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(See page 84)

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April 1990

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Add the missing dimension to your games with the Ad Lib Music Card. From a solo to a symphony, Ad Lib's music makes the adventure come alive.

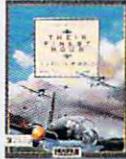


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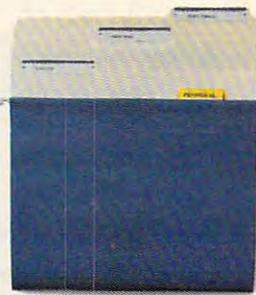
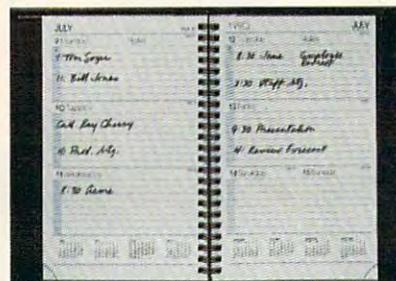
System requirements: IBM PC, XT, AT, or compatible with 256K RAM, DOS 2.0 or higher, CGA, EGA, or monochrome graphics adaptor, and headset or external speaker.

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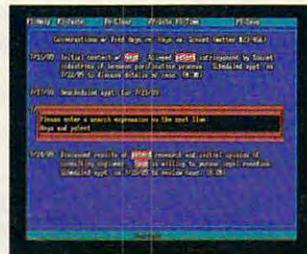
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Infoworld

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COMPUTE!

THE CHOICE OF HOME PC ENTHUSIASTS SINCE 1979

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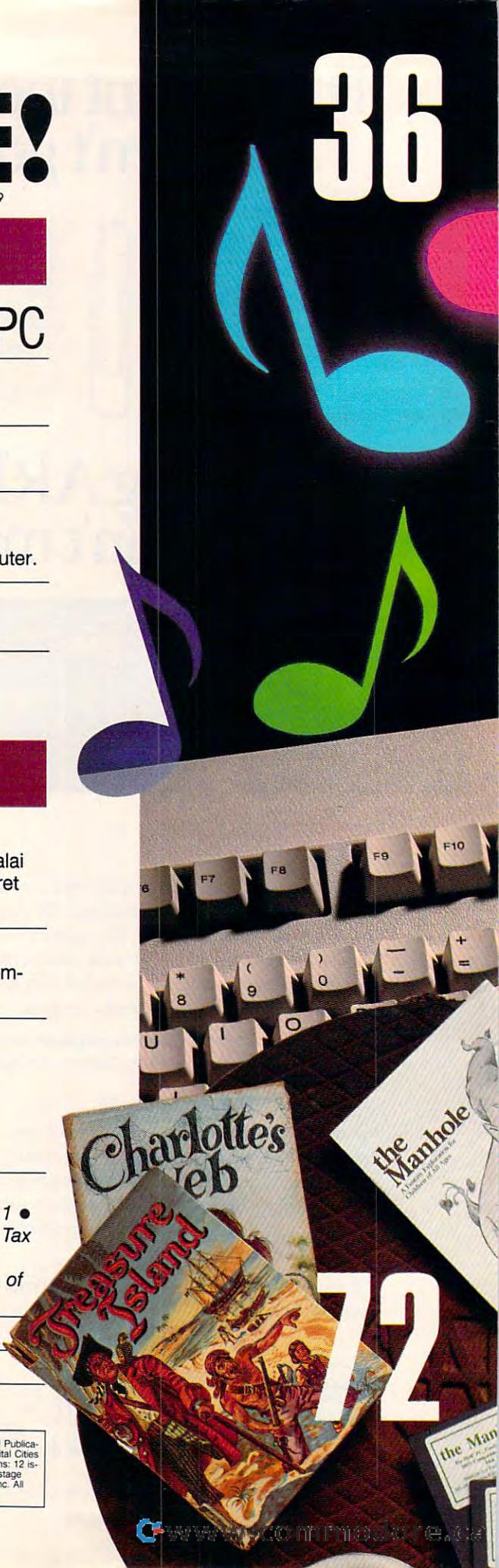
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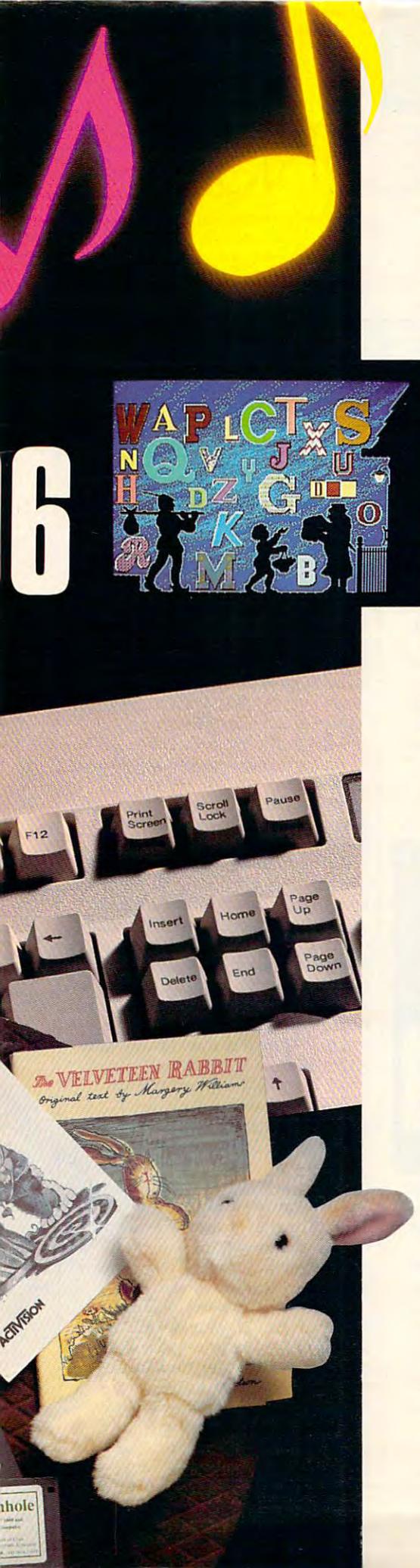
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Start your journey toward computer guruhood today.



EDITORIAL LICENSE

PETER SCISCO

Now hear this: *sound on the PC*. In the Oxymoron Hall of Fame, those words must share a shelf with *jumbo shrimp* and *deficit spending*. It's a phrase that sends Amiga heads into spasms of laughter. Utter those four words, and Macintosh users sadly shake their heads. As for C64 and Apple IIgs users, they must wonder what the fuss is all about (Sound from your computer? But hasn't everybody always had that?).

I've taken my share of verbal abuse for the vile noises that emanate from the tiny tinny speaker in my PC. But no more. Thanks to some third-party hardware and some clever hacking, my PC sounds pretty darn good. I wish that my machine used sampled sound and not synthesized sound, but all in all I'm pretty satisfied. It could be better, and someday soon it will be, but for now I'm happy.

So why has it taken so long? Why has PC sound remained so largely unexplored? Except for some notable products like *The Music Studio* and Ad Lib's Personal Music Composition System, PC sound products have traditionally attracted little attention or support. Even though research reflects the importance of music composition to home computer use (in a recent Dataquest survey, 20 percent of home computer users said they produced music with their computers), low-cost solutions to the PC sound dilemma have only recently reached the market.

Sound ranks with memory management as the last frontier of PC hardware development. By tracking the development of the PC platform, you could infer that there hasn't been a demand—either real or imagined—for sound on the PC. It beeps. It boops. It crackles like a ham radio 300 miles deep inside a Siberian snowstorm. What more do you want?

Plenty. The clamor for PC sound comes from the most ignored segment of the MS-DOS market—the home

computer enthusiast. It's the home computer user who makes the MS-DOS platform jump through hoops. We don't concentrate on just one task; we demand that our machines prove themselves capable of handling many jobs, from text processing and number crunching to flight simulation and reading comprehension. To do all these things, and to do them well, we need great graphics, decent processing speed, a world of software, and *sound*.

For all their talk of multimedia, Microsoft and IBM have barely addressed the pitiful sound capabilities of the PC. But smaller companies have stepped into the breach. Sound cards and lyrical software aren't the purview of computer-generated music-composition companies any longer. Mainline computer entertainment companies are looking at sound as a way to set their products apart. Sierra

face, rather than the keyboard or the score metaphor. Like most kids who came of age in the rock-'n'-roll era, I chose the guitar as the musical weapon of choice. I can't read music, but the fret board on my Gibson is like an old friend. Just once, I'd like to play the blistering solo that my heart sings but my fingers can never master. It might not get me on stage, but, man, it sure would sound sweet.

On the hardware side, Creative Labs has repackaged its musician's sound board as an under-\$100 entertainment product and released another card that boasts digital sound capability. Covox offers a card reminiscent of the Atari ST sound chip, and RolandCorp has shrunk its MT-32 modular sound system down to an add-on card.

Now that the number of players has grown, some of the MS-DOS heavyweights are looking toward sound as an integral part of the total personal computer package. Tandy offers a proprietary digital-to-analog chip in its SL and TL home computers. IBM's much-rumored low-end multimedia machine, scheduled for release in the late fall, is said to feature stereophonic sound. The much ballyhooed HeadStart CD-ROM systems feature CD-quality sound at less than \$2,000 (for the XT version).

Unless IBM sets an MS-DOS sound standard by default, you can plan to see a handful of add-on sound cards battling for support over the next few years. Already the window of opportunity is closing, with Ad Lib, RolandCorp, Creative Labs, and Tandy ahead of the pack. Developers will, for the short term, support most of these products, just as they support a variety of graphics modes.

For PC enthusiasts looking for sound advice, this month's In Focus section probes the pros and cons of the top MS-DOS sound products. The race for band leader is a long way from over, but when hardware and software companies start taking PC sound seriously, we all come up winners. □

THE PC BREAKS THE SOUND BARRIER

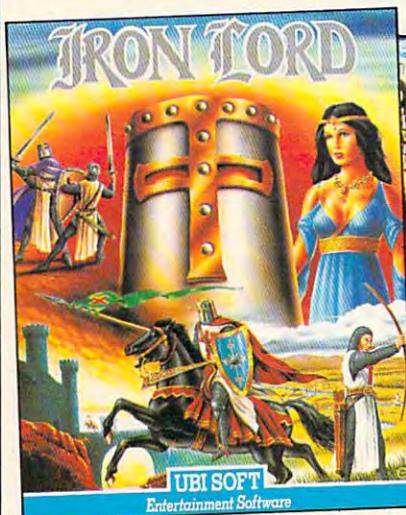
has embraced the world of music and sound in its adventure titles, from *King's Quest IV* to *Leisure Suit Larry III*. Electronic Arts kicks car-racing games into overdrive with the sound of its *Indianapolis 500: The Simulation*. Companies like Access Software, Brøderbund, Mediagenic, and Data East have incorporated hardware-independent sound into their products, with different levels of success.

The one piece of sound-intensive software I'm still looking for is a music-composition package that incorporates the guitar tablature inter-

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PRESENTS

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ADVENTURE



Prove your birthright through strategy and strength. Amaze the town with your superior archery, arm-wrestling, sword-play, and dice-throwing skills. Ultimately, you must build a following that not only respects you, but will go to war for you !

Take charge. Prove you are IRON LORD - The Crusader of Justice ! You owe it to your homeland. Your father, and most of all, to the future of your kingdom !

You are alone... a single warrior in a country of traitors, spies and assassins. You are unknown... the forgotten son of the dethroned King. Can you recover the throne ? Only a true Crusader of Justice could succeed at such a feat. Deceit and treachery abound !

ACTION

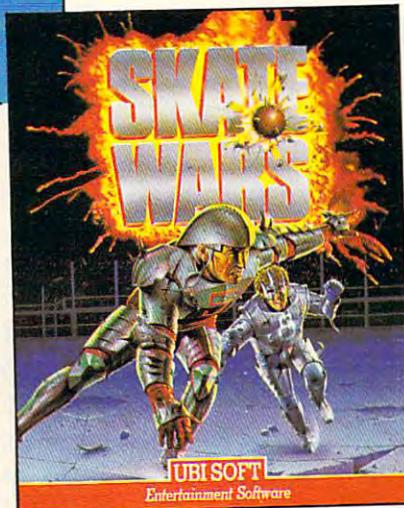


"DON'T GET PUUFFED OUT..."

That's the challenge in this addictive arcade-style game.

- **Avoid the enemies...** Ghosts, Acid Puddles, Flying Dragons, and Snakes lurk around each corner.
- **Choose your character :** Puffy is powerful, but Puffyn has the speed !
- **Explore twenty different levels** and settings, each offering secret passageways filled with demons.
- **Race through the mazes** quickly or accumulate points by exploring each level in full.
- **Enjoy the colorful graphics and entertaining sound effects.**

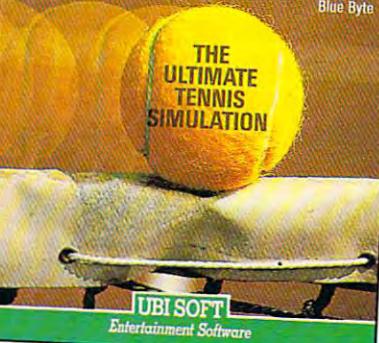
SPORT



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Skate Wars the sport of the future, combines the skills of soccer with the thrills of Rollerball, played in a space age ice stadium ! Lead your team to victory through a series of deadly hazards : crevasses, ramps, jumps, all while competing against the ruthless tactics of your opponents. You'll have to play dirty to win. Maim, trip, push, and shove... show no mercy. Only the brave win, or even survive !

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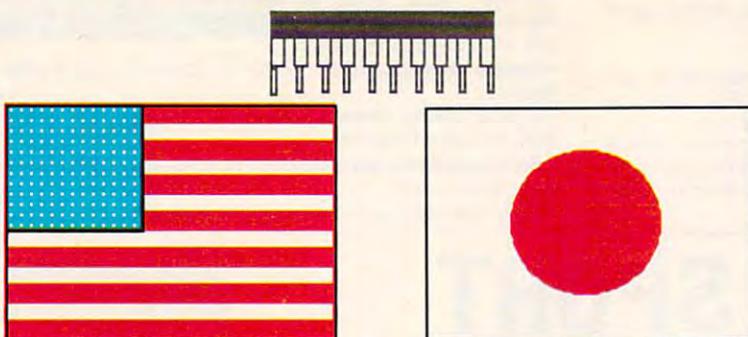
NEWS & NOTES

DID YOU CD THAT?

