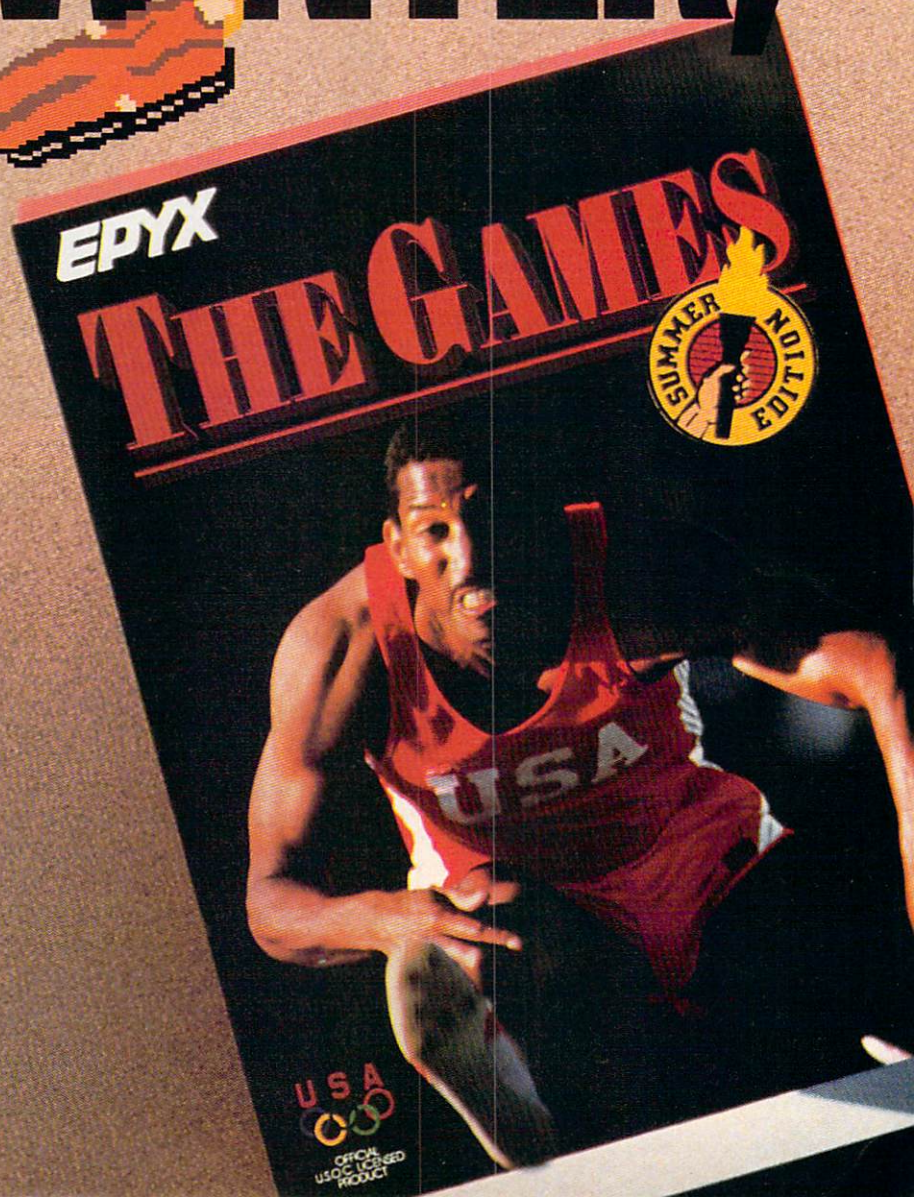
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You can also choose between two ways to display the enemy's units. One choice lets you see every enemy unit, whether it's in your line of sight or not; the second choice shows you only those units that your units can physically see. To truly experience the "fog of war," particularly in intermediate and advanced encounters, SSI encourages you to go for the no-see-'em option. Try it. It's an unnerving experience to suddenly find yourself under onscreen assault from an unseen but very real enemy.

In addition to the three game levels for each battle, *Sons of Liberty* offers five levels of difficulty for each game. Level 3, the closest to history, is effectively neutral and assigns each side the actual strengths and weaknesses experienced during the eighteenth century. Levels 1 and 2 favor the American side, with level 1 being the most forgiving. Similarly, levels 4 and 5 favor the British, with level 5 giving the British the greatest advantage. Until you've gained some experience, give your side all the help you can get.

Sons of Liberty is supplied on a single disk, which is not copy-protected.



Sweaty palms result when you experience one of the Revolutionary War-era battles in SSI's *Sons of Liberty*.

SSI does use an unusual scheme to discourage inappropriate copying. At the beginning of each game, the program asks you to type in a word from a particular point in the manual. The word varies each time the game is loaded; presumably, people will be discouraged from pirating the program if they have to have the manual, too. It's a mild annoyance, but is a tremendous improvement over disks that won't let you make backups at all.

SSI has gone all out to offer not only playability to beginners, but realism to hardened veterans. That quality translates into potentially excruciating tension for the person at the keyboard.

Without a doubt, *Sons of Liberty* provides plenty of tense excitement. It certainly caught the attention of my combat-seasoned friend. You plan your strategies, make your moves, and draw victory or defeat from the hands of a silicon army.

And that tight feeling in your gut is undeniably real.

— Steve Hudson

Sons of Liberty

For . . .

Apple II—\$39.95

Atari 8-bit—\$39.95

Commodore 64/128—\$34.95

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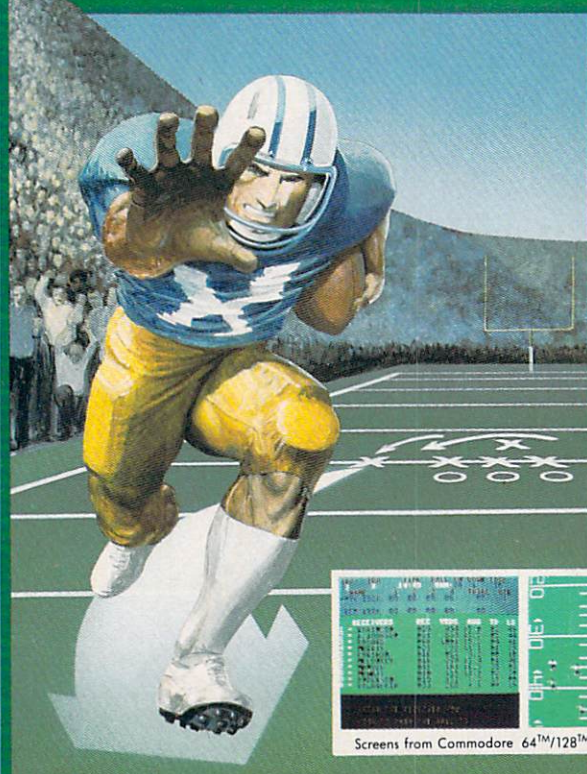
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Jumping Math Flash

Report cards are out and math scores are down. Getting little Michael to practice with flashcards is a nightmare in the making. He'll play games on the computer until the wee hours of the night, but he gets sleepy as soon as someone says *Do your school work*.

Why not compromise? Mindscape has just the solution for Michael, and for you and your school-aged children: an arcade-style math game called *Jumping Math Flash*, for kids in grades 1-4.

Some children feel as though they are drowning in deep, dark waters when they don't understand math concepts. They flounder around, become discouraged, and sink. *Jumping Math Flash* takes the child into the deep, dark waters—not to drown, but to find the answer to a math problem. Children direct Flash, a sea creature, through a maze of numbers to the correct answer. In the process, they must also help Flash dodge other sea creatures.

This program has 21 levels in two games. Game 1 is for addition and sub-

traction, and Game 2 is for multiplication and division. The menu gives a very detailed description of what each level offers. A teacher would have no trouble looking at the menu and assigning a level to a child, but a parent may need to see the problems on each level to understand what terms like *doubles* and *commutative (regular)* mean.

There are 20 problems at each level, and the child must master 18 of them before progressing to the next level. The program lists all the problems at the end of each play. A check by the problem means the player missed it, and a fish symbol means a fish ate Flash before the child got him to the correct answer.

When children must repeat levels, the program starts them off with the problems they missed. At Level A, Flash contends with only one creature, but, as the player progresses, more creatures swim between Flash and the correct answer.

Moving Flash to his answer takes practice. Children can use the arrow keys or the I, J, K, and M keys. They identify the correct answer by pressing the space bar. When more than two fish



Children help Flash, a sea creature, find his way through a maze of math questions in *Jumping Math Flash*.

are on the screen, it's difficult to coordinate the controls to swim to the correct number and then hit the space bar. Keystroke errors may account for several missed problems, even when the child knows the correct answer. A joystick would simplify the process of moving Flash and would make the program even more like an arcade game.

In fact, younger children may become more discouraged with the key-manipulation problem than with the math problem. The whole purpose of the program is to encourage math drills,

PART 5

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not make them more frustrating.

Jumping Math Flash offers three speeds, optional sound, and a record of each child's level and the highest score. The different speeds help build confidence, and the sound reinforces the arcade effect. The best feature for the child and the teacher or parent is the Play for the Record option. This choice records where children stop working and returns there when they start again. The program also keeps track of the ten highest scores, which children made them, and on which levels they were made. This is a great option for a classroom full of competitive children.

Although this program is a great home tutor, teachers can use it at school to remediate and to make math drills more interesting. There is a classroom-management section in the program which only the teacher can access. With the correct password, the teacher can print data on player levels, delete data, and change the password.

Arcade games have many redeeming qualities—if you look hard enough. They develop eye-hand coordination and sequencing and logic skills. Mathematics also requires sequencing and

logic skills, so why not put them together to make learning and practicing more stimulating? Children think arcade programs are fun and games. They probably wouldn't play *Jumping Math Flash* if they knew they were actually getting something out of it.

Jumping Math Flash has several payoffs. It helps with basic math facts in an entertaining way. It keeps Mom from having to nag and threaten the mythical Michael (and your own kids, too) to keep at those multiplication tables. It may even result in a better report card. Most importantly, though, it can help young children learn the basics of math, teaching them vital skills that they'll need the rest of their lives.

— Nancy Rentschler

Jumping Math Flash

For . . .
Apple II—\$49.95

From . . .
Mindscape
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(312) 480-7667

Thunderchopper

With the roar of the whirling rotor blades in my ears, I approach the armored column on the road ahead. As I maneuver to shoot a Stinger missile at the lead tank, my opponent fires first. A second later, our missiles pass in the air; the jolt of impact is followed by a message from the on-board computer, *Damage sustained*.

A bright flash up ahead tells me that my missile found its mark as well. Two more missiles, and two more tanks disappear from the roadway, but there's more damage to my chopper. I call up the computer for an assessment. The radar is out, and my Hughes chain gun is hit but functional. A push to the right on the cyclic control brings me around for another pass.

With *Thunderchopper*, the latest release from the ActionSoft/SubLOGIC team, the action just keeps coming. The game is a simulation of the Hughes 530 MG Defender helicopter, complete with high-tech weapons and computer systems. The battle described above is part of one of the five missions offered. They range from easy training and rescue flights to dangerous combat, escort, and rescue-at-sea missions.

As a simulation, *Thunderchopper* gets high marks. It's easy enough to fly, so, after completing the training course, you can get around without too much effort. But don't skip the training mission: you can't just boot up this game and start flying around. It takes some practice. Once you get the hang of it, the game is not so difficult that concentrating on flying takes away from the combat and rescue missions.

You can use the joystick to operate the helicopter's cyclic control (for horizontal movement) and the collective control (for vertical movement), but it was easier to use the keyboard to change the collective. Using the joystick to adjust the collective is awkward because it's reversed from what is instinctive to most pilots. Pushing forward on the stick increases the collective and causes the chopper to rise, a result just the opposite from fixed-wing airplanes; when you fly in a fixed-wing aircraft simulation, such as *Flight Simulator*, you pull back on the stick to climb. Other than that one problem, the controls responded quickly. Once mastered, *Thunderchopper* is a joy to fly.

With SubLOGIC involved in the game's development, I expected the graphics to be good. Although they're not as flashy as shown on the back of

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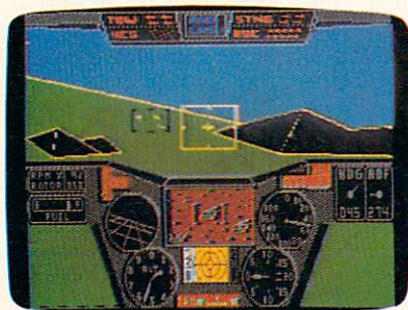
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REVIEWS

the box for the C64/128 version, they do provide a good flight environment. The instrument panel is a bit dull, though. It's composed mainly of black and gray.

Weapons operation and targeting are done well. Most targets show up on the radar screen, so they're easy to find. Once located, the targeting box appears, and the lock-on process is simple. The infrared capability also works well. It's essential at night and helpful during the day in locating targets against a dark background.



Thunderchopper's helicopter is equipped with several modern weapons.

Once you've completed the training mission, you'll be promoted and sent on a rescue mission. Rescues offer good opportunities to sharpen your flying and landing skills before you advance to combat-alert missions.

At this point, your progress will slow down. You'll probably need a number of attempts to complete a combat mission at the Commander level and even more flights to be successful at the Instructor level. In combat missions, there is never a shortage of targets, including trucks, tanks, boats, buildings, jets on the ground, and bridges. After several missions, you'll learn which targets shoot back and which don't. You'll probably need to return to the base at least once to rearm and repair damage before you can complete a combat mission which will include destroying a variety of enemy targets.

Weapon selection plays a large role in your success: Zuni rockets, TOW missiles, Stinger missiles, and the chain gun are all very effective against certain targets. With so many targets in each mission, you'll need to conserve your ordnance and use it wisely.

The escort mission is even tougher. Not only must you destroy the enemy targets and survive, but you must also protect slow-moving trucks traveling through a valley. Your mission performance depends on how many troops

make it through the valley—not on how many targets you destroy—so stay close to the convoy. The sea rescue mission requires all of the skills you've learned for a daring rescue of survivors in enemy-controlled waters.

As with most games, *Thunderchopper* has pluses and minuses. On the plus side is the simulation quality. The game flies very well, the 3-D graphics are very good, and the manual does an excellent job of getting you off the ground in the training area.

On the minus side is the combat portion of the game. The missions are repetitive, and they don't require much strategy. Although the back of the package mentions ECM (Electronic Counter-Measures), I could not find mention of them in the manual or any suggestions regarding evasive maneuvers. As such, most shots fired by the enemy will be hits. The addition of some sort of countermeasures to foil enemy missiles would make the game more enjoyable—and more realistic.

All in all, though not complex or strategy intensive, *Thunderchopper* is certainly an excellent, easy-to-learn helicopter simulation with plenty of action.

— Richard G. Sheffield

Thunderchopper

For . . .
Apple II—\$29.95
Commodore 64/128—\$29.95

From . . .
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And . . .
ActionSoft plans to release an IBM PC version during the fall.



Apple II GEOS

Today, it's hard to find a new computer that doesn't support a windowing operating system. But what about older computers such as the Apple II? Are they forever limited to text commands and keyboard-controlled applications?

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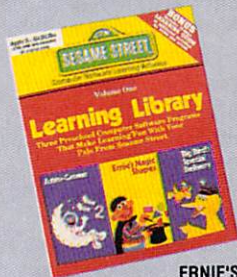
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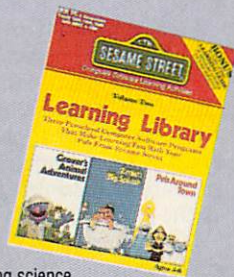
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Apple II GEOS replaces ProDOS and Applesoft BASIC with its own Graphics Environment Operating System.

When GEOS boots, it automatically loads and runs the GEOS deskTop. The deskTop, GEOS's equivalent to the Finder on the Macintosh or Apple IIGS, is designed for manipulating disk files and running programs.

The deskTop displays disks and files as graphic images called *icons*. Using a mouse, a joystick, or the keyboard, you move an arrow-shaped pointer around the screen to select a disk or a file and to choose options from pull-down menus.

The deskTop supports ramdisks and hard disks. In fact, you can set up GEOS so that it boots from a hard disk.

File icons appear in what is called the disk notepad. You can only see eight files at a time. To view additional files, you flip the notepad's pages by clicking on a dogeared corner or by pressing the number key corresponding to the page that you wish to see.

Like ProDOS, GEOS supports sub-directories and displays them as folder

icons. To enter a folder, simply double-click on it. You can back out by clicking on the up-arrow symbol displayed at the upper left of the disk notepad. To make searching through folders easier, a Browse option displays all the folders on a disk.

Lining the top of the screen are pull-down menus, an integral part of GEOS. To select a particular option, simply point at it and click. Pull-down menus make it easy to browse through a program's various options. All GEOS applications make use of pull-down menus, and some pull-down menus, such as *geos* and *appls*, are always present.

Using pull-down menus, you can perform any disk operation offered by the ProDOS *Filer*. For those who prefer to keep their hands on the keyboard, GEOS provides keystroke shortcuts for almost all of GEOS's functions.

Probably the most useful pull-down menu available is the *appls* menu, which lists all of the programs on the current disk. Finding and running a program is as easy as selecting a menu option. Best of all, the *appls* menu

switches from one program to another without exiting to the deskTop (a feature Macintosh system software only recently included).

There are two full-blown application programs supplied with GEOS: *geoWrite* and *geoPaint*. And according to Berkeley Softworks, more GEOS programs are on the way.

Modeled after *MacWrite*, *geoWrite* is a multifold, WYSIWYG (What You See Is What You Get) word processor with graphics capabilities. Formatting options, such as line spacing and margin settings, are adjusted by clicking on ruler icons at the top of the screen. *GeoWrite* supports left, right, centered, and justified text, and all changes to the text's format or fonts are immediately reflected on the screen.

Several well-designed fonts come with the GEOS system, and you can add or remove them easily. You can enhance fonts with any combination of bold, italics, underline, outline, superscript, or subscript.

GEOS's fonts look good on the computer screen, but they lack clarity on paper. For special flyers or snazzy party invitations, you'll appreciate GEOS's fancy fonts. But if you want readable letters and school reports, stick to *geoWrite*'s draft mode, which prints documents using the printer's built-in font.

For truly high-quality output, GEOS provides *geoLaser*, which makes it possible to print on an Apple Laser-Writer printer.

You aren't limited to using only text in *geoWrite*. You can incorporate graphics from *geoWrite*'s sister program, *geoPaint*. Graphics can be inserted anywhere, but text can't flow around them. Combine *geoWrite* with *geoPaint* and *geoLaser*, and you've got a simple desktop publishing system.

Multiple fonts and graphics support have their drawbacks: *geoWrite* is very slow. Fast typists will quickly outrun the program. Moving from one screen of text to another takes about 15 seconds. Running the program from a ramdisk, however, increases the program's speed considerably.

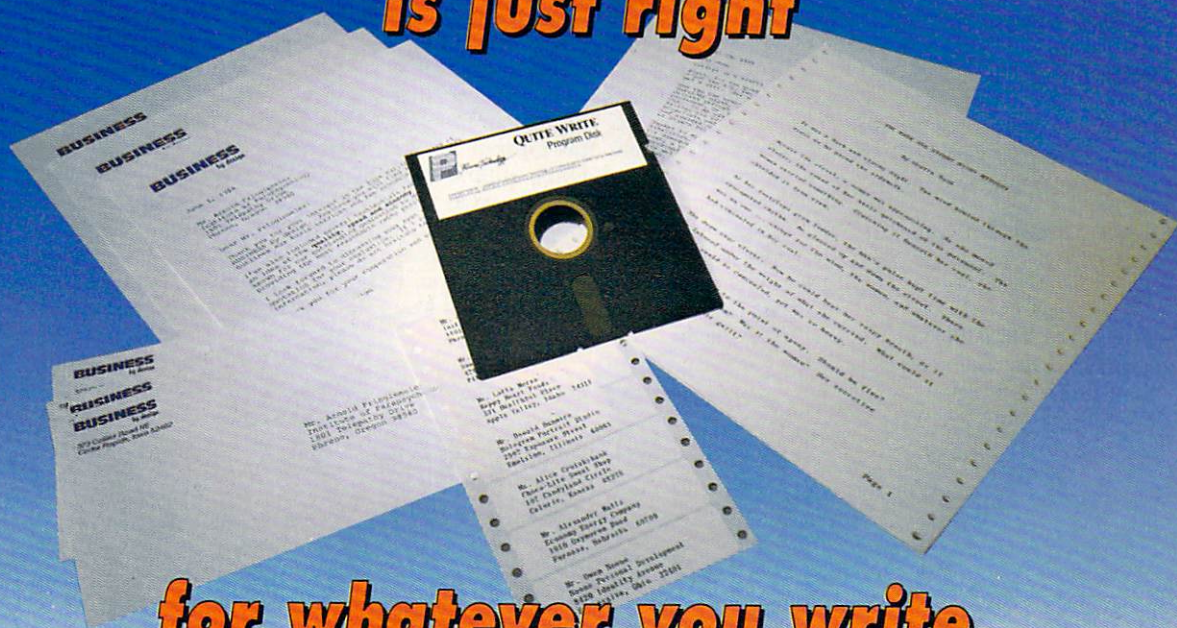
Surprising pluses to the *geoWrite* program are *geoSpell* and *TextGrabber*. Using a dictionary containing over 28,000 words, *geoSpell* checks the spelling in your *geoWrite* documents. *TextGrabber* lets you take files from popular word processors and convert them to *geoWrite* format.