Commmodore Business Machines didn't seem to be displaying anything new at CES—just a bundled C64 system and its current Amiga and PC-clone lines. Behind closed (and locked) doors, though, Commodore was indeed showing something new. Informed sources say CBM gave select showgoers a sneak preview of a new CD-ROM

game machine. This 68000-powered game machine is said to be based upon the Amiga graphics chip set. Using compact discs instead of cartridges for storage allows games to have hundreds of megabytes of graphics and sound. If Commodore brings the game machine to market, consumers should prepare for severe sticker shock—sources say the platform will retail for around \$600.

—DENNY ATKIN



NO THANKS FOR THE MEMORIES

U.S. Memories, a cooperative set up by a number of American semiconductor manufacturers to help reduce reliance on Japanese chip suppliers, was dissolved on January 15 before it could produce a single chip.

The cooperative was backed by a number of U.S. technology firms, including IBM, DEC, Advanced Micro Devices, Intel, LSI Logic, National Semiconductor, and Hewlett-Packard. Several companies, such as Apple and Sun Microsystems, decided not to back U.S. Memories and instead signed long-term supply contracts

with both foreign and domestic chip manufacturers.

U.S. Memories would have reduced dependence of American industry on overseas-manufactured memory chips, but it appears that many manufacturers decided it wasn't worth the financial risk because chip prices had dropped significantly in previous months. When U.S. Memories was first proposed, one-megabit DRAM chips cost over \$30 each. Now they sell for well under \$10.

—DENNY ATKIN

HOME BUSINESS BOOST

Home office workers looking for free advertising can contact MountainView Systems (930 South Washington Avenue, Suite 111, Scranton, Pennsylvania 18505; 717-342-2302) and request a data-entry form for inclusion in the *Homebased Business Directory of North America*. Scheduled for publication in the fourth quarter of 1990, the directory will list home businesses as well as goods and services available to home businesses. Your business might also get a mention in the company's monthly newsletter.

—RICHARD C. LEINECKER

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A poisonous stingray races straight at you. Your air supply is running low. What else could go wrong...

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• Solve unusual puzzles and find your way past clever traps—the right strategy will make you rich!

• Capture friendly fish, pick up important keys, locate vital tanks of air—be careful or the last words you hear will be a garbled "Glub, Glub!"



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WINTER CES: DISKS IN THE CARTRIDGE-GAME DESERT

Sega Sega Sega. Nintendo Nintendo. NEC NEC. You almost couldn't find the computers between the game machines at the Winter Consumer Electronics Show (CES) held in Las Vegas in early January. Several leading computer software publishers moved their exhibits into trailers, recreational vehicles, or hotel suites, away from the convention center.

Physically overshadowed by game machines, traditional computer software nonetheless made one of its strongest recent CES showings. CES is an entertainment-oriented show, and the majority of products on display were games, some of which are complete and should reach retailers by spring; others will be available later in 1990.

From around the show. . . . There's a *Crime Wave* coming from Access in the form of a new action game that pits you against heavily armed enemies.

Accolade continues to deepen its products and broaden their scope, showing a science-fiction adventure, *Day of the Viper*, as well as two combat simulators, *Strike Aces* (modern air combat) and *Gunboat* (river patrols).

What do Michael Jackson, Buffalo Bill, and Elvira have in common? All are represented in new games from Box Office Software. The titles are *Buffalo Bill's Rodeo Games*, *Elvira's Horrorsoft: A Personal Nightmare*, and *Michael Jackson's Moonwalker*.

Britannica Software sets sail with *Guns and Glory*, a re-creation of World War II naval warfare.

Moving past its arcade orientation, Data East showed *Drakken* and *Chamber of the Sci-Mutant Princess* (two role-playing games), *Bo Jackson Baseball*, as well as an action game, *The Untouchables*.

Typically, Electronic Arts covered a lot of entertainment ground, ranging from the ancient Rome of *Caesar* to the silly slopes of *Ski or Die!* to the deadly skies of *L.H.X. Attack Chopper*. EA's affiliate labels displayed even greater diversity of approach. France's UBI Soft will deliver medieval role-playing in *Iron Lord* and futuristic adventure in *B.A.T. (Bureau of Astral Trouble-Shooters)*. Strategy master SSI returns to the world of *Advanced Dungeons & Dragons* in *Champions of Krynn* and to World War II in *Second Front*. Arcade classic *Altered Beast* will be out from Sega, along with *Turbo Out Run*, a sequel to the popular racing game.

A new Electronic Arts affiliate, Parker Brothers, showed off the computer version of *Trivial Pursuit*. Cinemaware took flight with *Wings*, a World War I flight simulator, and added *T.V. Sports Basketball* and *Baseball* to the popular T.V. Sports line. Interstel displayed its first graphics adventure, *At Earthrise*, and a man-to-man combat simulator, *D.R.A.G.O.N. Force*. Miles Computing went undersea for *Aquanaut*, while New World Computing offered two fantasies, *King's Bounty* and *Might and Magic II*, in addition to *Nuclear War*, a humorous strategy/action game.

Two long-awaited products were unveiled at the Electronic Arts exhibit in Vegas: Three-Sixty's adaptation of the Larry Bond classic of modern naval strategy, *Harpoon*, and Lucasfilm's much-anticipated fantasy game, *Loom*.

Movie and book adaptations are the name of the game at Intracorp, with *Bill and Ted's Excellent Adventure* and Tom Clancy's *Cardinal of the Kremlin* both announced at CES.

MicroProse affiliate Medalist International takes two approaches to science fiction in *Midwinter*, set in a new ice age, and *Star Lord*, a game of galactic conquest. Paragon Software will bring Marvel Comics' *Punisher* to violent computer life, and it will translate the science-fiction role-playing classic *Megatraveller* to disk.



Take to the skies or to the water in Accolade's combat simulations, *Strike Aces* (pictured above) and *Gunboat*.



Ultima fans receive the sixth installment of the popular fantasy role-playing game. (See our review on page 84.)

Mediagenic showed its computer translation of *Power Drift*, Sega's arcade hit. Mixing other media, Infocom brings George Alec Effinger's ambitious fiction to electronic life in *Circuit's Edge*.

Newly acquired by Software Toolworks, *Mindscape* showed off *Guns and Butter*, the latest game from Chris Crawford.

Origin's Richard Garriott, a.k.a. Lord British, showed off the sleek, redesigned Ultima interface, making its debut this spring with *Ultima VI*. Chris Roberts, fresh from his *Times of Lore* triumph, offered glimpses of a refreshingly literate, albeit desolate and dangerous, future in *Bad Blood*.

The storytellers at Sierra unveiled *Iceman*, an antiterrorist thriller, and *Conquests of Camelot*, a serious look at the Grail quest.

Taito announced an ambitious schedule, highlighted by *New Zealand Story*: an adventure involving a kiwi (the bird, not the fruit); *Chase H.Q.*, a car-chase epic; *Operation Thunderbolt*, a sequel to *Operation Wolf*; and *Ninja Warrior*, whose title explains itself.

Visitors to Virgin Mastertronic's suite literally saw spots. *SPOT the Video Game* makes the 7-UP soft-drink character the central figure in a gorgeously animated strategy game.

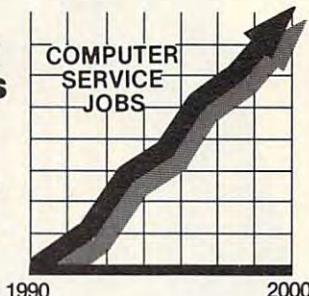
All in all, this was one of the most exciting Consumer Electronics Shows in years; 1990 may just mark the beginning of a computer-entertainment renaissance.

—KEITH FERRELL

5 sure steps to a fast start as a high-paid computer service technician

1. Choose training that's right for today's good jobs

Jobs for computer service technicians will almost double in the next 10 years, according to the latest Department of Labor projections. For you, that means unlimited opportunities for advancement, a new career, or even a computer service business of your own.



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Only NRI—the leader in career-building, at-home electronics training for more than 75 years—gives you practical knowledge, hands-on skill, and real-world experience with a powerful AT-compatible computer you keep. Only NRI starts you with the basics, then builds your knowledge step by step until you have everything you need for a fast start as a high-paid computer service technician.



2. Go beyond "book learning" to get true hands-on experience

NRI knows you learn better by doing. So NRI training works overtime to give you that invaluable practical experience. You first read about the subject,

studying diagrams, schematics, and photos that make the subject even clearer. Then you do. You build, examine, remove, test, repair, replace. You discover for yourself the feel of the real thing, the confidence gained only with experience.

3. Get inside a powerful computer system

If you really want to get ahead in computer service, you have to get inside a state-of-the-art computer system. That's why NRI includes the powerful new West Coast 1010 ES computer as the centerpiece of your hands-on training.

As you build this fully IBM AT-compatible micro from the keyboard up, performing key tests and demonstrations at each stage of assembly, you actually see for yourself how every section of your computer works.

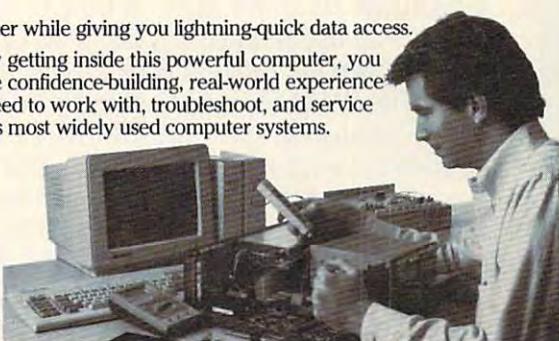
You assemble and test your computer's 101-key "intelligent" keyboard, install the power supply and 1.2 meg 5 1/4" floppy disk drive, then interface the high-resolution monitor. But that's not all.

You go on to install a powerful 20 megabyte hard disk drive—today's most-wanted computer peripheral—included in your training to dramatically increase the data storage capacity of your



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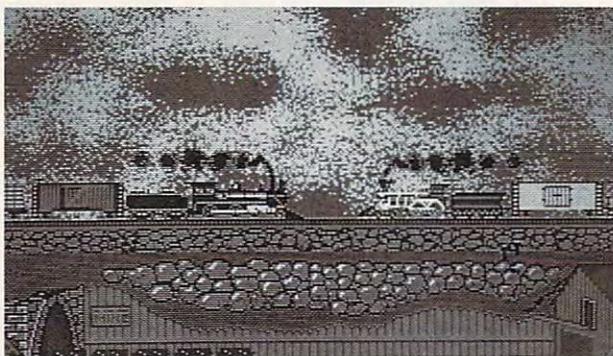
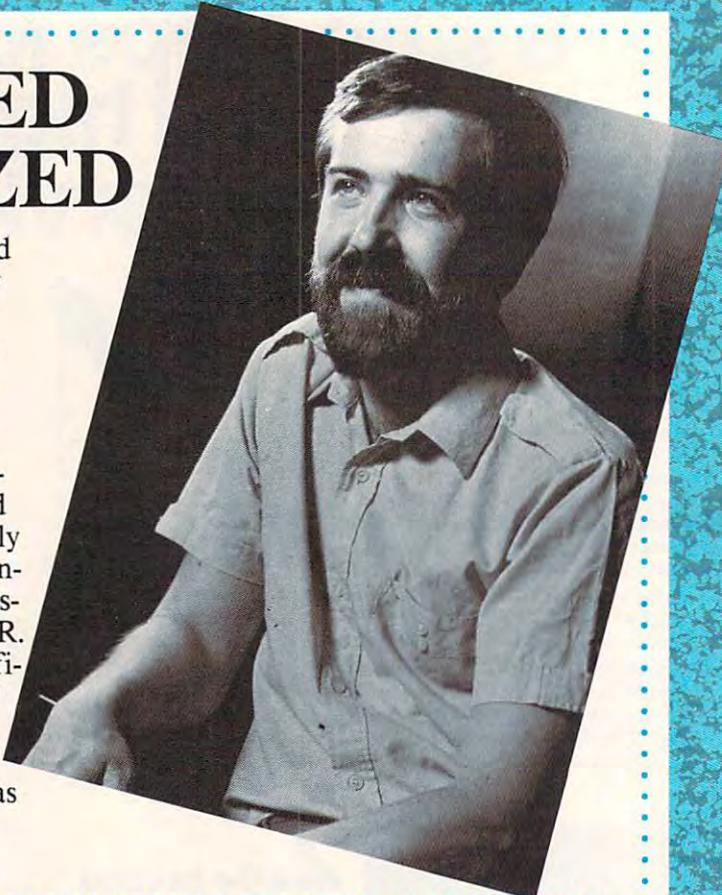
AMERICANIZED AND TETRISIZED

Soviet software author Alexey Pajitnov visited the United States for the first time in January to make an appearance at CES. Two of Pajitnov's 15 games, *Tetris* and *Welltris*, are available in the West from Spectrum HoloByte.

Enjoying the spirit of *glasnost*, Pajitnov hobnobbed with fellow developers and press representatives at a pair of get-togethers sponsored by Spectrum HoloByte. The 35-year-old Moscovite's English is very good, thanks partly to his wife Nina's occupation as an English language teacher. Pajitnov works as a scientific assistant at the Computing Center of the U.S.S.R. Academy of Sciences, where he works on artificial intelligence, voice recognition, and CAD/CAM software.

Excited by the success that *Tetris* and *Welltris* have enjoyed in the West, Pajitnov has new games in the works.

—DENNY ATKIN



Build a rail empire in *Sid Meier's Railroad Tycoon*, coming soon from MicroProse.

BUT THERE'S NO GUN, MAJOR BILL!

The Winter Consumer Electronics Show echoed with the sound of train whistles. The promotional whistles offered audible augmentation to MicroProse's upcoming railroad simulation.

Sid Meier's Railroad Tycoon, scheduled for spring release, puts you in command of the resources needed to launch and nurture a railroad empire. The game, which stretches from the nineteenth century to the present, offers scenarios set in the United States, England, and Europe.

Many observers remarked on the nonviolent nature of the game, something of a departure for MicroProse, which has traditionally produced sophisticated combat simulators.

"Wild Bill" Stealey, founder of MicroProse and former fighter pilot, was overheard muttering, "Maybe we can put a gun on a flatcar!"

—KEITH FERRELL

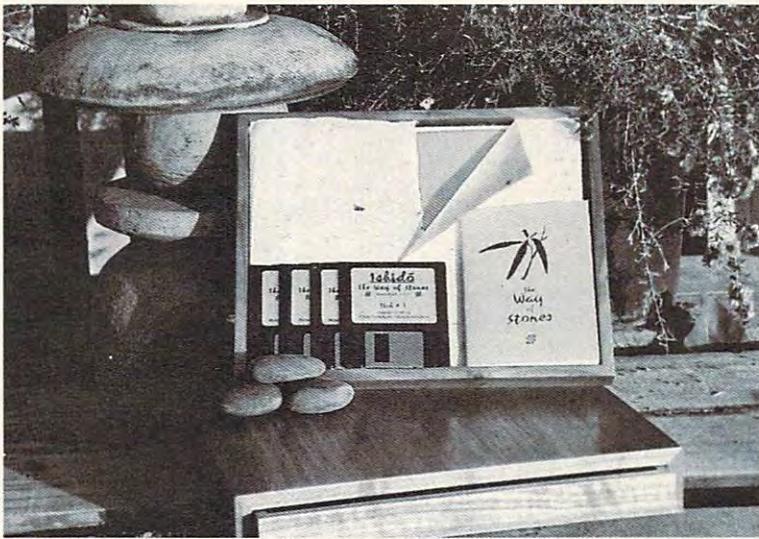
HALT! COMPUTER POLICE!

What does a computer company do when the details of its newest computer are leaked to the press two months before the official announcement? If the company is Apple Computer, it puts several former FBI agents on the payroll and sends them out to track down the culprit.

According to the *Wall Street Journal*, the trail led to RasterOps, a manufacturer of high-end monitors and display cards. Despite the company's agreement to keep the computer a secret, a RasterOps employee showed a Macintosh IIci prototype to the editors of *MacWeek*. The editors examined and photographed the computer for several hours and published a detailed account on the front page of their magazine.

Neither company will say what happened to the employee, but RasterOps will continue to receive support as a Macintosh developer.

—DAVID ENGLISH



CALLING ALL COLLECTORS!

Limited editions have a way of repaying investments. At least, that's the hope of Publishing International, which has released 1000 copies of *Ishido* in a \$495 edition aimed at the Macintosh collector's market.

Each copy is signed and numbered by producer Brad Fregger, designer Michael Feinberg, and programmer Ian Gilman. Reflecting its special nature, the limited edition is boxed in a handcrafted walnut case.

Fregger says that a mass-market version of *Ishido* may be released for the Macintosh, MS-DOS, and Amiga markets in the future.

—KEITH FERRELL

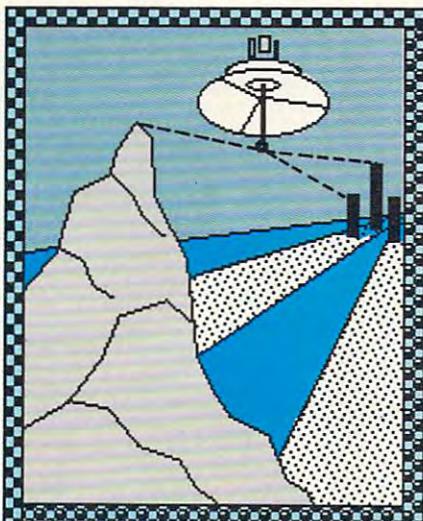
LIGHTER LAPTOPS

Psion attracted lots of attention at CES with its Mobile Computer series. The MC-200, MC-400, and MC-600 are the size of a two-inch-thick looseleaf notebook and weigh approximately 4½ pounds.

The MC-200 (\$1,199) and MC-400 (\$1,699) use Psion's proprietary multitasking operating system, whose graphical interface utilizes a built-in touch pad. Built-in software includes a word processor, a personal and business database, and a communications program. Each computer also can record, edit, and replay speech. It takes only 300K of RAM to store more than an hour's worth of speech.

The MC-600 (\$2,999) is an MS-DOS, PC-compatible machine. All three computers have four solid-state drives that utilize Intel's new Solid State Flash Memory technology. These matchbook-sized solid-state disks eliminate conventional mechanical drives and extend battery life significantly; up to 75 hours of continuous operation is possible using eight AA batteries on the MC-200.

—TOM NETSEL



TIBETNET

Even the Iron Curtain can't stop the moving electrons of a telecommunications network. And now the Dalai Lama and the members of his movement in China are using telephone lines to communicate with the outside world. They use SEAdog telecommunications software (System Enhancement Associates, 21 New Street, Wayne, New Jersey 07470; 201-473-5153) to facilitate the transfer of information.

Messages coming in from the Himalayan mountains on a regular basis bolster Tibetan resistance to Chinese oppression. If an execution is about to take place, for example, support groups can immediately mobilize to try to thwart it.

Bill Van Ghan of SEA said the system's Wide Area Network still faces some problems. International phone lines aren't always free of static and noise, for example. Poor connections corrupt electronic information with stray characters (fax images are plagued by distortion). Also, wide variations in time zones present difficulties for global system updates.

—RICHARD C. LEINECKER

LETTERS

COMPUTE!
THE CHOICE OF HOME PC ENTHUSIASTS SINCE 1979

Better Design Needed

Bruce Haase didn't go quite far enough in his review of Abracadata's *Design Your Own Home* (January 1990).

The biggest weakness is in its output capabilities. For example, although it supports EGA/VGA color, it only prints in black-and-white. All the great color hatching and filling one does onscreen won't appear on paper. The resolution of the output is also the lowest possible due to a generic printer driver.

Another complaint I have is with the dimensioning of the finished drawings. It takes hundreds of lines to make up a floor plan. In *Design Your Own Home*, the user is required to manually remeasure each line in order to place the dimension markers. The user manually creates the extension lines, arrows, dimension lines, and text. This measuring is awkward to accomplish because it requires the user to redraw the line to be measured.

This program has potential but lacks some basic functions for a program in its price range.

JEFF A. SAWYER
WOONSOCKET, RI

No Room to Share

I have the November SharePak disk, and when I try to uncompress the file CM170, I get a message that says *compressed file too large for disk*. Please explain why this happens.

RALPH MELUCH
FAIRVIEW PARK, OH

You need to uncompress the files to an empty floppy disk or to a hard drive with sufficient free space. If you have the file CM170.EXE on the same floppy disk to which you are uncompressing, there won't be enough room for all of the files. Your best bet is to use the MENU program on the SharePak disk to uncompress the files. While compressing the files on the SharePak disk adds a few extra steps before you can get the programs up and running, it allows us to fit almost

twice as many programs on each monthly disk.

Command Line Confusion

I look forward to reading the "PC Primer" column every month because of the useful bits of information that can be picked up for using DOS.

Is there a manual that contains every DOS command and explicit instructions on their use and function?

Thanks for a truly superior magazine!

JOHN R. HENSON
LIVERPOOL, NY

There are many MS-DOS tutorial books available. Beginning MS-DOS users should check out the Second Edition of Quick & Easy Guide to Using MS-DOS, by Strawberry Software and Bonnie Derman (\$14.95, ISBN 0-87455-218-4), available from COMPUTE! Books, Chilton Book Company, One Chilton Way, Radnor, Pennsylvania 19089; (800) 345-1214. This book teaches commonly used MS-DOS commands in a procedural manner. Intermediate and advanced users wishing to master commands such as EXE2BIN should get a copy of DOS Power Tools, by Paul Somerson (ISBN 0-553-34526-5). This 1250-page tome covers the inner workings of everything from ANSI.SYS to XCOPY and includes a disk packed with utilities that would be worth the \$44.95 price by itself. It's available from Bantam Books, 666 Fifth Avenue, New York, New York 10103; (212) 765-6500.

Correction

The publisher of Destroyer Escort was listed incorrectly on page 46 of our January issue. The program is a MicroProse product.

Do you have comments or questions? Send your letter, along with your name, address, and daytime telephone number, to COMPUTE! Feedback, P.O. Box 5406, Greensboro, North Carolina 27403. □

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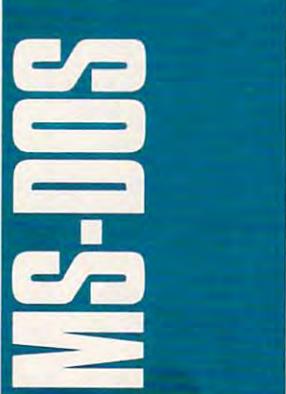
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COMPUTE! SPECIFIC



It's still early in 1990, but I may have found my nominee for Best Utility Program of the Year: *Control Room* from Ashton-Tate (20101 Hamilton Avenue, Torrance, California 90502; 213-329-8000; \$129). *Control Room* is an amazingly powerful and flexible tool that manages and customizes most aspects of your machine's environment, including your keyboard, disk, video, memory, and configuration files (AUTOEXEC.BAT and CONFIG.SYS).

Additionally, the program offers virus checking, macros, system benchmarks, an English-language analysis of hardware, file encryption, file undeleting, and much more, all from a single integrated interface.

Control Room does so much, in fact, that it's difficult to describe. Perhaps the best way to get a feel for the program is to walk through its installation and use.

First, *Control Room* consists of two main programs: CRLOAD, a TSR (Terminate-and-Stay-Resident program) that implements your system settings and CR, the control room itself, a command-line program for changing CRLOAD. In use, you never worry about CRLOAD after it's placed in your AUTOEXEC file; all your dealings will be with CR.

Control Room has a distinctive look. The screen is di-

vided into two parts: a menu bar and a panel. The top line is devoted to the menu, and the rest of the screen is filled with the selected panel. Each panel contains blocks with information and system settings.

If a panel takes more than one screen, there's a scroll bar—or as Ashton-Tate calls it, an *elevator bar*—that slides the panel. You can navigate menu selections and inside panels with cursor keys, the tab key, or a mouse. In practice, this interface is intuitive and exceptionally easy to use. You'll probably never need to read the manual.

Running CR for the first time is a noteworthy event. The program gives your hardware a complete physical, examining your keyboard, disk drives, memory, video, and more. When the analysis is over, you have both a snapshot of your system to help you customize it and a quick reference you can review at any time.

When you start to customize, a good place to begin is with your keyboard, the first selection on the menu. Here, you can change the size of your keyboard buffer; activate quick-stop cursor braking; set the buffer's beep to soft, medium, or loud; and adjust the keyboard's repeat rate and delay.

You can also set the Num-

Lock, ScrollLock, and Caps-Lock keys to be on or off at boot time. In addition, there are controls for setting your key click to none, soft, medium, or loud. (I always thought an audible key click was silly, but after trying it, I've found I like it.)

Next, select the desired macro environment. *Control Room* has three types of macros: a small set of predefined macros for things like the date and time; bank macros, which uses preassigned banks of keys, such as Shift-F1 through Shift-F10; and variable macros, allowing you to map a macro to almost any key. You can adjust the size of your macro buffer from 300 to 3000 keystrokes. If you don't want to use macros, they're easy to turn off.

CR's next panel, Disk, provides a battery of statistics on your hard disk, but the panel's main function is to allow you to set up a cache and turn head parking on or off.

Control Room's cache can be placed in conventional, expanded, or extended memory, and there's an optional track read-ahead feature. This is a safe, read-only, fault-tolerant cache, meaning that data entering and leaving the cache is checked for integrity. True to *Control Room*'s have-it-your-way philosophy, you can set the fault tolerance to either a

high or low level of checking.

As with every *Control Room* panel, as you make adjustments, you can see the amount of memory your settings will use displayed at the bottom of the panel.

The next panel—General—lets you adjust the date and time, display parameters (25- or 43-line EGA display, for example), the program's virus scanning, printer redirection, and screen blanking.

For now, we'll skip CR's Help, Memory, Config, Expert, and Summary panels and go right to Tasks, which shows the memory requirements of your CR settings. With most options active and a 256K cache in extended memory, CR uses about 25K; with a 47K cache in conventional memory, the program soaks up just 64K.

After reviewing the settings, select Quit. If you've made changes that won't take effect until the next time you boot, the Quit panel lets you know; otherwise, it updates both the in-memory portion of *Control Room* and the CRLOAD file on disk so the next time you run the program you'll have your new defaults. If your changes affect memory requirements, the Quit panel informs you.

Control Room is such a great idea it's amazing that no one else has done it. With this single program, you can replace scores of TSRs with one, save some precious RAM, and keep your AUTOEXEC.BAT file sweet and simple. While 1990 isn't over yet, I'm ready to put *Control Room* in this year's winner's circle.

Fade to Black

Screen blankers are controversial. They appeared soon after the first wave of monochrome-equipped PCs because monochrome displays have a tendency to burn in; that is, when an image is left on the

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screen for a long period, it etches itself into the phosphor. Screen blankers saved monitors.

Things are different with color displays, however. Most hardware gurus argue that CGA, EGA, MCGA, and VGA displays just don't burn in. Nevertheless, screen blankers have remained popular. Why? Because we aren't sure that color monitors won't burn in, and we don't want our monitor to be the one to prove that they'll burn.

There's another reason, too: security. Many people like to be able to turn off their screen whenever they wish, and they're reassured knowing that if they leave their PC with some sensitive information on the screen, it will soon be blanked.

I'm looking for the ideal screen blanker. It would have on-demand blanking triggered by either a hot key or a mouse movement; it would be sensitive to movement from keyboard, screen, mouse, or any combination of the three; it would unblank with either mouse movement or a key-press; and while it was blanked, it would put some random entertainment on the screen to remind me that the computer wasn't turned off. And it would be small—less than 2K. (Mac users have a blanker—*Pyro*—that just about fills the bill.)

My ideal screen dimmer may not exist—yet—but while I'm waiting, I've found two excellent substitutes. The first is the blanker that comes with *Control Room*. It offers settings for 3-, 5-, 10-, and 15-minute delays, and it's sensitive to the mouse.

If all you're looking for is a blanker, however, *Control Room*'s power may be overkill. For those who want a stand-alone program, there's *VGA Dimmer* from Revolution Software (320 Route 24, Chester, New Jersey 07930; 201-455-0995; \$29.95). Although you might not guess it from its name, *VGA Dimmer* blanks monochrome, CGA, EGA, MCGA, LCD, as well as VGA, screens. It offers on-demand blanking (press the Shift key three times) and timed blanking (you set the interval), and it blanks every screen I've tried, including text and graphics.