As you might expect, *geoPaint* strongly resembles the classic Macintosh art program, *MacPaint*. Like *Mac-*

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The Music Studio 2.0

Music makes the world go 'round. Or at least it makes the machine so much fun.

Prospective Apple IIGS buyers are usually sold on one of two things—the computer's great graphics or its superb sound. Both capabilities make the Apple IIGS an impressive machine. But once you get the computer home, un-

packed, and plugged in, how do you make it sing? With software, of course.

The Music Studio 2.0, for the Apple IIGS, is a fun, colorful program for composing, editing, arranging, recording, and playing music. It provides a number of useful tools to place notes on a musical staff, select and edit instruments, add lyrics to your songs, and print musical scores. For nontechnical musicians, it includes a musical paint-box to let you "paint" music on a staff.

For more advanced applications, *Music Studio* works with MIDI instruments such as drum machines and synthesizers. It also makes good use of the GS's ability to play digitized sounds and display radiant color graphics.

Setting up *Music Studio* is easy. The program's two disks aren't copy-protected, so it's a breeze to make back-up disks. I reviewed the program using a 512K Apple IIGS RGB color system with a MDIdeas stereo card, Bose Roommate speakers, a Casio CZ-101 synthesizer with Apple MIDI interface, and an ImageWriter II printer. To get the best sound possible, I connected the outputs from the CZ-101 to the auxiliary inputs on my stereo system. The Bose speakers were attached to the stereo headphone jack on the stereo card for playing the music generated by the internal sound chip on the GS.

The work screens found in *Music Studio* closely resemble ones found in Macintosh programs, with pull-down menus across the top of the screen and click-boxes around the screen for accessing various program functions. The program makes extensive use of high-resolution color graphics and icons. When you click the flying-note icon, for instance, the notes in the current song stream by on the staff, from right to left, as the song plays.

Like many IIGS programs that use lots of graphics, *Music Studio* can be slow when it redraws the screen. When I used the Control Panel to change the IIGS's system speed to Fast, the program performed fine, except for one thing—the instruments played by the internal sound chip went out of tune and my CZ-101 synthesizer didn't. The resulting sound was chaotic. I was unable to find any mention of the system speed in the program's documentation, nor could I find any information on tuning the instruments. I ended up testing the program in Slow speed and often found myself waiting for the screen to be redrawn.

The program offers three ways to enter music into the computer. You can use the mouse to place colored notes on a musical staff. If you don't care for standard music notation, you can "paint" a song using the musical paint-box, which lets you use a musical paintbrush and palette to place notes on the staff as colored blocks. The third way of entering notes is to play them in using a MIDI instrument.

The mouse is the easiest and most accurate way to enter music. To create a song using the mouse, you select a note duration from the notes menu and an



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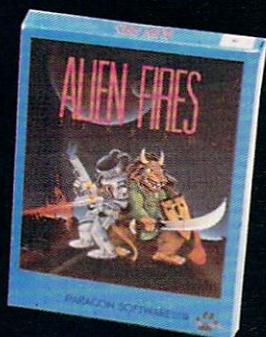
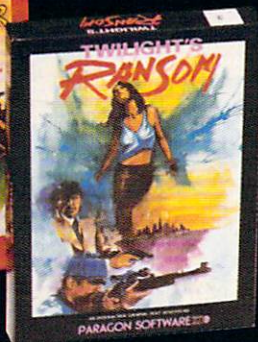
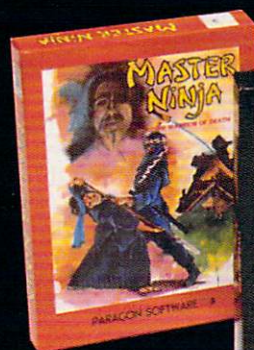


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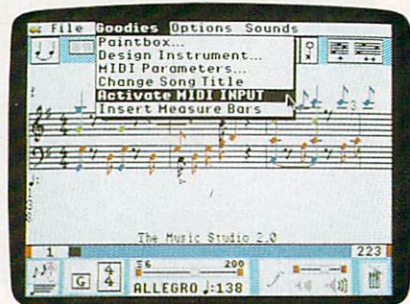
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REVIEWS

instrument from the voice palette. You can then place the note by positioning the pointer on the staff and clicking the mouse button. The color of a note represents the instrument that will play that note. *Music Studio* plays up to four instruments simultaneously, and instrument selections can be made or changed at any place in the musical score. Other features to choose from in this area are ties, dotted notes, rests, accidentals, key signatures, tempo, volume, block actions, and a scroll bar for quickly moving through a song.



The Music Studio 2.0 uses the IIGs's pull-down menu interface to make selection of even the most advanced features as simple as pointing with the mouse.

The music paintbox makes it easy to paint songs on the screen, but it's not made for serious composition. The palette contains 15 colors, each representing a musical instrument. There are six "brushes," from thin to wide, to choose from. The thinner the brush, the shorter the duration of the note. When you've finished painting a song, you can play it back by clicking the flying note or ear icon. Most of the songs I painted sounded rather confusing when I played them back. With a bit of work, however, I was able to scratch out one or two decent melodies this way.

Playing notes from a MIDI instrument could be a great way to enter notes into *Music Studio*. I say *could* because, while the program supports what the manual calls *realtime MIDI input*, a metronome, or click track, is not supplied to help you keep time while you play. Instead, you're instructed to just play and then press the mouse when you've finished. The problem is that, when you play back the song, it's not faithfully reproduced. Notes are rounded off and tied together in ways that you won't even recognize.

The sound quality of the instruments provided with *Music Studio* is generally good. Included are a few doz-

en digitized (digitally recorded) and synthesized sounds ranging from string bass and piano to horns and drums. One nice feature built into the program is the Design Instrument Window, where you can modify existing instrument sounds or shape your own. Other options available in this window let you select stereo channels, turn vibrato on and off, use an interactive ADSR graph, and select the octave. You can also test or undo the current changes you've made.

Music Studio lets you play back compositions through MIDI instruments. MIDI parameters, selectable from the pull-down Goodies menu, give you four controls over MIDI-equipped instruments. By setting the right MIDI parameters for a particular note color, you can make notes written in that color play through the MIDI instrument. You can also set the MIDI channel (1-16), octave range, and MIDI preset you want for each note color.

Although the printed sheet music produced by *Music Studio* on my ImageWriter II isn't of publication quality and it takes some time to print, it's easy to read and understand. One nice feature of the program is that it lets you add as many as three verses of song lyrics to your compositions and integrate them with your sheet music. This could be an important feature for musicians who make lots of lead sheets.

The program's documentation is very good and includes helpful screen shots. There's a guided tour of the program, along with step-by-step examples, a logical table of contents, and a thorough index. The program itself is intuitive and generally hard to get lost in.

Music Studio 2.0 is an excellent introduction to Apple IIGs computer music. But while the novice may find it a little overwhelming at times, the professional musician might discover that the program runs slow and lacks key MIDI performance features.

— Joey Latimer

The Music Studio 2.0

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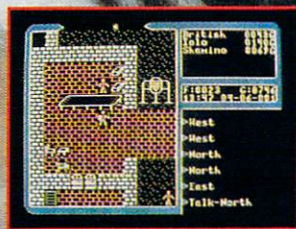
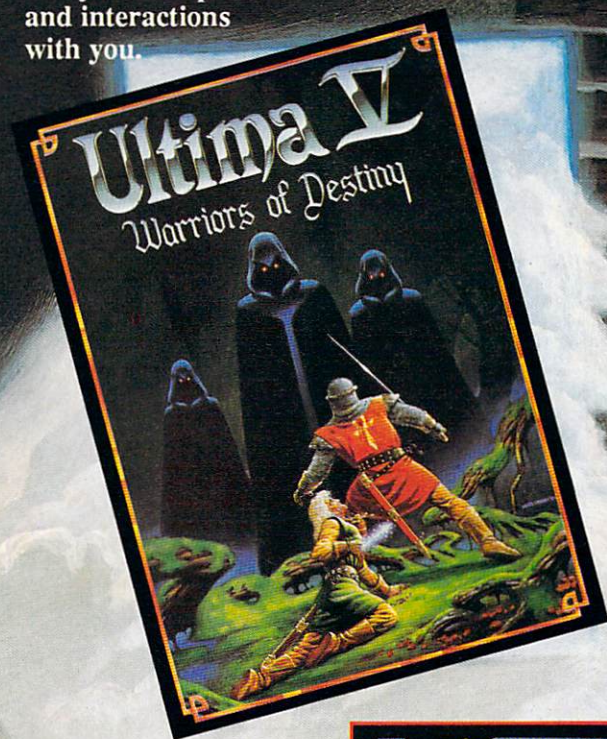
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Pit of a Thousand Screams

Once upon a time, comic books cost only 12 cents. Really.

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Today's comic books cost 75 cents, minimum. They're thinner, and though the art is better and the stories are more sophisticated, there is something disturbing about a Batman who's strangely insane, who actually *enjoys* the violence he must use to destroy wise guys and lowlifes. A lot of the fun of comic books has been replaced by more literate storytelling—stimulating for adults, but not a source of wonder and joy for kids,

even kids in their 30s.

Maybe that's why the idea of computerized comic books is so inviting. Maybe the comic books of yesterday have somehow found their way into the machine on my desk.



Infocom's *Pit of a Thousand Screams* captures the feeling of old-fashioned comic books.