To load *VGA Dimmer*, simply type *DIMMER/n* at the DOS prompt, where *n* is the number of minutes of delay before the program blanks. If you want to disable the program, you can

type *DIMMER/0* or press the Alt-PrtScr hot-key combination. To reenable it, give the *DIMMER* command again or press the hot key. To remove the program from memory, simply type *DIMMER/X*. If you forget any of these commands, help is always available with the /H switch.

VGA Dimmer is not sensitive to video activity, which is often a plus: You can blank the screen while you're downloading or compressing your hard disk, to give two examples. While neither the *VGA Dimmer* nor the *Control Room* blanker is the blanker of my dreams, they're both solid contenders.

Command Ease

Minimal effort and maximum productivity—that's everyone's goal. But when it comes to typing complicated commands at the DOS prompt, that hardly ever seems to be the reality. A couple of keys can help, though. The F3 key allows you to recall a previous command line so that you don't have to type the whole thing over again, and the right-arrow key recalls the command line a character at a time.

Also, a public domain program called *Stack* gives you a window that lists previous commands, and it allows you to randomly select from them rather than having to type the command at the prompt again. You can find this program on CompuServe, GENie, and other bulletin boards and services.

—Clifton Karnes



Not so very long ago, owning a computer signified that you were part of a brave and somewhat frightening new world. Consequently, computers came to be associated with youth, excitement, innovation, and the future. When the Com-

modore 64 came along, with its gigantic 64K of memory, sparkling colors, and honest-to-goodness music and sound capabilities, it heralded a very bright future.

Then business set in.

Read through any number of PC-based magazines on your favorite newsstand, and what you get is the sound of an industry in the throes of middle-age crisis. These magazines ignore games, entertainment software, sound, and in many cases even graphics. In their place, they concentrate on spreadsheets, database managers, and word processors; all of which are simply rehashes of existing products with a few more bells and whistles thrown in. All in all, following their concerns is about as exciting as following the stock market if you don't own any stock.

Interestingly, though, the 64 user base is aging as well. Go to any computer show with 64s in evidence, and pay attention to those who continue to show a strong interest in the machine. You'll get some kids, certainly, and that's always a good thing. More frequently, though, you'll find that 64 owners tend to be men in their late 40s through early 60s. Not a bad thing, but certainly an interesting one.

Youth, of course, has been seduced by the video-game explosion. Besides, many now have computers in schools. All of which means that the home-computer industry has passed its age of innocence and true innovation.

Battling Bishops

The games, however, keep on coming, and they continue to exploit the machine's hardware to its fullest extent.

Interplay (1565 Corporate Drive, Costa Mesa, California 92626; 714-545-9001; \$39.95) has released *Battle Chess*, previously available for Amigas and IBM compatibles. Interplay has designed such strong titles as the Bard's Tale series, *Neuromancer*, and *Tass Times in Tonetown*, and they carry that spirit of innovation into this fine effort.

The idea behind *Battle Chess* is simple: Take chess and animate it. Many computer-chess programs have some rudimentary animation. But *Battle Chess* takes the approach several steps farther. Each piece not only walks, wiggles, or clomps its way to its

new square, but when a piece captures an enemy piece, it defeats it in an animated battle.

The most interesting of these are the magic users, especially the queen. When capturing, the queen casts spells, and depending on the enemy piece, something different happens each time. Other notable pieces are rooks, who become lumbering stone giants, and bishops, who glide soundlessly.

Battle Chess is no slouch as a chess opponent, either. The game has seven levels (far more than I need to prove my mediocrity) and a host of options (including a 2-D screen for faster play). But the point is sound and animation. Because of its attractiveness, the game is an ideal forum for teaching chess to beginners; they will move pieces around just to see what happens in the battles.

Bumpers and Nets

Innovation is foremost in *Ballistix*, the new graphics-rich entry from Psygnosis (Century Buildings, Tower Street, Liverpool L3 4BJ, United Kingdom; \$29.95). As its cover indicates, *Ballistix* combines soccer and pinball with the aim being to outscore your opponent. You score a goal by maneuvering the ball into the net at your opponent's end of the playing field. But getting there is more than half the fun.

You'll find yourself constantly fighting against gravity; only by hitting the ball properly can you move it at all against this substantial force. As in pinball, there are bumpers to contend with and to use to your advantage. To make things more interesting, each level is entirely different from the previous one. And if the ball hits the arrows, it speeds practically beyond your control.

Ballistix is colorful and unusual—and very addictive.

Savage Dungeons

Much less innovative, but quite enjoyable to play, is *Savage*, a fantasy action game from Microplay (180 Lakefront Drive, Cockeysville, Maryland 21030-9917; 301-771-1151; \$29.95). Similar in concept to games such as Psygnosis's *Barbarian*, *Savage* has you maneuvering a heroic warrior through the dungeons of a castle (and several levels) to defeat the castle guardians. If you succeed, the game changes to a

first-person view through the savage's eyes, and eventually you'll need to have your pet eagle do your fighting for you.

—Neil Randall



Wake up, sleepyhead!

That's what your preschoolers say at the crack of dawn, right? Usually on a Saturday, when all you want to do is get a little more shuteye, right? Tired of feeling guilty when you send them downstairs to the television. Instead, plop them on a chair in front of your Apple IIgs and stick McGee in the disk drive.

McGee is a preschooler simulation—that's simply the best way to describe the program. It's also one of the most charming and original software packages around. Billed as an independent exploration for ages 2-4, McGee is controlled solely by the mouse. Reading skills aren't required since the program contains no words.

McGee is the kid in McGee. He (or she—your child can imagine McGee to be either gender) wakes up in his bedroom. You'll hear digitized sounds and voices from the start. Notice the four icons at the bottom of the screen? Your child uses the mouse to shift a selection outline from one icon to the next. A press of the mouse button sends McGee into action.

Kids delight in watching McGee bounce a ball, talk to his bunny-rabbit puppet, ride his hobby horse, and then head out to the hallway. After all, there's a whole house to explore! McGee can wander into Mom's bedroom (even wake her up), the bathroom (get ready for some laughs when the toilet icon is chosen), or downstairs for more fun.

The graphics and sound are excellent. The artwork is crisp and the background sounds are realistic. McGee

gets into everything, but it's a pleasure to watch your children discover the new world inside their computer. My in-house preschool-software expert thoroughly enjoyed McGee.

For more information about McGee, contact Lawrence Productions, 1800 South 35th Street, Galesburg, Michigan 49053; (800) 421-4157. McGee retails for \$39.95.

EduFest?

It seems like the rumors from last fall's AppleFest are coming true. Recent reports from Cambridge Marketing, purveyors of AppleFest, indicate that the show will be turned into an all-educational software show.

No big surprise, considering the pre-Christmas news of 1989: Apple stock took a dive, primarily on the basis of lower-than-anticipated Apple II sales.

In May, look for the Boston AppleFest to target teachers using Apple II's. There's talk about including MS-DOS machines in the show.

If you thought Apple II owners were mad when AppleFest let a few Macintoshes through the AppleFest doors, you ain't seen nothin' yet.

Weatherman

Twisting tornado funnel clouds. Hurricanes dashing spray high over harbor jetties. Lightning stabbing into pine forests. The weather may be something everyone talks about, it may be something you can't do anything about, but it's sure to get kids interested.

The weather around us makes for fascinating study. National Geographic's *The Weather Machine* is a multimedia Apple II software/workbook/filmstrip package perfect for junior and senior high school students.

Kids learn how weather works, observe the ever-changing patterns in the weather, and even make primitive forecasts—all with recent data from the National Weather Service. Students can look into the causes of drought, examine how the jet stream affects the weather thousands of feet below it, and learn how to read a weather map. Students can use the Apple II to display, produce, and print colorful hi-res graphic maps using real Weather Service data.

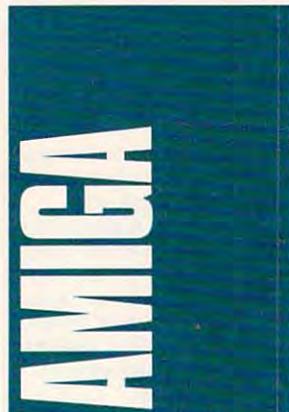
An excellent companion to the courseware kit, The National Geographic Society

also offers *The Weather Machine Telecommunications Service*. This electronic service brings real weather, in realtime, into the modem-equipped classroom. With a subscription, you can download current National Weather Service data into *The Weather Machine* for map display and printing.

Neither *The Weather Machine* nor the Telecommunications Service is very cheap; the courseware kits sell for \$159.95, and the Service's introductory price is \$125.00 for connection from January 1 to August 31, 1990. But for the science room of choice, for anyone wrapped up in the clouds, it's worth the money.

For more details about *The Weather Machine* and its Telecommunications Service, contact National Geographic Society Educational Services, P.O. Box 1640, Washington, D.C. 20036; (800) 368-2728.

—Gregg Keizer



The computer industry has changed a lot over the years. Early computer enthusiasts were willing to get their hands dirty and write their own programs. As the industry developed, the wealth of commercial and public domain programs made creating your own software largely unnecessary.

Still, it's fun to create your own software. Unfortunately, the complexity of programming the Amiga has held a lot of people back. You'd like to write a new text-file reader, but you just don't have the time or inclination to read the *ROM Kernel Reference Manual*.

Inovatronics has come to the rescue with the most impressive program to hit the Amiga market since the original *DeluxePaint*. *CanDo* (\$149.95) is billed as "interactive audio-visual authoring software." Imagine taking the Macintosh's *HyperCard*, but adding support

for all of the Amiga's features and making it even easier to use—that's *CanDo*.

CanDo lets you create full-blown Amiga applications using a point-and-click interface and a simple script language. No more initializing strange data structures or tracing down compiler errors. Creating a program (called a *deck*) with *CanDo* is almost as easy as using the WorkBench.

What can you create with *CanDo*? Sample decks packaged with the program include a text-file reader, address book, appointment calendar, clock and memory-meter utility, and a puzzle. You can create slide shows, text editors, directory utilities, and even games with a minimum of effort with this program.

Objects that you can use in *CanDo* decks include IFF graphics, sampled sounds, *DeluxePaint III AnimBrushes*, text-editor windows, scrollable lists, button gadgets, and pull-down menus. You can also call external programs such as music players from within decks. Decks can send and receive *ARexx* macro language commands. My first *CanDo* application was a simple text editor with 3-D gadgets, scroll bars, and a file requester—and I created it in less than five minutes.

CanDo is an Amiga program I can recommend to everyone. Artists can create gadget-controlled slide shows; hobbyists can easily create their own utility programs, and parents and educators can create professional-quality graphic tutorials and quiz programs with minimal effort.

Best of all, *CanDo* decks can be bound as stand-alone programs, so you don't need *CanDo* or a special browser program to use them.

To find out what you can do with it, contact Inovatronics, 8499 Greenville Avenue, Suite 209B, Dallas, Texas 75231; (214) 340-4991.

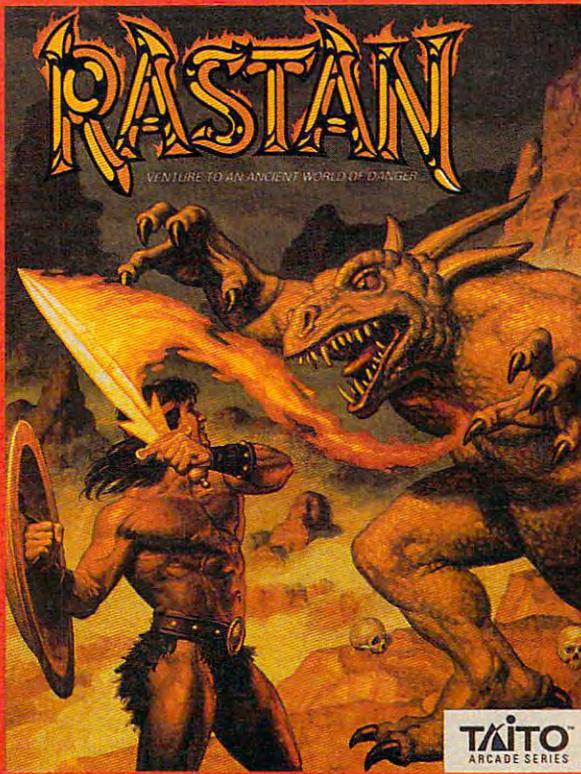
Block Mania

I thought *Tetris* was the most addictive game ever developed. I was wrong. I should have never opened the seemingly innocuous box from California Dreams containing *BlockOut*; now I'm hooked.

BlockOut (\$39.95) is a game based on the Soma cubes that were popular in the late sixties. It's basically a three-dimensional version of *Tetris* where you drop blocks into the bottom of a pit. It's not

"EAT SWORD, LIZARD LIPS!"

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a ripoff of Spectrum Holobyte's game, though. *BlockOut* demands its own unique strategies, especially on the upper levels where the action is fast and the shapes of the blocks would confuse even Escher. This program adds a new dimension to the falling-block-game genre—I can't recommend it highly enough.

BlockOut is available from California Dreams, 780 Montague Expressway, Suite 403, San Jose, California 95131; (408) 435-1445.

Adios, Amiga 1000

It looks as if the Amiga 1000 may soon be an orphan computer, at least as far as Commodore is concerned. In a surprise move, CBM reinstated its Amiga 1000 + \$1,000 = Amiga 2000 trade-in offer in early February. The trade-in program, which at press time was scheduled to end March 31, is designed to give Amiga 1000 owners one last chance to upgrade to the A2000.

According to the rumor mill, the company is making this offer because the soon-to-be-released Kickstart/Workbench 1.4 combination and Enhanced Chip Set (ECS) aren't compatible with the A1000. CBM has said all along that the ECS wouldn't work in the Amiga 1000. However, users and developers have always assumed that the 1.4 system software would, because all you usually need to upgrade the A1000's system software is a new Kickstart disk. However, it seems Kickstart 1.4 has gotten a lot bigger than previous releases. That's no problem for the A500 and A2000, since you can plug in a 512K ROM chip in place of the older 256K chip. However, the Amiga 1000 stores Kickstart information in a special 256K bank of write-protected RAM, which isn't big enough to hold Kickstart 1.4.

While you could build an adapter board that would let you plug the 1.4 ROM chips into an A1000, CBM has apparently decided not to go that route. It's offering the trade-in as a final opportunity to move up before it drops support for the A1000 and as a way to get the model off the streets. With CBM's previous trade-in offer, users could often buy back their A1000s from the dealer who made the trade. Not this time; CBM wants the dealer to send it the keyboard.