Infocomics, a collaborative effort of Infocom and Tom Snyder Productions, are touted as electronic comic books that will appeal to everyone, not just computer users. Part of that claim comes from the utter simplicity with

which they work. Once you put the disk in the drive and turn on the computer, it's no more difficult to read something like *Pit of a Thousand Screams* than it is to turn the pages of an issue of *Silver Surfer*.

Although I spent most of my time reading *Pit*, all the Infocomics work the same way. They're not games—not in the way I use the word, anyway. They're completely passive, just like a paper comic book. You watch things happen; you don't have any way to change the story, talk to the characters, or alter the outcome. There's one ending, and one ending only.

So where's the fun? What's so great about watching a computer screen?

Watching Infocomics is as much fun as reading comic books or *any* story. You want to get to know the characters, to find out what happens to them, and to be entertained. On all three counts, Infocomics succeed.

Pit of a Thousand Screams has a plot that would make the most hackneyed science-fiction writer blush with shame. Outrageous occurrences at nearly every turn; one-dimensional characters, and outdated and clichéd plot

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twists are the norm in *Pit*. The gist of the story is that three beings—a pilot named Ratchet, a beautiful woman named Elena, and an ugly waterbeast named Eskobar—have been brought together after their individual deaths to form the Gamma Force. Each has been given elemental powers—Ratchet, fire; Elena, earth; and Eskobar, water. The Balance (whatever *that* is) must be restored to the universe, and the only way to do that is to destroy the Nast, a particularly slimy creature who rules a chunk of space because he has the XT-3 market cornered. (XT-3 is a cruelly addictive drug mined on Zuron, the planet where his palace is.)

For all the space-operatic dialog, for all the obvious plot developments, *Pit of a Thousand Screams* in particular, and Infocomics in general, succeed. No one ever said comic books were supposed to have thought-provoking plots or characters who are more than stereotypes. Comic books are, after all, the ultimate in escapist reading. Infocomics have bravely brought that escapism to the screen.

And the screen is surprisingly active in *Pit of a Thousand Screams*. Info-

comics use graphics in each panel, though sometimes those graphics are simple line drawings that evoke the scene. The graphics take on a filled-in look only when the camera zooms in.

Not everything in *Pit* and the other Infocomics is a comic-book clone. Infocomics use several techniques that take advantage of their electronic nature. The most interesting is the *jump*, a place in the story where you can leave one character's point of view or present frame of reference and take up another's. In *Pit*, for instance, as you're watching what happens to Eskobar the waterbeast, you come across a frame with a dogeared corner at the upper right. Hitting the Return or Enter key at this point sends you off on another path, perhaps toward the Nast, the evil one. In this fashion, Infocomics stories have the depth that printed comic books can't match. *Pit of a Thousand Screams* and its companions are hyper-text comic books.

It's this multiple viewpoint that makes Infocomics especially worthwhile. Even though the story has only one ending, there are so many branches to explore that only one reading is sim-

ply not enough. After 20 minutes with Elena, I got to the ending. But I knew only bits and pieces of the total story. Who were Swelch and Ziff, and where did they come from? Was it just chance that Eskobar and Ratchet were in the palace when Elena cried for help? To get the answers, I had to take plot paths I'd passed by before. I spent more time, and had more fun putting the entire story together than I did simply getting through to the ending.

Other enhancements of the printed comic book take the form of primitive camerallike movements of the graphics. They move as if your monitor screen were panning, zooming in, or pulling back. It's a touch that adds to the enjoyment of the story, though it's not distracting or even vital. Key commands are laughably simple: Two keys move the story forward and backward at fast speed; another key advances the story to the next frame. Or you can do nothing and let the story unfold automatically at one of three speeds. Infocomics are even priced at comic-book rates, at least relative to other computer software entertainment.

I hope *Pit of a Thousand Screams*

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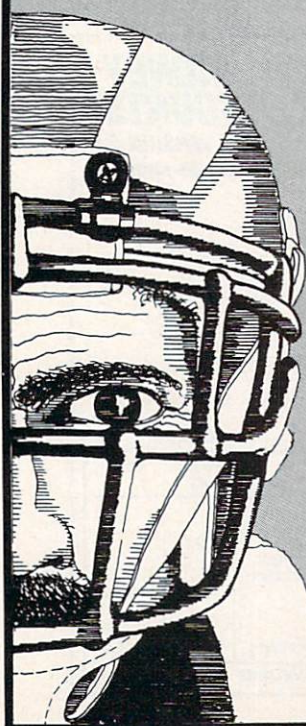
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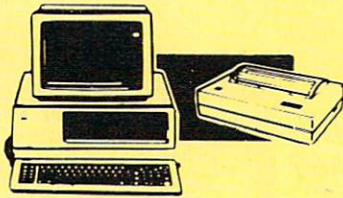
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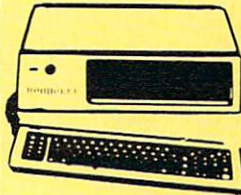
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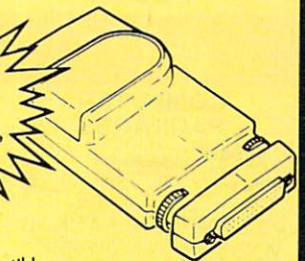
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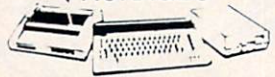
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Spelling checkers have come a long way. My first spelling program was sluggish and awkward. My wife, then an unremitting doubter of my spelling checker's reliability, would rail at its snail's pace and puny vocabulary. "By the time it checks your spelling," she would say, "you could have written another article." Or, "I can't believe there are no *fboigls* or *byenfqs* in this so-called dictionary."

Actually, of course, there were many genuine words the speller program couldn't handle—no *all right* or *alright*, for example. But that was five years ago. Things have changed—radically.

Webster's New World Combo is a multifeatured software package with a powerful 114,000-word Speller and an expanded Thesaurus containing 20,000 entries, 330,000 synonym references, and access to over 1,000,000 replacement words. The two-part program, based on *Webster's New World Dictionary* and *Webster's New World Thesau-*

rus, is compatible with all leading word processors and many other text editors and integrated computer programs. It's simply the best speller/thesaurus package I've ever used.

It's easy to install *Combo* in RAM. Once installed, *Combo* waits in the background until needed. The moment you use one of its entry keys, it appears online and offers several convenient spelling modes. Or if you want a more pertinent synonym, *Combo's* Thesaurus is available.

Combo will gladly check your spelling while you're working (assuming you actually *like* to hear those officious little beeps that signal bad spelling *as you commit the errors*). This feature is for masochists who revel in typos being found as they're made and whose hearts warm to instantaneous, over-the-shoulder critics.

Secretaries who type very fast or writers who hate looking back over their entire composition, however, may actually enjoy this feature. You don't have to pause to look at the screen to make sure your spelling is correct.

Combo recognizes plurals, contrac-

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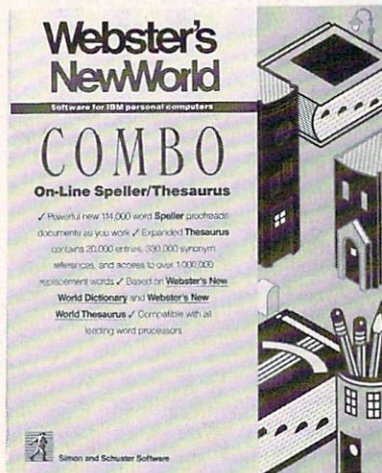
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tions, and hyphenated words as well as misspellings. If you wish, *Combo* integrates its substitutions into the text. The program forces agreement between the replacement word and its preceding article; for example, *an idea* becomes *a notion*. And when you select a synonym, the prefix or suffix may be added automatically, if you choose.

You can elect to search first for phrases containing the word you're looking up or to search for words first and then phrases. *Combo* looks up faster if it doesn't list synonyms. It's an extremely fast speller/thesaurus package with context-sensitive HELP always as close as your F1 key.

The Speller lets you add your own replacement words by writing in or altering the questionable word. The Thesaurus lets you chain from one synonym page to another for alternatives. A Note Page feature lets you keep track of words you might want to look up later or use elsewhere, and a Retrace list enables you to backtrack or find a previous word.

Combo checks the spelling of your document beginning with your cursor



Webster's New World Combo puts a speller and thesaurus at your fingertips.

position. You can skip any fruitless search with the F5 key, replace a highlighted correction or alternative by pressing Enter, or stop the process at any moment with the Esc key. Naturally, like any good spelling program,

Combo lets you add words by creating (or purchasing specialized) auxiliary dictionaries. You may use only one at a time, and I tend to keep these small since they slow the Speller. Auxiliary dictionaries may be extended from the default 2K storage up to 64K; if you run out of room, you can always delete words with your text editor or word processor.

Other *Combo* options include previewing mistakes onscreen or running a word count (which takes at least ten times longer than a standard word-count program on my CP/M computer).

Combo works by reading your screen, and if you happen to be using a wider column than your screen allows (using, say, an extra-wide text measure for 12-character-per-inch type), end-of-line hyphenation will defeat *Combo's* usually thoroughgoing efficiency. (The remedy is simple: Just set the margins so that your text doesn't extend off-screen. You can always widen the margins *after* you make the necessary corrections.)

One note on a mixed blessing: *Combo* mimics human keystroke re-

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placement by feeding characters to your word processor as though you were typing them in yourself. I'm sure *Combo's* programmers designed this for a good reason. Perhaps this torpid character-by-character replacement reinforces the user's conviction that an appropriate correction or substitution has been made. Personally, I would prefer the standard, snappy wholesale replacement. But considering what this program does, this is a minor quibble.

Actually, there's much to admire about the way *Combo* slavishly mimics the standard procedure of human correction. Korenthal Associates (in conjunction with Simon and Schuster Software) have cleverly designed this bundle. The way the cursor blips, word by word, at high speed over your manuscript imitates a proofreader. Most writers know how brutal it is to slog from one word to the next, a finger running under each line, engaged in that thankless, mechanical, and odious task of revision. When the Speller does the same thing, you like it.

On a more serious note, the *Webster's* orientation of this program will

appeal to all who have faithfully used a dictionary or thesaurus over the years. The windows which appear onscreen utilize a format familiar to all users of standard dictionaries and thesauruses.

I would like to see Simon and Schuster Software develop some options to this program. A word history which counts word lengths or indicates how many times specific words are used is helpful to a writer trying to improve his or her style.