While the trade-in is a no-

ble gesture on Commodore's part, it's a shame to see the company take the attitude that it wants to get the A1000 off the market. Third-party products could (and still might) allow the Amiga 1000 to run 1.4 and even the Enhanced Chip Set.

One such product is the Rejuvenator, an add-in board designed by Greg Tibbs. The Rejuvenator gives the Amiga 1000 many of the A2000's features.

Replacing the Kickstart RAM daughterboard in the A1000 with the Rejuvenator allows you to use the Enhanced Chip Set so that you can take advantage of the new high-resolution noninterlaced graphics modes. It also adds one megabyte of chip RAM (the 512K on your motherboard becomes fast RAM). The Rejuvenator supports both 256K and 512K Kickstart ROM chips, so it should be compatible with 1.4. Finally, it has a slot that will accept many boards designed for the A2000's video slot, such as MicroWay's FlickerFixer.

The projected retail price for this board is \$500-\$600, about half the cost of trading up to an A2000. Plus you'll still be able to use all of your A1000 peripherals, many of which won't work with the A2000.

Unfortunately, Commodore's desire to get the A1000 off the market may keep the Rejuvenator from seeing the light of day. Producing an expensive hardware product for an orphan computer is risky, but the Rejuvenator could keep the A1000 from becoming an orphan. If Tibbs decides to go ahead with production, you'll read about it here.

—Denny Atkin

months' delay, it's finally available. The game has received rave reviews on other platforms, and, when you take a look at it, you'll certainly understand why.

Omega looks like a tank simulation, but, in fact, it's an artificial-intelligence simulation. As an employee of the Organization of Strategic Intelligence, you have access to a tank designer's tool box. You determine the class of tank, its fuel capacity, scanning and firing range, and so on. To make the game even more realistic, you must work within a budget—a budget that increases with success.

After you've chosen your tank's characteristics, you write the artificial-intelligence instructions that tell the tank what to do. Here's where the game really distinguishes itself from all of the other games. Through a special interface, you click on buttons and choose options. In the end, you've written a computer program. Figuring out the best combination of commands and conditional statements is a puzzle that will entertain you for hours.

What do you mean, you don't know how to write a computer program? *Omega* can teach you the basics. And, the next thing you know, you'll be shopping for Pascal compilers.

Maybe that's a little too optimistic. Maybe you never want to learn to program. Regardless, *Omega* is a fun game and a real challenge.

For more of a challenge, trade tank programs that you've designed with a friend who plays *Omega* (on any type of computer) and see who builds a better war machine as your tanks battle it out.

The game costs \$49.95, and you can contact Origin at 136-B Harvey Road, Londonderry, New Hampshire 03053; (800) 999-4939.

System Seven

Apple has updated its developers on the company's progress toward completing System 7.0. Here's the word from the corporate orchard in Cupertino.

Apple will release the newest version in the summer of 1990. The package will include a new Finder, outline fonts, the Interapplication Communications Architecture (which provides hot links between Macintosh programs), and virtual memory (which lets your hard disk operate as

though it were extra RAM).

The advent of this new and powerful system marks another step in the reduced attention to the home market. Has anybody out there got an extra megabyte of RAM on the home front? Without two megabytes of RAM, you'll be stuck with the less glamorous older systems. Of course, they've worked pretty well for many of us all along. Perhaps the new system will separate the family-room computer from the office machine. Perhaps Apple plans to develop a whole new line of home computers. Speculation about a low-end Mac runs rampant.

Of Mazes and Men

If you like fantasy role-playing adventures, try *Citadel: Adventure of the Crystal Keep* (\$49.95). It's got all the elements of a good story as well as the qualities of a dungeon-exploration game.

As the story goes, the Lady Synd and her Blood Guard had maintained peace and harmony in the land for as long as most folks could remember. One day, though, a mysterious cloaked stranger asked directions to Lady Synd's Citadel. The land would never be the same. The Citadel was swallowed up by the Earth, and all that remained was the roof of the highest tower.

To play the game, you define characters by their ancestors, their class, and their upbringing. Gather some companions from the town tavern, and enter the darkness of the Citadel, long buried under the power of darkness.

You control the party by clicking on arrows on the screen, dragging objects in and out of windows, and getting information from menus. The interface is very Mac-like, and the graphics are sharp.

So far, and I admit that it's not very far for me, the game has been a lot of fun. I'm still trying to grab a torch from the wall so I can light my way through the maze. Part of the game is figuring out how to keep your torches lit because they have a tendency to burn out. The torch puzzle adds an extra sense of urgency to your quest.

For more information, contact Postcraft International, 27811 Avenue Hopkins, Suite 6, Valencia, California 91355; (805) 257-1797.

—Heidi E. H. Aycock

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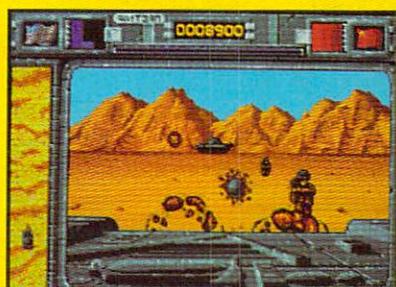
Amiga game screens.



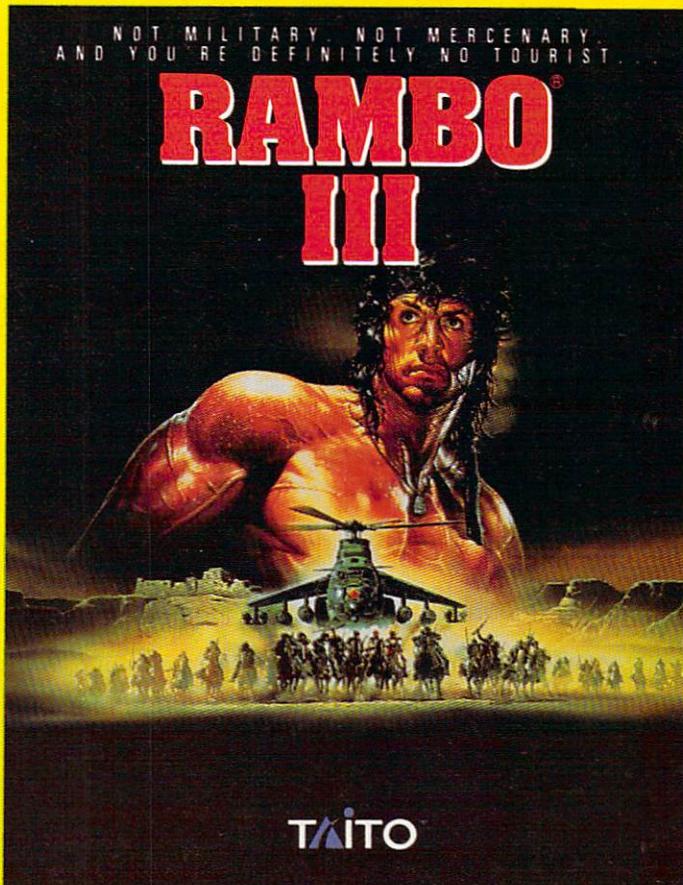
It takes more than muscle to de-activate electronic gates, cross treacherous mine fields, and find the keys to Trautman's cell.



Ever fly one of these things? With the enemy breathing down your back, that Hind chopper's the best way out of this hell hole.



It's just you and your hijacked tank against anti-tank missiles and choppers. Sight in and rearrange that balance of power!



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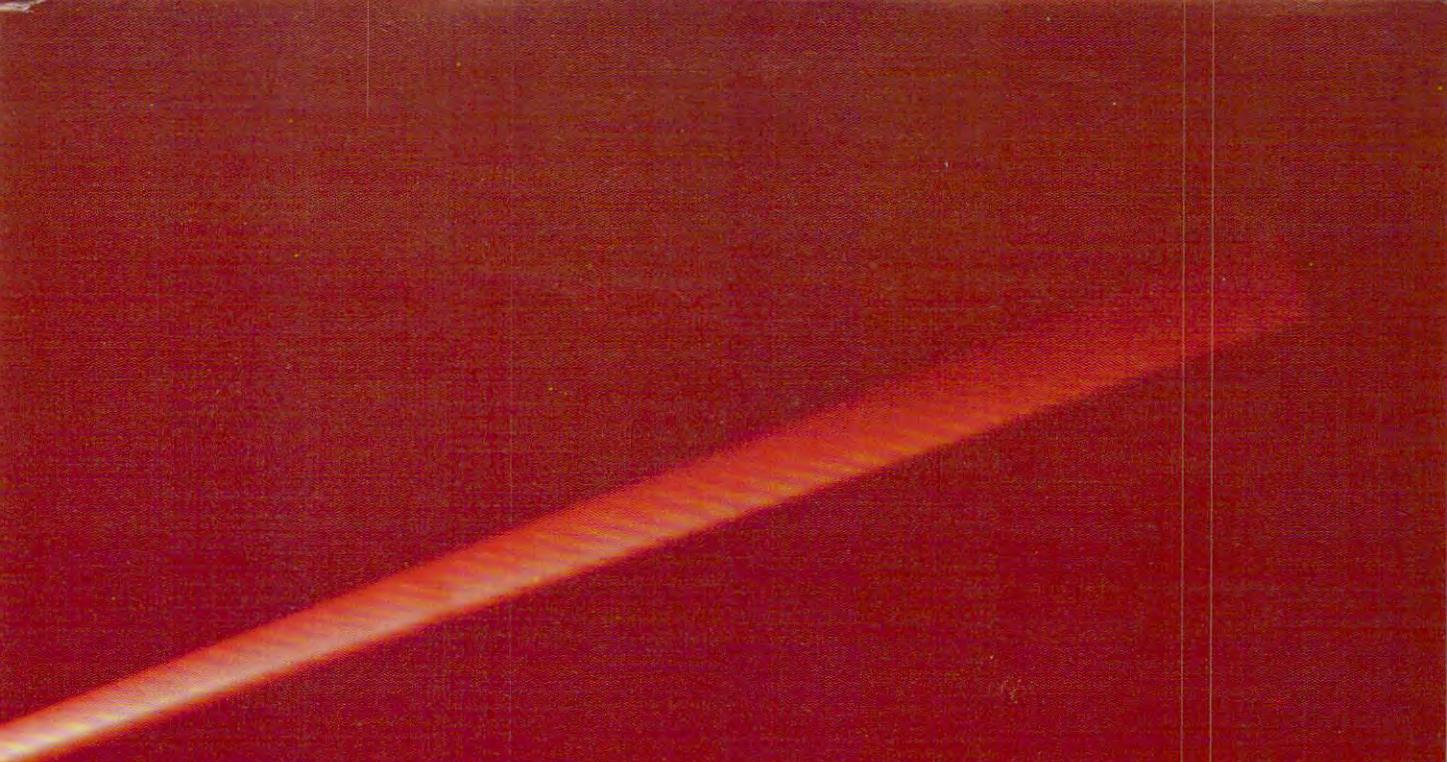
OPEN YOUR EARS AND QUIT BEING SO QUIET. BREAK INTO THE WORLD OF SONG WITH YOUR HOME COMPUTER. LATE TO THE DANCE, THE PC IS FINALLY PLAYING HOST TO THE SOUND HARDWARE AND MUSIC SOFTWARE THAT CAN PLAY ITS TUNE. BUT IT'S NOT EASY TO PICK FROM AMONG THE CACOPHONY OF CONTENDERS. FOR A LOOK AT THE LATEST IN SOUND HARDWARE FOR THE PC, TUNE IN TO "HIT IT, MAESTRO!" ON PAGE 22. NO MATTER IF YOU'RE A BUDDING MOZART OR A METALLICA MAVIN, MUSIC-COMPOSITION SOFTWARE CAN HELP YOU SETTLE YOUR SCORE. THEIR METHODS ARE DIFFERENT, SO YOU NEED TO FIND THE ONE THAT MATCHES YOUR OWN STYLE. LEND AN EAR TO "COMPOSE YOURSELF" ON PAGE 36. IF YOU WANT TO KNOW HOW THE COMPUTER-MUSIC REVOLUTION GOT STARTED AND WHERE IT'S GOING, AND YOU WANT TO SET UP YOUR OWN STUDIO, OUR "MY VIEW" COLUMN ON PAGE 32 SOUNDS JUST THE RIGHT NOTES. OUR APRIL SHAREPAK DISK INCLUDES A QUARTET OF NOTEWORTHY PROGRAMS THAT RANGE FROM AN ELECTRONIC JUKEBOX TO THE TRIVIAL PURSUIT OF MUSICAL KNOWLEDGE. FIND THAT LITTLE INTERLUDE ON PAGE 34. IF YOU'VE REALLY GOT THE MUSIC IN YOU, THEN YOU'LL WANT TO CHECK OUT "RESOURCES" ON PAGE 42. IT'S THE ONE SOURCE YOU NEED FOR TRACKING DOWN THE BOOKS, MAGAZINES, ONLINE SERVICES, AND USER GROUPS THAT WILL HAVE YOUR COMPUTER SINGING. CLAP ON YOUR HEADSET AND OPEN YOUR EARS AS WE EXPLORE

SOUND ON YOUR HOME PC

HIT IT, MAESTRO!

JOEY LATIMER





THE LATEST SOUND HARDWARE WILL HAVE YOUR PC SINGING

Speed, memory, storage, and graphics have for some years overshadowed the potential that good-quality sound offers to PC software applications. The built-in sound capabilities of most PCs consists of a tiny speaker and a tone generator that produces one note at a time. MS-DOS machines sound tinny; their musical arrangements are confined to a melody. PC owners haven't enjoyed the added dimension that sound brings to software programs. Nowhere is this more apparent than in entertainment and educational software—just how realistic is a flight simulator if the jet "beeps" down the runway?

Fortunately, circumstances have changed. Software companies are looking for sound hardware to make their sophisticated new products sound more realistic on PCs, and hardware manufacturers are popping up with fresh alternatives. Cooperation between hardware and software companies has resulted in several unique and effective solutions that many software developers are including as options in their programs. Foremost among these solutions are add-on sound boards, such as the Ad Lib, Game Blaster, Sound Blaster, Sound Master PC, and Roland MT-32.