I've used some fine spelling and thesaurus programs and, as a businessman and former high school and college composition teacher, I'm pretty picky. The one packaged with the latest edition of *WordStar 2000*, for example, is excellent. But I've abandoned that and other impressive speller/thesaurus packages for *Combo*. One reason for doing this is that *Combo* works with so many word processors. If I want to use it on *WordStar* instead of *WordStar 2000*, for instance, I can reinstall it in seconds. I can even use it to check messages on invoices in accounting software. *Combo* is an *extremely* friendly package. There are some secretaries and

writers around who are going to be mighty—or mightily—grateful for *Combo*.

— Robert Gingher

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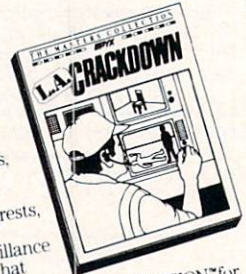
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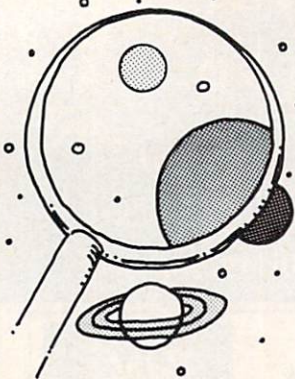
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It's October, Computer Learning Month, a time to recognize successes, correct mistakes, and set new directions.

Think back to 1979. Remember the barrage of stories about how microcomputers would soon change every aspect of our lives? They would improve efficiency at work, turn average children into Einsteins, and transform drudgery into euphoria at home. By 1985, predicted one source, every home in America would have its own computer.

What mystic, powerful force was supposed to lead us to the Promised Land? The public schools, of course. Don't worry that the computer industry suffered from a complete lack of standardization and seemed incapable of getting its own act together. Forget that teachers themselves didn't understand the technology. Never mind that no one knew exactly what we should be doing. Somehow everyone agreed that public education had a clear obligation to work everything out.

"Why can't Johnny read? Why can't Johnny add? SAT scores are falling. What's wrong with our schools?"

Mainstreaming, court-ordered busing, double-digit inflation, teacher layoffs—schools had plenty to worry about already. Even so, the powers-that-be demanded that schools provide every graduate with at least a rudimentary understanding of computers.

Educators accepted the challenge and set to work. Today, every student in Jill's kindergarten class feels comfortable with an IBM PCjr. Each child recognizes keyboards and monitors and disk drives. In Jill's school, at least, today's kindergarten graduates know more about computers than did most seniors in the Class of 1980.

Have schools met the challenge? Absolutely! Even the poorest districts offer students sufficient opportunities to achieve 1980s-style computer competence by graduation. Most districts have exceeded those early expectations. Educators and taxpayers everywhere deserve a pat on the back for doing so much so quickly. Unfortunately, they'll probably have to congratulate themselves.

It's the nature of things. Meet one goal, and new ones appear. "Integrate computers into the core curricula!" those powers-that-be now demand. "Use them in English and science and math and history. Use them for remediation. Use them for enrichment. Use them to keep 'at risk' students enrolled and involved. Teach business students the computer skills they'll need for employment. And don't neglect those SAT scores."

When Jill graduates from high school in 2001, word processing, telecommunications, spreadsheets, and a raft of applications not yet imagined will be second nature to her and her classmates. Programs already in place assure a level of computer literacy far beyond what anyone imagined in 1979.

So, what now? What new programs should schools implement? What new goals shall we strive to achieve? What new philosophies shall we espouse? What dangers must we avoid? These are the obvious questions educational leaders must answer, and their answers will affect us all.

But we must also consider more fundamental questions. What is knowledge in a world where a few keystrokes can provide instant access to unlimited data, both trivial and profound? How can we assure that educational technology will make us more, not less, human?

What are computer educators to do while society grapples with these issues? I hope we'll remember that educating children is the goal, while technology is just one tool for achieving that goal. I hope we'll remember to move cautiously, thereby avoiding the fads that push schools first one way and then another. I hope we'll learn by the mistakes of others. I hope we'll avoid the pitfall of promising greater benefits than we can deliver.

If we do things right, our children will be smarter (and happier) for it. □

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

continued from page 7

Tandy's Quantum Leap

On July 27, amid a storm of hardware and software announcements, Tandy introduced PC-Link, a telecommunications service that Tandy developed jointly with Quantum Computer Services of Vienna, Virginia.

PC-Link, a service for all PC users, not just Tandy owners, is the most significant DeskMate-interface product released to date. In fact, for many industry observers, Tandy's release of DeskMate 3.0 and PC-Link consolidates that company's position as the leader in the home and small-business MS-DOS market.

PC-Link is a telecommunications service with a difference. Using the same design strategy as Quantum's other successful services—Q-Link, for Commodore users, and AppleLink—Personal Edition, for Apple II users—PC-Link uses Tandy's DeskMate to provide an easy-to-use, machine-specific telecommunications interface and service for PC users.

PC-Link boasts all the features you'd expect to find in a modern telecommunications database service, but they're arranged differently. Unlike CompuServe or the Source, PC-Link is for PC users only (even though Commodore and Apple users literally share the same Quantum hardware, there's no communication between the groups). And since the system's interface is customized for the PC (instead of its relying on standard ASCII for all exchanges), it takes advantage of the PC's special features.

PC-Link groups its services into two broad categories: PC-Link and PC-Link Plus. The standard PC-Link services are covered in a \$9.95-per-month subscription fee. PC-Link Plus services cost an additional ten cents per minute.

The PC-Link area includes a Tandy-specific section, a Software Buyer's

Guide, NewsLink Headlines, Dollars & Sense, Reference Desk, Entertainment Guide, Our World, Quiz Center, Home Shopping, and PC-Link's Customer Service. The Plus services are People Connection, Financial Center News Room, Learning Center,

sphere, PC-Link is like a breath of fresh air. Logging on is as simple as inserting the PC-Link disk, running the program, and choosing *Signon* from the options menu. The program takes care of dialing Tymnet or Telenet, entering your log-on and password, and

line. Unlike that of most systems, which have only primitive editing features for online electronic-mail composition, PC-Link's editor is more like a word processor.

For first-time telecommunications users, PC-Link is an enjoyable introduction. For power users, its virtues are also its limitations.

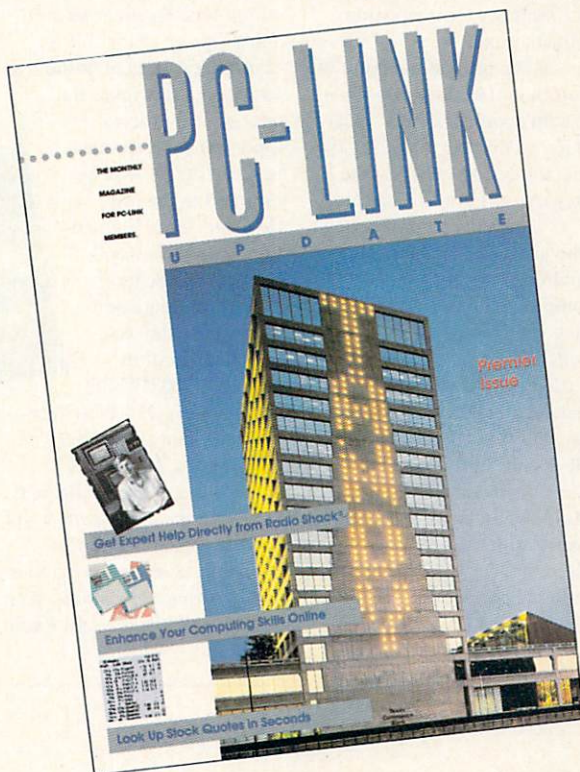
PC-Link's DeskMate software is easy to use, but it has some drawbacks. It can be used only with Quantum's PC-Link service, and it doesn't support advanced features (like macros) that many users demand. For uploading and downloading, it offers only one protocol—Quantum Computer's proprietary protocol. Power users like to experiment with new terminal programs and the faster protocols supported by many BBSs (Bulletin Board Systems) and some commercial services.

Is PC-Link something just for beginners, then? Is it a service they'll soon outgrow and that power users won't be interested in at all? Not according to Steve Case, Quantum's executive vice president. "More than anything else, PC-Link is people, and it's the people that will keep users coming back."

PC-Link software is included in DeskMate 3.0, which Tandy bundles with each Tandy 1000 SL and TL computer. A version of DeskMate 3.0 that will run on any PC compatible can be purchased separately for \$99.95. A PC-Link stand-alone program—one that doesn't require DeskMate to run—is available for \$29.95.

These products, which should be on the shelves by the time you read this, will be available initially only at Radio Shack computer stores. There are plans, however, to also distribute DeskMate and PC-Link through wider channels—into computer software stores, for instance.

— Clifton Karnes ▸



Community Center, Computer Forums, Software Library, Publisher's Connection, and the Mall.

These services offer what most people want from a telecommunications database: You can meet people with similar interests, share information, and upload and download software.

But PC-Link's services are only half the story. The other half is the software that makes PC-Link so easy to use. For the first-time user, telecommunications is the last holdout of user-hostile interfaces. Most services unlock their secrets only after hours of mastering labyrinthian menus and esoteric commands.

In this confusing atmo-

all the other sticky connection details. When you're connected to PC-Link, you navigate the system with simple pull-down menus in a DeskMate-style environment.

The system menu's three principal choices are *PC-Link*, *PC-Link Plus*, and *Post Office*. To select one, you press the appropriate function key (or double-click on the menu name, if you have a mouse), and another menu appears. To back out of menus, you can press the Esc key or click on *Cancel* in any menu box.

Post Office is Quantum's electronic mail service. With *Post Office*, you can send electronic mail to any PC-Link member or send an instant message to anyone who's on-

Get a Jump on the Future

By 1995, 31 percent of the work force will be using computers. This forecast, made in a 1986 National Commission for Employment Policy report, is a telling argument in favor of computer literacy.

In response, Computer Learning Month is including a special booklet in its repertoire of offerings. Called *Preparing for a Career in the 21st Century*, the booklet offers activity suggestions for children and adults.

"We wanted to pull together information to show people how exciting the changes that technology was bringing to the workplace are, rather than how threatening they are," said Sally Bowman, Computer Learning Month director.

"For example, we look at a lot of the technology in medicine today—the CAT scan and the incredible diagnostic tools that have been made possible by computers," she said. "We focus not just on the fact that computers do things faster, but that they allow us to do things that we could never do before

or that were practically impossible."

Some examples of activities include using a computer at home, looking for colleges that emphasize the development of computer skills, taking advantage of company training programs, and performing online searches for interesting information.

Bowman said the point of Computer Learning Month is to help people take advantage of the technology that is available today and to help them prepare for future advances.

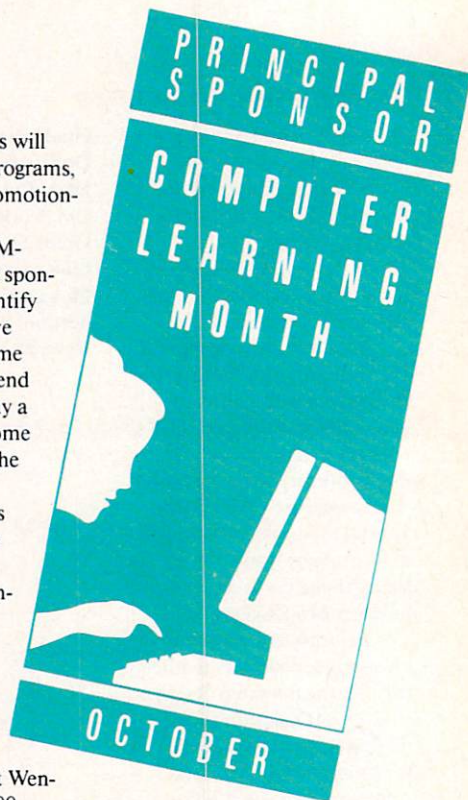
"There are a lot of people who are concerned that children become familiar with computers to prepare them for their careers tomorrow," she said. "We see in business, daily, that people are grappling to take advantage of the technology that is available. And people even find it intimidating."

Computer Learning Month, a Software Publishers Association project, takes place in October. During the month, special events will highlight the need for computer literacy. Schools, busi-

nesses, and user groups will sponsor educational programs, contests, and other promotional events.

For example, COMPUTE! Publications is sponsoring a contest to identify creative and innovative educational uses of home computers. To enter, send a description of the way a computer is used at home to enhance or extend the educational process. One-year subscriptions to *COMPUTE!* will be awarded to the top three entries in Elementary School, Junior/Senior High School, and Adult Education categories. Mail entries to Education Contest, COMPUTE! Publications, 324 West Wenderover Avenue, Suite 200, Greensboro, NC 27408.

Copies of *Preparing for a Career in the 21st Century* will be available at Computer Learning Month events and in participating retail stores, such as Walden Software and Radio Shack.



For more information, write to Computer Learning Month, Department CPE 10, P.O. Box 60007, Palo Alto, California 94306-0007.

— Heidi E. H. Aycock

Singing to a Cake at Biggest AmiEXPO Yet

Part of the Midwest AmiEXPO was weird. Where else but a computer show would you find a packed house singing "Happy Birthday" to a computer-shaped cake?

Over 70 exhibitors displayed hardware and software, including dozens of new or upgraded packages, at the July show dedicated to Commodore's Amiga personal computer. Lots of people showed up to help celebrate the Amiga's third birthday—more than 10,000 people, actually, making the show the biggest AmiEXPO yet.

The show had no theme, but if there had been one, it might have been "The Amiga Grows Up." R. J. Mical, de-

signer of the Amiga's Intuition interface, told his fascinating story of the birth of the Amiga for the very last time.

The exhibitors, while well aware of the Amiga's unusual past, were very serious about bringing the Amiga into the mainstream of computing. The first booth visitors saw as

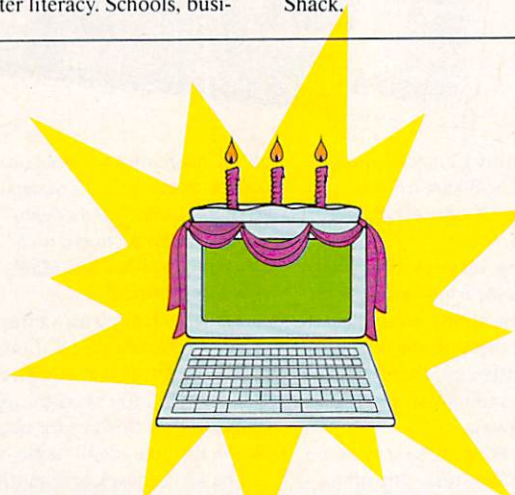
they came into the hall was NewTek's. The company's video products wowed spectators. NewTek says that its long-awaited special effects do-it-all Video Toaster board will be available this fall and that it will work on all Amigas.

Emerald Intelligence previewed its new artificial intelli-

gence program, *Magellan*, at a champagne party Friday night. The product allows users to build elaborate knowledge bases and expert systems. *Magellan* has been in the works for three years and is said to compete favorably with systems costing tens of thousands of dollars.

ASDG showed Twin-X, an expansion card for the Amiga 2000. It controlled four light bulbs, which could be turned on and off individually by clicking on gadgets with a mouse or by running a wand over a bar code. "Don't think of these as light bulbs," said Perry Kivolowitz, developer; "Think of them as solenoids operating a factory. . . . It's the first time this has been done on the Amiga."

Discovery Software took the moral high road by drop-



ping its popular *Marauder II* disk copier. This move opens the market for Fuller Associates' excellent *Project D* disk copier and editor. Discovery showed impressive new games and *V.I.P.*, a promising virus-protection program.

Crowds gathered around the Haitex booth for a chance to look through a pair of X-Spec 3-D glasses, which provide realistic full-color 3-D pictures and animation.

For the sound-hungry, New Wave demonstrated *Sound Oasis*, a program that reads any of the thousands of disks of sampled sounds for the Ensoniq Mirage sampling keyboard.

MicroWay's expensive Flicker Fixer board was installed in many of the Amiga 2000s at the show. The flicker-free screens were breathtaking. T. S. R. Hutchinson was sell-

ing Flicker Master, an \$18 plexiglass screen, to budget-conscious buyers. For the price, Flicker Master does a good job.

Of course, the Amiga will never really grow up. The dozens of games shown at this AmigaEXPO were the best yet, and the developers say that there's nothing to stop them from getting even better.

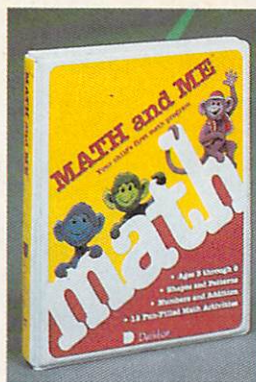
— Rhett Anderson

Best Preschool Software

High/Scope Educational Research Foundation has announced what it considers to be the six best preschool programs: *Color Me* (Mindscape), a drawing program; *Explore-a-Story* (D. C. Heath and Company), a language-learning game in which children use ani-

mated characters; *Mask Parade* (Springboard), a computer aided-design (CAD) program that allows children to design and print their own masks, badges, and other paper cutouts; *Math and Me* (Davidson), an easy-to-use math-learning program; *Muppets on Stage* (Sunburst Communications), a program that teaches children about letters, numbers, and colors; and *Observation and Classification* (Hartley Courseware), a program designed to help children improve their observation skills.

These 6 programs were selected from the 280 that appear in the Foundation's *Survey of Early Childhood Software*. According to High/Scope's



Warren Buckleitner, choosing the top 6 was difficult. "It was fairly easy to narrow things down to 20 or 30 excellent programs, but things were very tough after that," said

Buckleitner. "We wanted our list to have a good mixture of programs and to show the variety of early-childhood software, so this was an important consideration, too."

High/Scope is a nonprofit organization, founded in 1962, that reports on educational software for children. A copy of the Foundation's *Survey of Early Childhood Software* is available for \$20. Contact High/Scope Foundation, 600 North River Street, Ypsilanti, Michigan 48198; (313) 485-2000.

— Clifton Karnes

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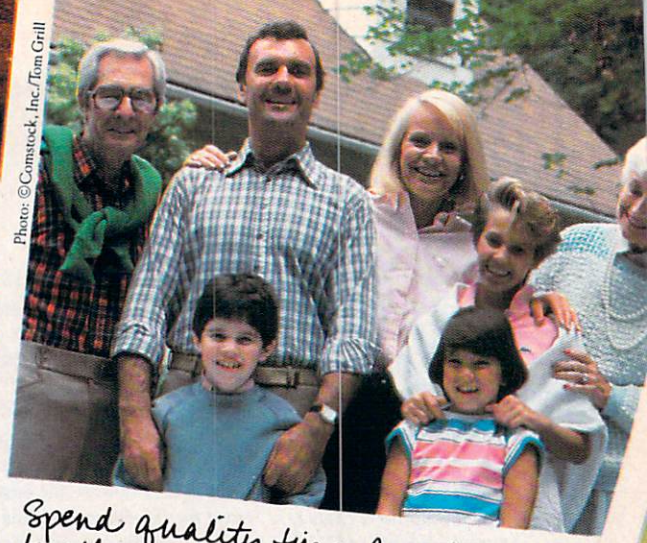
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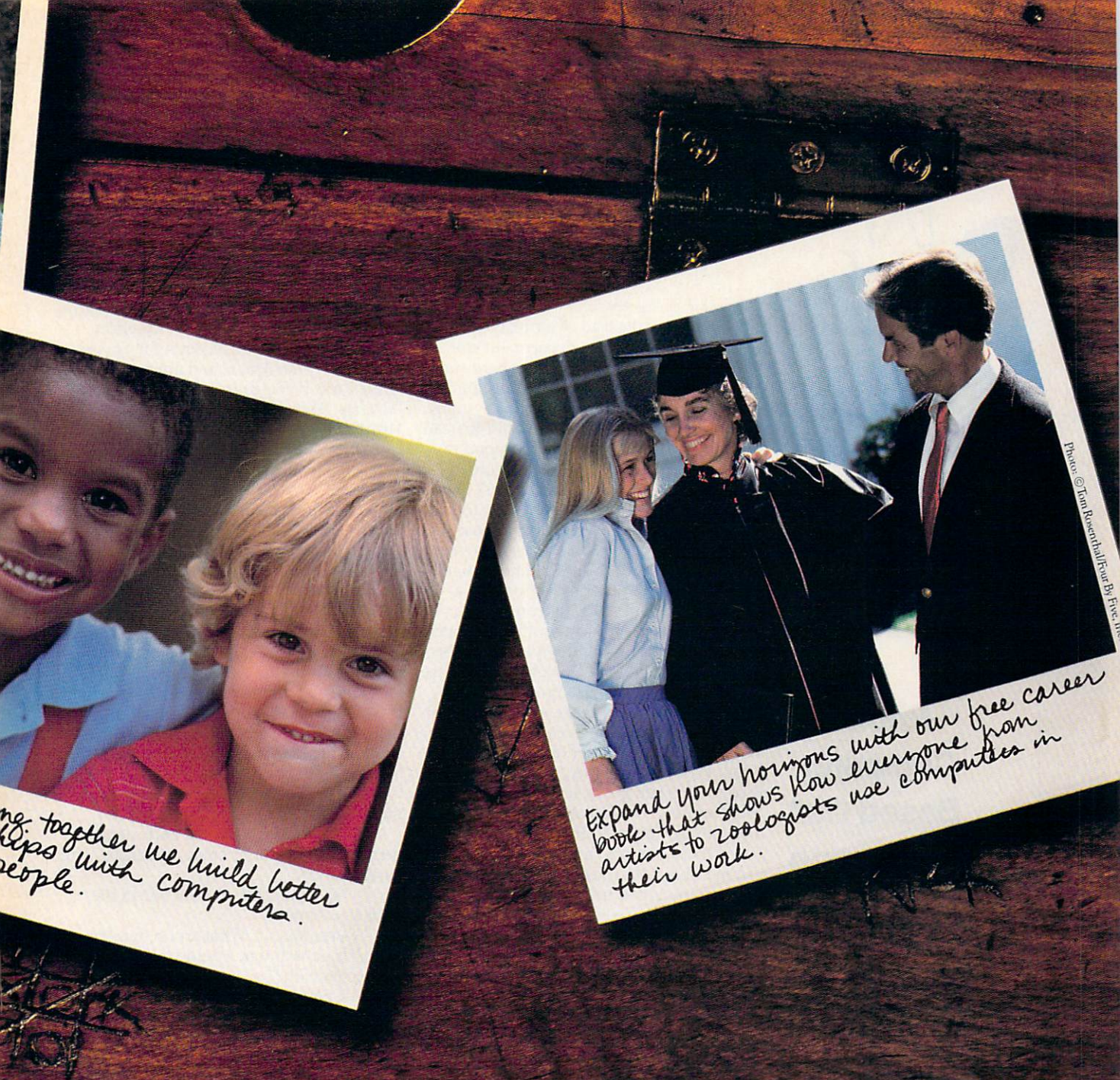
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Only Franz Kafka Could Appreciate the New Madness on the Phone—Computer-Based Call Routing