Each board offers its own answer to the PC sound dilemma. Choosing from among them is mostly a matter of personal preferences and economics. So, whether you're an audiophile or a transistor radio buff, if you're a game player, a multimedia maven, or a music composer, this overview of the basic features, costs, pros, and cons of the major players in the PC-sound marketplace will have you singing. ▶



Ad Lib Personal Computer Music System

The main component of the Ad Lib PCMS is the Ad Lib Music Synthesizer Card, a half-size FM synthesizer card designed for IBM PCs and compatibles. The Ad Lib card can play up to nine different melodic instruments or six melodic and five percussion instruments separately or simultaneously. For audio output, the card features a 1/4-inch audio output jack, an amplifier capable of driving a small speaker, and a built-in volume control. The jack (along with the 1/8-inch miniplug adapter) can be connected to headphones, a speaker, or an external stereo system.

In addition to the synthesizer card, the Ad Lib PCMS includes software for composing and playing music. *The Visual Composer* (\$89.95) lets you write, listen to, and modify musical compositions without a great deal of music



knowledge. With the Jukebox program, you can select songs for your computer to play. With yet another Ad Lib program, *Instrument Maker* (\$49.95), you can design and edit instrument sounds for use with *The Visual Composer*.

I had no trouble installing the synthesizer card in my PC XT clone and hooking it up to the auxiliary jacks on my stereo. Firing up *The Visual Composer* first, I experimented using the 145 preprogrammed sounds, which include keyboards, strings, horns, and percussion instruments. I loaded *Instrument*

Maker next and experimented by changing various waveform parameters, modifying some of the old instrument sounds to create new ones. All of the instruments sounded a bit electronic to my ears, but most of them are recognizable and, when arranged together, produce as rich an ensemble as sampled instrument sounds.

To get a different perspective on the Ad Lib card's features, I booted up *Leisure Suit Larry Goes Looking for Love (In Several Wrong Places)*—also known as *LSL3*—an adventure game from Sierra that supports the Ad Lib card. The arrangement of Larry's theme song that poured from my stereo system made me feel as if I were playing a completely different game from the one I had played on my non-Ad Lib-equipped PC. It's a welcome and long-overdue game enhancement.

Pros: Heavily supported, large software base, good sound quality

Cons: No stereo, no digital sound/speech, moderately high price

Sound Support

It doesn't do much good to have a sound board if you can't find software to support it. I have a few cards in my garage that died due to little or no software support. To get an idea of the support behind these products, seven of the top entertainment software manufacturers and distributors gave us their strategies for present and planned support as of the start of 1990.

Accolade. Supports the Ad Lib and Game Blaster; is working on MT-32 support.

Electronic Arts. Supports the Ad Lib; 50 percent of its new programs will support the Sound Master PC; looking at Game Blaster and Sound Blaster; one new program (an Indianapolis 500 simulation) supports the MT-32.

Lucasfilm. Supports the Ad Lib, Game Blaster, and MT-32; is looking at the Sound Blaster.

MediaGenic. Supports the Ad Lib; is developing support for the Sound Master PC, Game Blaster, Sound Blaster, and MT-32.

Mindscape. Supports the Ad Lib; plans support for the Game Blaster.

Origin. Supports the Ad Lib; is looking at the Sound Master PC and Game Blaster; *Ultima VI* will support the MT-32.

Sierra. Supports the Ad Lib and MT-32; is looking at the Sound Master PC and Game Blaster.

Sound Master PC

The Covox Sound Master PC package includes a half-size card, two stereophonic minispeakers with connecting cables, and a user's manual. The circuit board features a minijack and two digital joystick ports. These joystick ports, unlike those found on most MS-DOS machines, accept Commodore, Atari, and other common game-machine-type joysticks for much smoother arcade action. You should note, however, that unless a game has been specifically designed for digital joystick input, these ports won't be of any use. (Very few MS-DOS programs have digital joystick drivers.)

The Sound Master PC card supports digital speech and sound through a DMA-driven (Direct Memory Access-driven) 8-bit digitizer. In addition, the on-board three-voice sound chip gives you the capability of layering multipart music with special effects in stereo—all while graphics are moving on the screen.

Installing the Sound Master PC board wasn't as simple an operation as was putting in the Ad Lib card. The Covox board has jumpers for setting I/O (Input/Output) ports, DMA channels, and Interrupt Request Lines. When I installed it using the default settings, it conflicted with another card I had installed in my computer. After a bit of detective work and screwdriver wrist action, I discovered that my mouse card and the Sound Master PC card were set on the same Interrupt Request Line. I was able to solve the problem, but now

continued on page 28

Other Voices

Besides add-on sound boards, there are other solutions for solving the PC sound problem. Tandy and Access Software have each come up with acceptable, yet very different, solutions.

For its 1000 TL and SL computers, Tandy has built in a custom sound chip, a headphone jack, and a microphone jack. The chip features three tone generators and a white-noise generator for three-part harmony and sound effects. Also included is a digital-to-analog converter for translating prerecorded digital sound, voice, or music into analog audio output (to play back through the internal speaker or headphone jack). You can use the microphone jack and audio input circuitry for recording analog sound, voice, or music and then convert those sounds to digital data. Many software developers and distributors support or plan to support Tandy sound in their products.

Access Software's RealSound allows the internal PC speaker to play back digitized sounds such as speech, music, and sound effects without adding any hardware. RealSound master recordings are electronically enhanced and then digitized on custom hardware. The effects are then edited for inclusion in computer programs. Software companies pay a fee to use RealSound in their programs.

Access suggests that you improve your PC's sound by replacing your PC speaker with a 3½-inch speaker. If you'd rather, you can follow the instructions in the pamphlet included with RealSound products to build a cable to connect your PC to your stereo.

Ultima VI

The False Prophet



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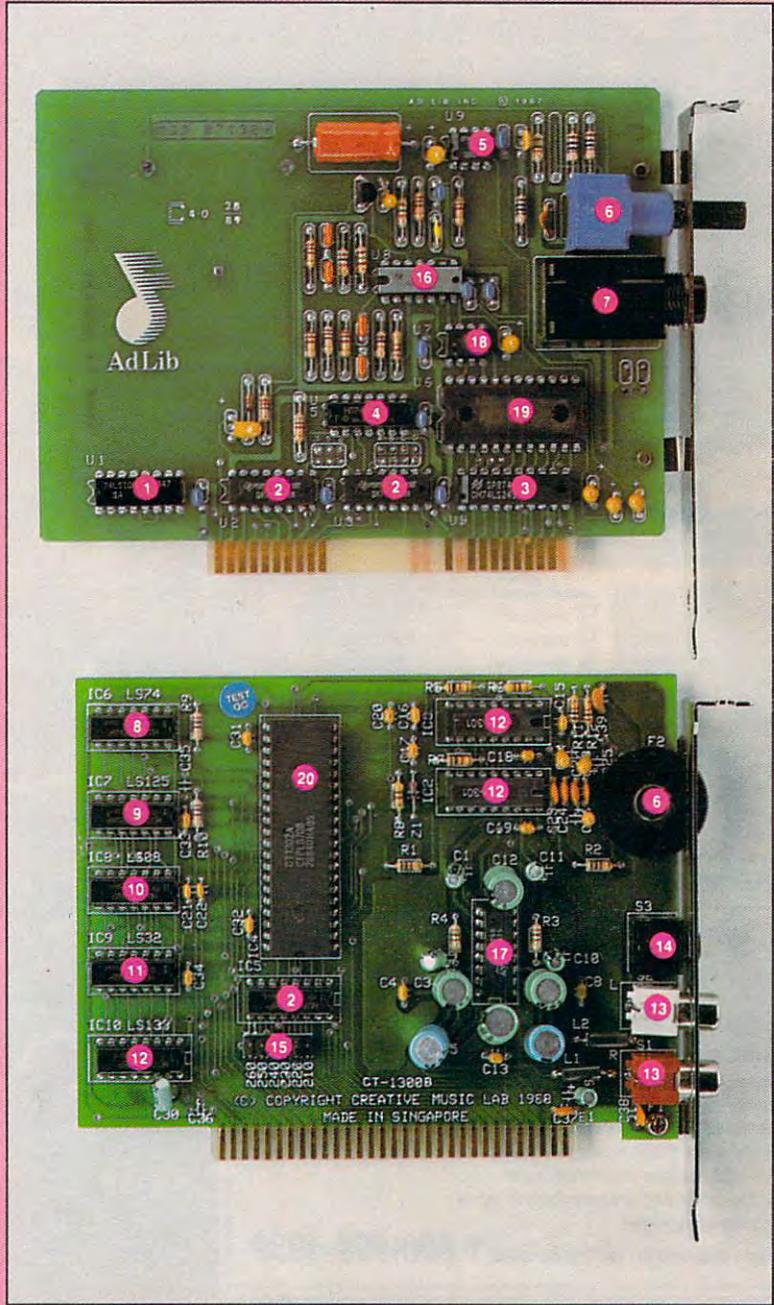
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TOUR THE ORCHESTRA PIT

Take a look at the inner workings of two of these electronic orchestras. The card pictured on top is the Ad Lib synthesizer card; the card pictured at the bottom is the Game Blaster. We've labeled the major components so that you can see the principal players.

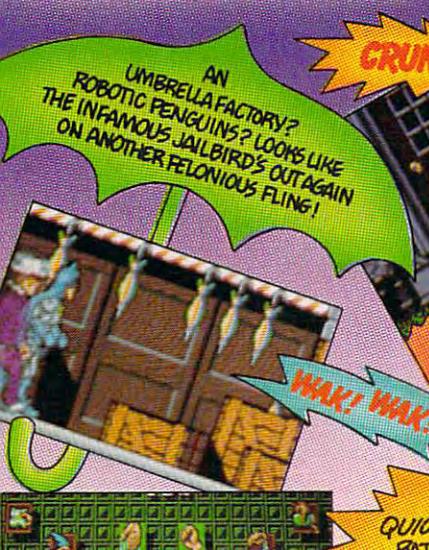
- 1 Dual JK Positive-Edge Flip Flop
- 2 Expandable 3/8 Decoder
- 3 Octal Bus Transceiver Noninverting
- 4 Hex Inverter
- 5 Low-Voltage Audio Amp
- 6 Volume Control
- 7 Audio Jack
- 8 Dual D Flip Flop
- 9 Tristate Quad Buffer
- 10 Quad Two-Input AND Gate
- 11 Quad Two-Input Positive OR Gate
- 12 CMS Sound Generator
- 13 Stereo Audio RCA Jacks
- 14 Stereo Mini-Jack
- 15 Interrupt Address Jumper
- 16 Quad Op Amp
- 17 Stereo Power Amplifier
- 18 Digital-to-Analog Controller
- 19 FM Sound Generator
- 20 CMS Digital Controller



Article continues on page 28 ▶

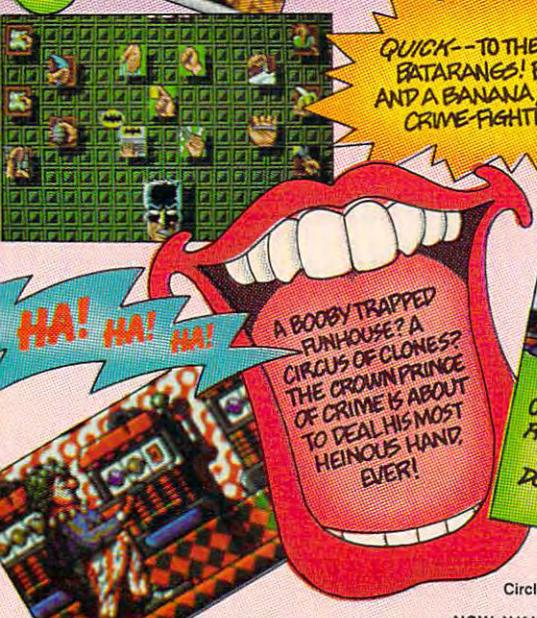
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WEB-FOOTED WARRIORS... THEN, A
BARRAGE OF BOMB-THROWING
BUFFOONS. THIS COULD ONLY BE
THE DIABOLICAL DOINGS OF YOU
KNOW WHO...



CRUNK!
AN UMBRELLA FACTORY?
ROBOTIC PENGUINS? LOOKS LIKE
THE INFAMOUS JAILBIRDS OUT AGAIN
ON ANOTHER FELONIOUS FLING!

WAH! WAH!
CAN YOU LOCATE THE PENGUIN'S
MASTER COMPUTER CLIPHS
WINGS, AND PULL THE PLUG ON
HIS SQUAWKING THUGS?!



HA! HA! HA!
A BOOBY TRAPPED
FUNHOUSE? A
CIRCUS OF CLONES?
THE CROWN PRINCE
OF CRIME IS ABOUT
TO DEAL HIS MOST
HEINOUS HAND,
EVER!

BLAM!
CAN YOU RESCUE THE IMPERILED
ROBIN? DETHRONE THE JOKER
AND DEFUSE HIS TROUPE OF
DOOMSDAY DUPLICATES?!

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ice PC users may need assistance.

The Sound Master PC has been out since the spring of 1989, but there isn't as much software available for it as there is for some of the other devices (this may change, however). One popular game, *SimCity* (Maxis Software), does take advantage of Sound Master PC's features. The realistic sounds of tornadoes, earthquakes, monsters, and more came through my stereo speakers and enhanced the program to the extent that I can't imagine playing *SimCity* again to the beeps from a standard PC. The best comparison I can make is to the digital sounds I've heard from Tandy TL or Apple IIgs games.

Pros: Gaining support, low price, supports digital sound/speech, includes stereo speakers and two digital joystick ports
Cons: Small software base, only three-voice sound chip, difficult installation, digital joystick ports don't work with analog joysticks

Game Blaster

The Game Blaster, a 12-voice synthesizer card from Creative Labs, resembles the Ad Lib and Sound Master PC cards. It plugs into any internal slot in your PC and includes a built-in power amplifier (2.5 watts), volume control, and a stereo output (1/8-inch stereo and two RCA plugs) for feeding headphones, external speakers, or your stereo system. It can play 12 channels of music simultaneously, panned left or right in the stereo mix. Installing the Game Blaster card posed no serious obstacles. I used an RCA-to-RCA cable to hook up the card to my stereo system.

I ran two programs through this card—*The Intelligent Organ* (an electronic player piano) and *Silpheed* (a sci-fi adventure game from Sierra). The



Intelligent Organ comes with over 80 songs stored on disk. You can select different instruments and various rhythm patterns to use while playing along on your computer keyboard. If you prefer, you can have the computer play Auto bass, Auto chords, and/or Auto arpeggios, much like a small Casio or Yamaha keyboard. The sound quality from the Game Blaster is very good, with great stereo imagery and texture.