continued from page 104

Following the lead of ultralarge corporations and retail department stores, more and more computer hardware and software manufacturers are installing microcomputer-based call-routing systems to handle incoming telephone calls. Instead of a human operator who can respond to your simple requests, you get a recorded voice that drones through an endless litany of numbers for you to press on your touch-tone phone. These systems are supposedly less costly and more efficient than banks of real people. However, the situations that this creates often take on overtones of a Franz Kafka or Joseph Heller novel.

While traveling last month, I lost one of the manuals for my PC-compatible laptop. I called the manufacturer's technical-support line to order a new one, a process I innocently assumed would take just a minute or two. Rule number 1: Never try to deal with an automated call router before you've had a couple of cups of coffee. The first time I tried to navigate the system was uglier than being ambushed by a pack of Kobolds while negotiating Mangar's labyrinth in the *Bard's Tale*. One slip of my finger shunted my call to a member of the custodial staff doing a bad imitation of Arnold Schwarzenegger. He said he would have been glad to transfer me to the customer service department, but he'd been unable to figure out how to use the company's new phone system ever since it had been installed three months earlier.

I hung up, downed three mugs of java, got out my adventure-mapping materials to chart my way through the maze of twisty little menus, and called back. Six minutes later, I had traversed eight levels of menus and was informed by yet another disembodied voice that all of the customer reps were busy . . . would I please hang on? Following was a choppy segue to Muzak that sounded like Montovani playing Twisted Sister. Adding to the suspense were occasional interruptions from Robo-Operator informing me of the number of people ahead of my call and random assurances that satisfaction with my laptop was the company's number 1 priority. My satisfaction, perhaps, but certainly not my sanity.

After only 12 minutes of electronic torture, I was finally connected to what appeared to be a real live human being. I fell to my knees, inwardly singing hosannas at the opportunity of dealing with a sentient, logical being.

"Customer Service. May I help you?"

"I'd like to order the User Guide for my laptop. Someone passing out flowers at O'Hare must have mistaken it for *Sayings from Chairman Moon*, and appropriated it while I was placing my bets in Northwest Airlines' 'How long can we delay your flight?' lottery."

"Certainly, I'll be glad to order that for you. What is the part number for that manual?"

"I have no idea. Where would I find the part number?"

"The part numbers for the items you received with your laptop are listed in the User Guide."

"If I had the User Guide I wouldn't be calling you."

"I'm sorry; I really need a part number to order your item, sir."

Panic began to set in as I realized that this was probably not a human being I was dealing with, but a beta test of a LISP-based artificial intelligence project destined for use as a psychological-warfare weapon.

"Don't you have a description of the part numbers?"

"I'm sorry, sir; only the parts department has descriptions cross-referenced with part numbers."

"OK; let me talk to someone in the parts department."

"Certainly, sir. What group number in the parts department would you like to be connected with?"

"I haven't the foggiest. Whatever group handles laptop parts!"

"I'm sorry, sir; I don't have that information. I'll have to transfer you to the main menu of our call-routing system. Thank you for calling. Have a nice day."

I stared blankly at the wall as I was once again greeted by a saccharine voice that informed me that I was back to square 1. Within the space of a few microseconds, I made a careful analysis of my options and deduced the path of least resistance. I hung up the phone, went in to work, borrowed the manual from one of my cohorts who owned a similar machine, and spent 20 minutes with a photocopy machine.

Sure, I could have just looked up the part number in the manual I borrowed and called the customer service department back. That would have been easy, about as much fun as sitting through an entire evening's news coverage of the Democratic or Republican party conventions, and only slightly less likely to result in permanent impairment of higher brain function. □



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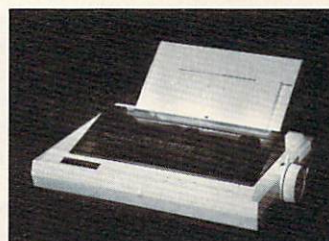
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ARLAN LEVITAN



If Press Releases Are Junk Mail for Journalists, I Need to Cut Out the Between-Meal Snacking

My editor tells me that three straight months of columns dealing with computer trade shows is enough. Unfortunately, this means you'll never get to read my coverage of the local Zug Island computer swap meet and baseball card exposition. (Hey, I'll trade you three 250-nanosecond 2764 EPROMS for Manny Moto, Rocky Colavito, and a slightly bent Jim Piersal.)

Why do I pay my own way to so many trade shows? To keep readers of this column well informed, right? Actually, the more weekends I spend at shows, the easier it is to put off cleaning my computer room. However, three months is a long enough hiatus for putting things in order. When your 18-month-old kid, whose playroom typically resembles Omaha beach a week after D-Day, opens the door to the computer room, looks in, and says "Uh-oh," you know it's time to neat up.

After six hours of sorting and tossing, I've cleared enough room to wedge myself in front of the AT clone and get down to pounding out this month's malarkey. I even tried to straighten out the rat's nest of cables and wires that lurks just beyond the pale, but to no avail. Ever notice how every computer accessory you buy these days has its own AC transformer "brick"? I think I have enough of them lying around to build a scale model of the Great Wall.

On the positive side, I've managed to locate three lost robots, a Hayes Transet (which I wish had stayed lost), a Convergent Technologies Workslate (one of the first and most unsuccessful laptop computers ever produced), and my trusty old IXO Telecomputing System. Finding the IXO was a relief.

The IXO was one of the first battery-powered terminal devices with a built-in modem. It was designed by a couple of renegade engineers who left Mattel after doing most of the design work for the old Intellivision game system. The IXO is about the size of a thick paperback book, weighs less than a pound, and has a full QWERTY chiclet keyboard and a one-line LCD display. When it was introduced in 1982, it was an instant failure; it resurfaced about two years ago in the inventory of several bargain-basement mail-order liquidators. I picked one up for about \$75 as a collector's item, but the IXO has taken on terrific practical-joke value with the recent advent of useless and expensive hand-held MS-DOS computers.

The last time I was cornered by a rep for one of the hand-held manufacturers, I

happened to have the IXO in my briefcase. After I'd listened to the guy drone on for a half-hour about the wonders of his \$1,000 128K machine, I innocently asked, "Don't you have anything like this with 640K and a built-in modem?" I whipped out the IXO and the guy went white as a sheet. "Never seen one of these before? It's a prototype on loan to me. Sorry I can't let you play with it, but I'm violating a nondisclosure agreement by just showing it to you."

The down side of cleaning up my computer room is going through at least 12 linear feet of press releases that I've thrown in the corner for the last four months. Press releases are the junk mail of journalism. Anyone whose name has found its way onto a half-dozen public relations firms' distribution lists is assured of enough waste paper to keep an average-sized home warm and toasty through the coldest Minneapolis winter. While we all appreciate releases that announce new products and services, I think most of us can live without inch-thick corporate backgrounders that wax poetic about the inception, growth, and altruism of a company, complete with glossy photographs of corporate officers and board members.

A time-honored ritual for reporters attending trade shows is to hit the pressroom early, grabbing one of every kit laid out on the tables and dumping them into a large box. For the next three days, the press lounge and workrooms are full of folks removing extraneous detritus from press kits, a process lovingly referred to as "shucking the jive." The latest measurements by the National Bureau of Standards peg the highest wheat-to-chaff ratio for press kits in the microcomputer industry at about six grams per kilo.

The bigger the company, the higher the volume of useless information it generates. Somehow my name got on the mailing list of one of the world's largest manufacturers of business minicomputers. For months, not a day went by that my mailbox wasn't stuffed with at least four thick 9 x 12 inch packages stuffed with news from the world of the Digital Equipment Corporation. Since minicomputers aren't really my cup of tea, I finally called one of the DEC PR flacks and let her know that they were needlessly blowing away scores of perfectly good trees and dropping almost a thousand bucks in postage on coloring paper for my kids. Three weeks later, I began receiving two of every DEC press release.

continued on page 102

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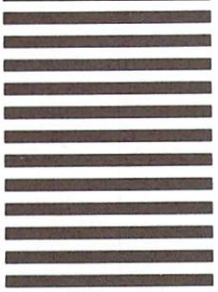
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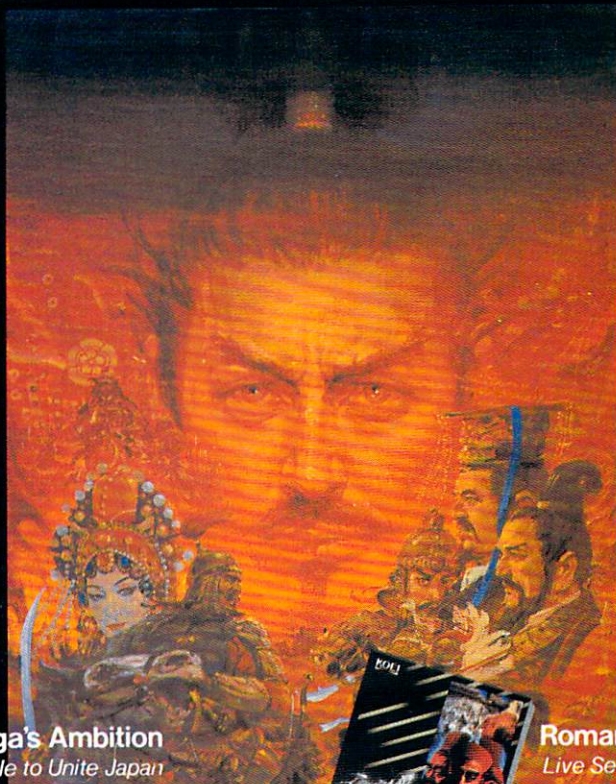
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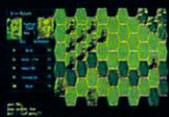
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**Greatest
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Nobunaga's Ambition
The Struggle to Unite Japan



For the IBM PC and most compatibles

The Japan most people don't know about. The Warring States period of the sixteenth century. Central government was weak and ineffective as feudal lords called daimyos gained power. Each daimyo ruled a single fief, each wanted to rule the nation. One man, Nobunaga Oda, came close but failed. He paid the price for failure, death.

Nobunaga's Ambition is a military, economic and diplomatic simulation for one to eight that puts you in Nobunaga's place, or in the place of one of his rivals. You start with one fief and try to take the entire nation. A game of both strategy and tactics, success takes careful planning and opportunism.

Administer your fiefs during peace to increase their strength. Keep your peasants and army loyal or risk revolt. Use your resources effectively, not spending too much on either guns or butter. Negotiate with other daimyos, or perhaps you'd rather just send ninja.

On the battlefield, control your troops in close tactical detail. Take advantage of terrain, attack, retreat, fight a war of attrition or go directly after the enemy general. Just be sure your side is smarter, tougher and better prepared.

Nobunaga's Ambition is fast moving and easy to play but historically accurate. Characters and game events come from the reality of sixteenth century Japan. Maps are almost entirely accurate, both geographically and politically. Advanced graphics and animation help give the game a feel of complete reality. One to eight may play either of two scenarios and five different levels of difficulty. Instruction manual and historical notes included.

Some comments from Japan's leading computer magazines:

"If you own a computer you've got to try this game."

OH! PC
January, 1987

"If the user can supply intelligence and imagination, Nobunaga's Ambition will provide more and better entertainment than any other game on the market."

Enter
August, 1986

"First released more than five years ago, Nobunaga's Ambition is still not just a best seller but one of the very best simulation games on the market"

Popcom magazine
January, 1987

"Nobunaga's Ambition is the absolute pinnacle of simulation gaming."

Mainichi Shimbun
May 7, 1987

"A great hit"
Asahi Shimbun
February 20, 1986

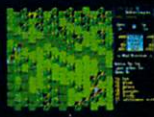
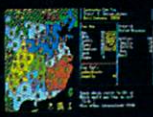
"Far and away the most authentic simulation game I've ever seen."

Hiroharu Seki, professor of Political Science at University of Tokyo in an interview with *Tokyo Newspaper*.



\$69⁹⁵

Romance of The Three Kingdoms
Live Second Century China



For the IBM PC and most compatibles

China's second Han dynasty has collapsed. The entire nation battles with itself as warlords struggle for supremacy. You are a Master, one of these warlords determined to beat out the others and control the country.

Manage the states under your control to increase their power and resources. Cope with disasters, both natural and otherwise, when they occur. Choose good subordinates and win their loyalty. Negotiate with other Masters, or take a less diplomatic approach, controlling your armies and those of your generals in great tactical detail on the battlefield. Take advantage of terrain as best you can. Choose the right kind of attack for the situation, or just try and trick the enemy. Do what the immediate situation calls for but don't fail to think ahead.

A huge data base together with advanced graphics, animation and programming give the game an unprecedented degree of reality. Romance of The Three Kingdoms is based painstakingly on the Chinese epic novel of the same name, but is fast moving and easy to play. Features include:

- *255 characters, each with a distinct personality
- *Military, economic and diplomatic simulation
- *Five different scenarios
- *Ten levels of difficulty per scenario
- *Play by one to eight
- *Demonstration mode
- *Complete instruction manual and historical notes

"Our highest accolade to Koei's Romance of The Three Kingdoms"

Popcom magazine
May, 1987

"Highest award for a simulation game"

"All around best game"
Login
July, 1987

"A simulation game without peer"

Enter
August, 1986

"Romance of the Three Kingdoms is simulation gaming at its absolute best"

Technopolis
July, 1986

"Romance of The Three Kingdoms is a simulation war game that will strengthen any businessman's ability to work through a problem, logically or intuitively"

P C magazine
October, 1986

"Romance of the Three Kingdoms may be pricey but the entertainment it provides makes it a good buy at any price"

OH! FM
March 1987

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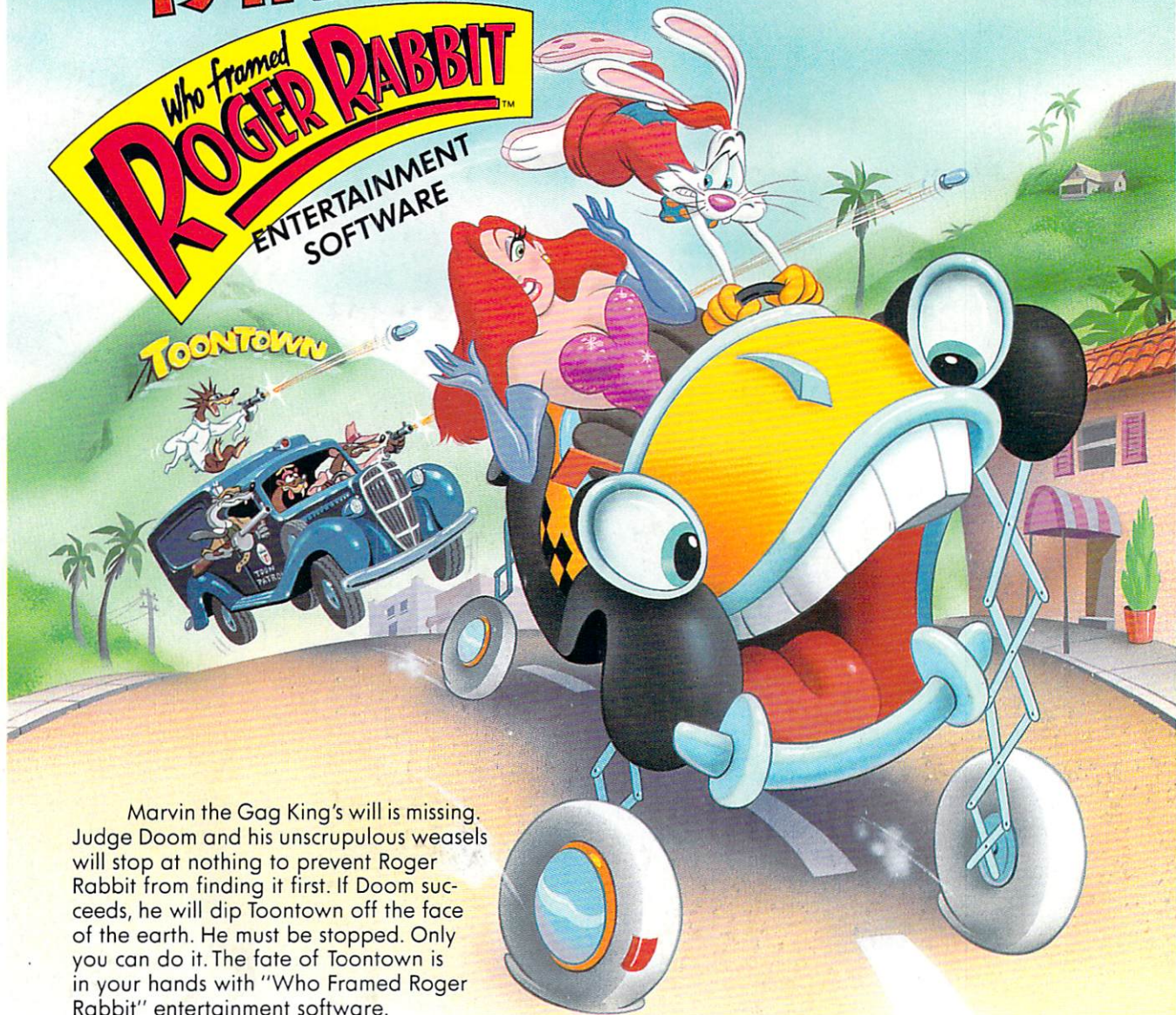
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Who Framed
ROGER RABBIT
ENTERTAINMENT
SOFTWARE



Marvin the Gag King's will is missing. Judge Doom and his unscrupulous weasels will stop at nothing to prevent Roger Rabbit from finding it first. If Doom succeeds, he will dip Toontown off the face of the earth. He must be stopped. Only you can do it. The fate of Toontown is in your hands with "Who Framed Roger Rabbit" entertainment software.

It's a fast-paced, action-packed adventure that's **more** than an arcade game. Stunning graphics, high quality animation and sound effects put you "in Toon" with Toontown's fate.

Can you defeat Judge Doom? Are you going to let him get away with this? It's up to you. And remember, Toons are idiotic—but they're not stupid!

Ask for "Who Framed Roger Rabbit" at a software dealer near you. The future of Toontown depends on it!

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