To my ears, the Game Blaster sounds much like the Ad Lib, but in stereo—which is quite an improvement. *Silpheed*, which is bundled with the Game Blaster, uses the card to produce a stunning musical backdrop for its plot and provides an extra premium to users interested in buying a sound card for their PC.

Pros: Heavily supported, large software base, good stereo sound
Cons: No digital sound/speech

Sound Blaster

The Sound Blaster card just started to ship to stores last Christmas (see the COMPUTE! Choice for Entertainment article on page 88 in the December 1989 COMPUTE!). This 24-voice, half-size synthesizer card is an extension of the Game Blaster and offers compatibility with the Ad Lib. It includes 11 Ad Lib-compatible voices, 12 Game Blaster-compatible voices, one digital input and output, as well as decompression

hardware (for decompressing speech and sounds that have been compressed by software to save storage space). Like the Sound Master PC, the Sound Blaster contains a DMA-driven digitizer; but, unlike the Covox unit, you can plug a microphone or audio source directly into the Sound Blaster and digitize sounds. To top it off, the card includes a PC analog joystick port and stereo output jacks for hooking up to headphones, speakers, or a stereo, all driven by a four-watts-per-channel amplifier.

The Sound Blaster package comes with three software programs, including *The Intelligent Organ*. The other two programs take advantage of the Sound Blaster's digitizing capabilities. VoxKit, a voice-development kit, lets you record, compress, store, and play back digitally recorded speech and sounds. The Talking Parrot features a parrot on the screen that mimics your speech, talks back, makes outrageous remarks, and screams when you tickle it.

For an additional \$49.95, you can add a MIDI box to the Sound Blaster. It plugs into the analog joystick port and includes one MIDI In and three MIDI Out jacks, plus a joystick port (to make up for the one it uses). The Sound Blaster won't work with MIDI software from other companies, but Creative Labs says it's working on the problem.

Pros: Heavily supported (both Ad Lib- and Game Blaster-compatible), large software base, good stereo sound, supports digital sound/speech recording and playback, includes analog joystick port
Cons: No software to use all 24 voices at once; no built-in MIDI interface (contrary to its advertising), moderately high price ▶

continued on page 31

Melody Makers

To get in tune with the products surveyed in this article, contact the companies listed here.

Ad Lib

50 Staniford St.
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 (synthesizer card, *The Visual Composer*,
 and Jukebox)—\$245; Ad Lib synthesizer
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Covox

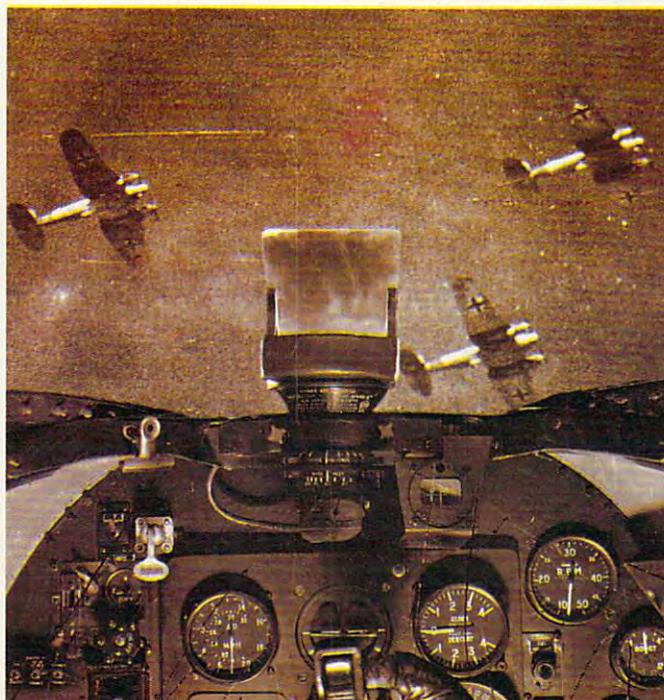
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 Covox Sound Master PC—\$89

Creative Labs

Distributed by Brown-Wagh Publishing
 Suite 210
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 Los Gatos, CA 95030
 (800) 451-0900
 (408) 395-3838
 Game Blaster, *Intelligent Organ*,
Silpheed, manuals—\$129
 Sound Blaster, *Intelligent Organ*, Parrot
 and VoxKit programs, manual—\$239; Ad
 Lib, Game Blaster, or CMS card owners
 who send in their old cards when ordering—\$139

RolandCorp

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 Los Angeles, CA 90040
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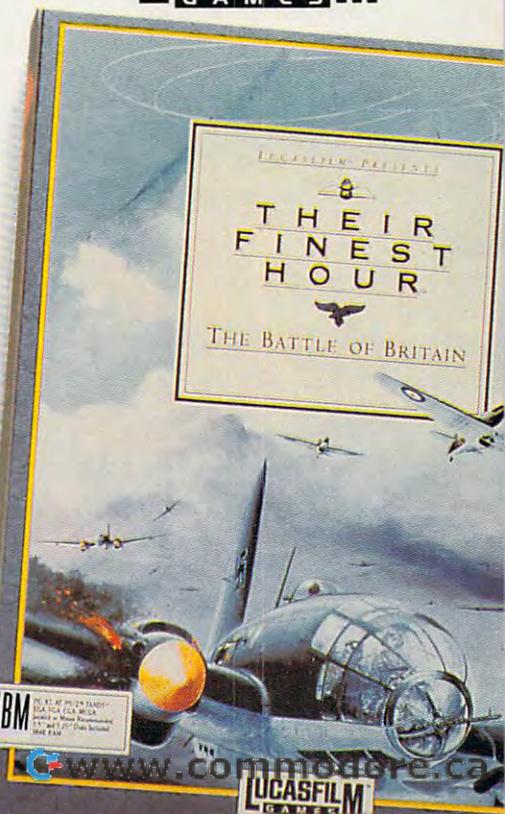
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HIT IT MAESTRO!

Roland MT-32 Multi-Timbral Sound Module

The Roland MT-32 is definitely the Mercedes in this group of sound boards. Rather than sliding into any open PC slot, the MT-32 has its own case and power supply. Because the MT-32 is actually a stand-alone MIDI module, it requires a MIDI interface to connect to the computer. The package I evaluated for this article included a Roland MPU-IPC MIDI interface, an MT-32 module, a MIDI connecting cable, and a Roland EASE MIDI recording program, made especially for using a MIDI keyboard with the MT-32.

Not lacking in performance value, the MT-32 is a 32-voice synthesizer (in a sense, it's eight synthesizers in one, with a percussion sound module) featuring 128 preprogrammed instrument sounds, 30 percussion sounds, and ten different digital reverb settings. It has MIDI In, MIDI Out, and MIDI Through ports, volume and tuning controls, and stereo outputs. For all practical purposes, it's a complete electronic orchestra—and you're the conductor.

Installing the unit takes about ten minutes and requires that you place the Roland MIDI card inside your computer. After closing your computer, you'll have to connect the Roland MIDI processing unit to the MT-32 and then connect the MT-32's stereo outputs to your stereo. In addition, you must run a DC power supply between the sound module and a local wall socket. Roland has eased this installation process by bundling many of the MT-32's features into its LAPC-1 sound card (\$595).

I was eager to see how the MT-32 handled the theme music to *Leisure Suit Larry*. After reinitializing the program to recognize the MT-32, I experienced the most beautiful music I'd ever heard coming from a computer program. The sounds reminded me of the New Age CDs I've heard. Amazingly, though, the MT-32 seemed to sound better than most of my CDs. That makes sense, because it's coming right from the horse's mouth—directly from the synthesizer.

After booting up EASE, the recording program included with the MT-32, I plugged in my Kawai K1 MIDI keyboard and laid down some tracks of my own, finding that I could quickly come up with songs using the same instruments as I'd heard in *LSL3*. I dubbed some chirping birds to my Polynesian melody, but that was just the beginning. I ended up messing with the MT-32 all night long. Al Lowe, watch out. Here I come.

Pros: Moderately supported, growing software base, fantastic stereo sound, large note capacity (32 voices), MIDI ports

Cons: High price, no digital speech

All Around, Sound

PC sound hardware has come a long way from beeps and boops. Recent developments have brought prices down, making sound and music peripherals

available to a majority of home PC owners, not just to professional musicians. Although each solution to the PC sound dilemma offers different benefits and trade-offs, one thing is for sure: Stick a sound board in your computer and it will be music to your ears. □

Joey Latimer composes music in his home-based MIDI recording studio in Idyllwild, California.

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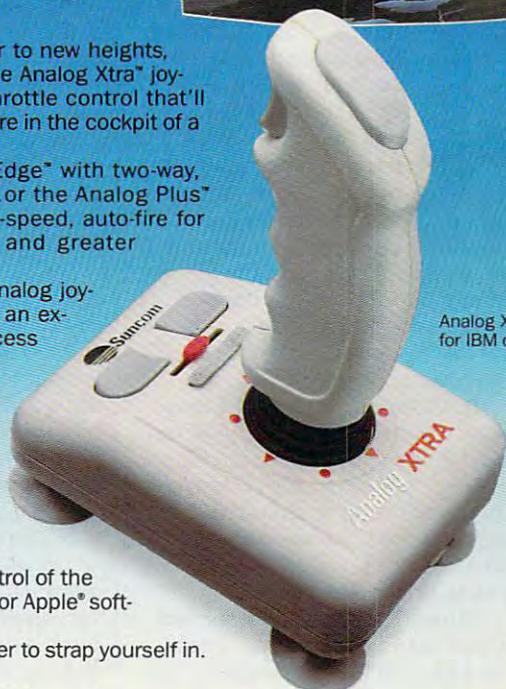
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MY VIEW

D A N R U E

COMPUTERS AND MIDI BRING **MUSIC TO THE MASSES**

As an important expression of who we are and how we feel, music has always been an integral part of our culture. Fifty years ago, the popular adage was "a piano in every home." With the advent of rock-'n'-roll, guitar became the icon of popular music and, for the most part, remains so today. In the nineties and into the third millennium, we'll see the increasingly dominant presence of a new type of instrument: the synthesizer.

Just over five years ago, a technology was created that really packed the synth full of power. An interface was developed called MIDI (Musical Instrument Digital Interface) that let two synths speak to each other. More importantly, MIDI allowed synths to speak to personal computers.

Almost immediately, sequencer software started popping up. These programs used MIDI to digitally "record" your synth in a manner which mimicked the multitrack tape recorders of professional music studios. Sequencers, by digitally encrypting what

is played on the synthesizer, offer a huge variety of creative editing options, comparable to the options made available by using a word processor rather than a typewriter.

Another major type of software that was developed for the synthesizer is commonly called the editor/librarian. An editor allows you to program the sounds for a synth with your computer. The librarian allows you to categorize and store these sounds on your computer.

Finally, within the last year or two, the synthesizer has become surprisingly affordable. You can now get a professional-quality, expandable setup for around \$2,000—that's less expensive than most pianos.

The heart of your system, obviously, would be the synthesizer. While there are dozens of buzzwords that your local music-store salesman will throw at you, the main thing you're looking for is a multitimbral instrument. This means that it can play more than one sound at a time (a crucial feature if you're going to be using it with a computer). The Roland D20, Ensoniq VFX, and Yamaha V50 are just three examples of this type of synth. While the prices of these instruments vary greatly, you can usually find a multitimbral synth for around \$1,300-\$1,500.

Next, you'll need to pick up a MIDI converter for your computer (a device that lets your computer send and receive MIDI signals). These devices come in several varieties; go for the simplest, least expensive one. The more expensive units are designed to work with large, multisynth professional studio setups. You should be able to pick up a converter for \$100-\$200.

Now it's time to shop for sequencing software. These programs vary in price and complexity as well. For the IBM PC and compatibles, popular software includes Twelve Tone Systems' *Cakewalk Professional*, Voyetra Technology's *Sequencer Plus Mark III*, Magnetic Music's *Texture*, Roland's *MESA*, LTA Productions'

Forte II, and numerous others. Examples of popular Macintosh software would include Mark of the Unicorn's *Performer*, Opcode's *Vision*, and Passport's *Master Tracks Pro*. Atari ST programs include Steinberg's *Cubase* and *Pro24*, C-Lab's *Creator*, Dr. T's *KCS* and *Level II*. For the Amiga, check out Micrilliusions' *Music-X* and Passport's *Master Tracks Pro*.

Many of the music software companies have toned-down versions of their professional packages at about half the parent program's price. So how much money are we talking about here? Well, the full-blown program will probably cost you anywhere from \$400 to \$600. The beginner's packages usually run around \$100-\$250. You might find that these smaller programs are more than adequate.

There was once a time when being a musician meant that you had dedicated a huge part of your life to the tedious, patience-taking physical practice required to master your instrument of choice. Now, with sequencers, you can create entire songs with complex arrangements and have no keyboard-playing skills whatsoever. These new instruments have even made it possible for paraplegics and other handicapped people to express their musical ideas where they had never been able to do so before.

And there you have it—music for the masses. As integral as telecommunications has become to business, so too will the computer entrench itself into the art of making music. Practicing becomes a matter of days (to read the owner's manuals) rather than

years, and the musician is now anyone with the inclination to create music.



Dan Rue is the assistant editor of Music Technology Magazine and a high-tech musician in his spare time. □

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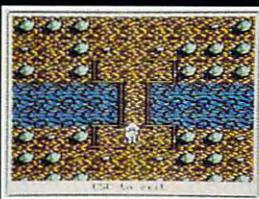
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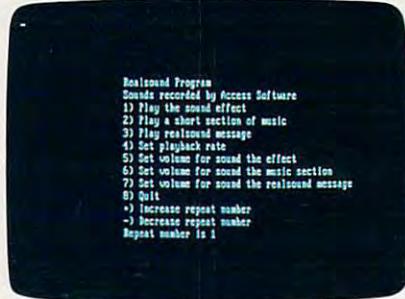
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eleasing musical talent with your PC has become a lot easier. Instead of relying on your PC's archaic, built-in speaker, you can now add hardware to your system and enjoy sounds ranging from simple polyphonic tones to digitized sounds to full-blown, multiple-voice, synthesized scores. And some pretty talented software is waiting in the wings to exploit the capabilities of these devices without sapping your creativity in the process.

Two problems have long faced composers. The first is "hearing" the piece during its development. Pierre Boulez claims to hear his best performances while reading scores in his study. But even after completing a rigorous course based on Paul Hindemith's *Elementary Musical Training* (which isn't so elemen-

tary), I still can't compete with Boulez—without the help of musical composition software, that is. Using these tools, I can literally hear the notes of my compositions through a speaker. Listening to the entire work, a single phrase, or a single voice is as near as a single keystroke or a short sequence of keypresses.

The second major dilemma facing composers, once they've finished a score and copied the separate parts, is getting a performance worthy of the work. While a graduate student at Cincinnati Conservatory, I faced this problem on a regular basis. Persuading musicians to commit themselves to your work between their own rehearsal and performance schedules and finding a suitable room or hall was a chore deserving a graduate degree of its own. What's more, the very short rehearsals prescribed by such arrangements never allowed enough time for your selected musicians to really

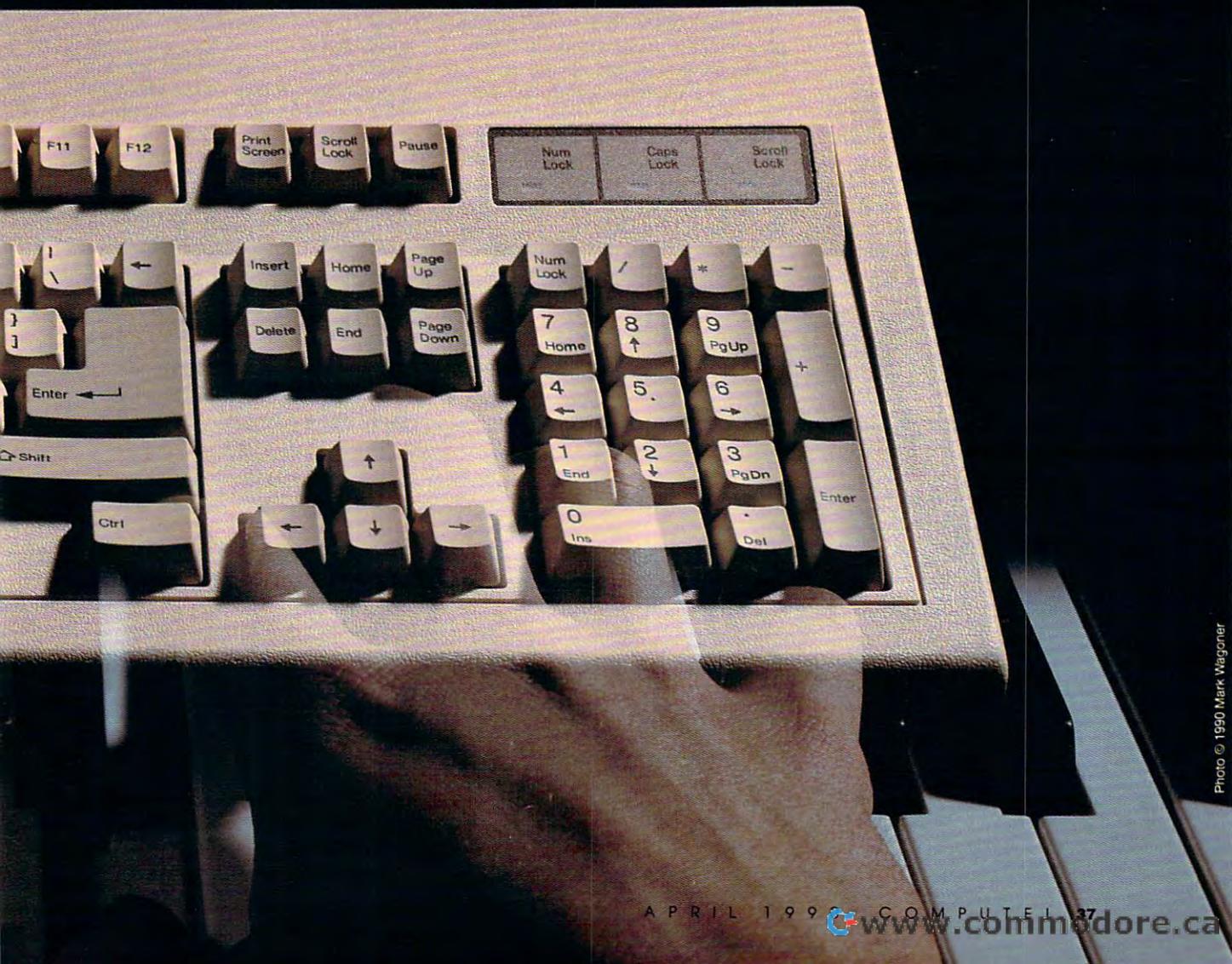


Photo © 1990 Mark Waggoner



get your composition right: There were always missed notes and misinterpreted passages. Now, with the benefit of music-composition software, I can simply tailor an instrument bank or patch library according to the instruments that my work calls for, hook up a recorder, and press a key. Look out Henry Mancini!

Play It by Eye

The Ad Lib synthesizer card is probably the most popular sound add-on available. Since it has nine melodic voices or five melodic and six percussive voices (you can configure the board either way), it's perfect for music that requires only a small instrumental group. That's enough for most aspiring artists because it covers chamber and jazz ensembles and instrumental rock bands.

Ad Lib's *Visual Composer* program, which you can purchase with the card or separately, is easy to use and quickly produces fantastic results. As a classically trained French horn player, I just had to satisfy some repressed urges to make some fast-moving, upbeat, pop music. To my surprise, my first experiment was a success.

The first thing I had to do was choose the instrumentation of my band. *Visual Composer* gives you a smorgasbord of choices with 96 pre-defined instruments. If those aren't enough, you can buy *Instrument Maker*, an Ad Lib program that lets you design your own instruments. I settled on a typical band: bass and snare drums, tom-toms, a cymbal, a high-hat, two electric guitars, and an electric piano.

Then I turned my attention to creating the notes.

With *Visual Composer*, I was able to set tempo, beats-per-measure, and volume anywhere within a piece. This capability let me use dynamics effectively and to do ritardandos at crucial moments. Computer-composition skeptics who fear that software programs may lock in the meter and tempo and not allow for metrical modulation and other such techniques shouldn't worry. I found Ad Lib's software particularly free from such constraints.

Take, for example, Leonard Bernstein's "I Want to Be an American" from *West Side Story*, in which the meter alternates between 6/8 and 3/4. Just to prove computer-music naysayers incorrect, during my initial experiments I constructed a simplified version that played as effectively as any Broadway performance. As a second test I took on Elliot Carter's *Canaries* for timpani, in which metrical modulation abounds. Although the complexity of the piece and the amount of time it took to transcribe it to the screen kept me from getting too far, I had no trouble capturing the essence of the piece in a short sample, changing meter, tempo, and subdivision every several measures.

Unfortunately, such techniques aren't effective in pop music, where a composer must rely on a steady beat with driving interest. I used 4/4 time with a bass drum on the first and third beats, along with a syncopated snare drum that punctuated the underlying bass drum to keep things moving.

After a couple hours of noodling with textures, metrical techniques, and sonorities, I had to force myself to determine the tune's overall form. Sketching it out before actually selecting pitches is a habit that's ingrained in most formally trained composers. Unfortunately, none of the software I looked at fostered this valuable habit. In fact, there's a real temptation to jump right in without the proper planning. It's like giving kids a recorder or a drum; they can't resist making noise. When you have a mouse in your hand and composition software in front of you, all you can think of is making more of those neat sounds. But the old adage *form before beauty* still holds true, so don't forget paper and pencil as you bring form, tonal levels, harmonic structures, and compositional procedures into shape.

Placing a note with *Visual Composer* is as simple as clicking or holding down the mouse button with the pointer in the right place on the onscreen score. Besides seeing the graphical representation, you hear each note as you place it. If you retain the most recent of these in your memory, you'll have a good idea of what the line sounds like. It's not totally necessary to keep them in your head, though, since playing a phrase is as simple as pressing the Ctrl-P key combination. I found that crafting an entire line before listening gave me a few more misplaced notes, but the overall effect, more times than not, contained a greater number of those sought-after, unanticipated, fresh turns.

The Shape of Sound to Come

Here's my COMPUTE! theme song as composed with Ad Lib's *Visual Composer* (Figure 1), and as composed in a text editor for Creative Labs' *Composer* (Figure 2). The *Visual Composer* score simultaneously shows all voices, so it's difficult to pick out the parts. In general, however, the lower four voices are the percussion and the upper voices carry the melody and accompaniment.

The instruments in the *Composer* text file also feature the percussion in the lower voices and the melody and accompaniment in the top voices. I used the *Definst* program, which is part of *Composer*, to get just the right sounds that would match the Ad Lib timbres.

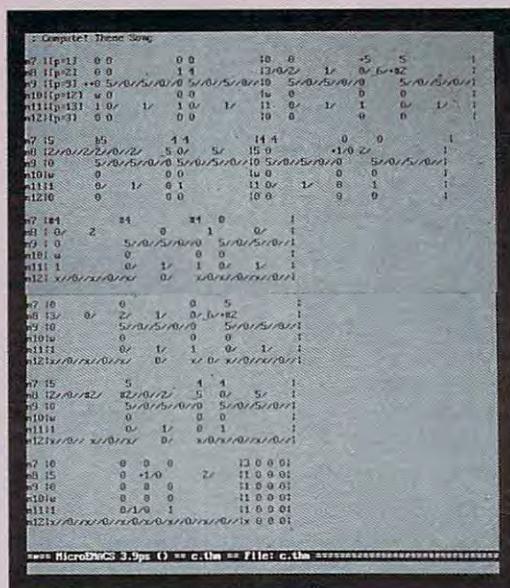


Figure 1

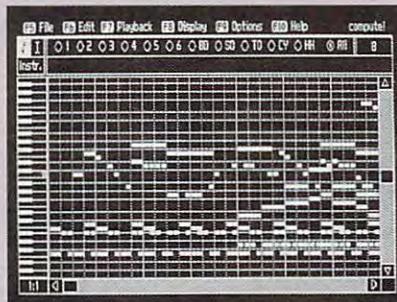


Figure 2

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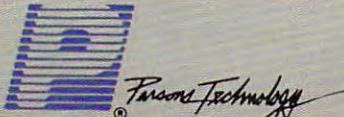
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COMPOSE YOURSELF

in the melody. A smooth and uninterrupted writing of each part gave the lines direction and intrinsic beauty—something that would please any counterpoint teacher.

Repeating sections is easy: Just highlight the section that's going to be repeated, press Ctrl-C to copy it into the buffer, position the cursor at the destination, and then press Control-V. The program pastes an exact copy of the highlighted section into the score at the point you have indicated. If you want to transpose, highlight the passage and press Ctrl-U to move it up a half-step or Ctrl-D to move it down a half-step. Make several such keypresses, and you've arrived at the dominant or another important key. But be careful: If you're adhering to traditional keys, you'll have to alter some notes to conform to the key signature.

Once I was familiar with the *Visual Composer* interface, things went quickly; I had a finished product after about eight hours. With that pop melody out of my system, I was ready to try some so-called "legit" music.

The instruments of a woodwind quintet (flute, clarinet, oboe, French horn, and bassoon) combine for a wide variety of sounds and textures, so that became the next experiment. The graphical representation of the pitches on the screen lends itself to a piece based on the shape and direction of parts, and I planned one similar to Arnold Schoenberg's early atonal pieces.

Making shapes from lines of notes is easy since you not only see them but also hear them. For the traditionalists who are wary of this type of approach to music, the aural effect in the end was pleasant and interesting—far better than some of the things that pass for twentieth-century masterpieces. In fact, what I heard was reminiscent of Schoenberg's *Kammersymphonie*.

Incidentally, for fans of geometric relations, *Visual Composer* presents a golden opportunity. Now you can easily calculate the beats and measures to find those magic moments where a climax would fit. A counter tells you where you are in relation to the beginning. Just figure out where the end is, make some calculations, and you can pinpoint ratios between notes, measures, and phrases. It's also handy for keeping track of lengths of sections so that your masterpiece achieves a good balance.

Having a Blast

Creative Labs' Game Blaster is another popular sound card. If you listen to games that support both the Ad Lib and the Game Blaster, you may prefer the

Ad Lib card's sound quality. But the Game Blaster costs less and is bundled with some very easy-to-use and flexible software. It isn't as easy to compose for the Game Blaster as it is for the Ad Lib (that's the software's fault), and some games don't utilize its full potential (that's the software developers' fault). But with patience and some extra effort, it's up to snuff for producing some great sounds.

The composition program that Creative Labs markets for the Game Blaster has no editor; the program simply converts ASCII text files to a format that can be loaded by the playback program. You must use special codes and a text editor or word processor to create music. In spite of this drawback, however, I soon got the hang of it—but it was never as easy as *Visual Composer*.

I wanted to see how close I could come to the Ad Lib card in imitating the pop tune I created earlier. The default Game Blaster instrument definitions sounded like those produced by my Atari 800, which wouldn't do justice to my latest creation. So, the first thing I did was design the instruments of my combo. The instrument editor was easy to use but, because tinkering with the sounds was so much fun, I found myself slipping into some ridiculous sounds. When I was finished, the instruments I had developed were pretty close to those I had created for the Ad Lib card.

The next step was coding the notes. Manipulating notes for conversion by *Music Composer* isn't too hard: Using your text editor, type 1 for tonic, 5 for dominant, and so on for all of the notes

in a key. Accidentals are easy; placing a # sign before a note raises it a semitone, and placing an @ sign before a note lowers it. You can set the key (or tonal center for avant-garde composers) by placing the name of the key (type A, for example, to play in the key of A) at the beginning of any measure. All of these commands, including volume, instrument number, octave, and so on, are embedded within the lines of notes. I found this extremely confusing at first, because it was hard to locate the notes, volume controls, key changes, and other compositional alterations. To solve that problem I made sure that each beat was aligned on the screen vertically; then, I placed my alterations between the appropriate beats. In a sense, writing music for *Music Composer* is easier than writing for *Visual Composer*, where you can only see one voice and one attribute on the screen at once. Here, everything is simultaneously in sight and easier to coordinate.

To repeat phrases, use the cut, copy, and paste functions found in your text editor. Transposing to a different key in *Music Composer* is a snap—just type the new key at the beginning of any measure. Transposing repeated phrases adds interest and variety to your compositions. *Music Composer* treats its notes in a relative manner; to modulate a measure, you simply type a new key at the start of the measure. With *Visual Composer*, which uses notes in an absolute way, you must copy the measure you want to modulate and then press Ctrl-U (to raise the pitch a half-step) or Ctrl-D (to lower the pitch a half-step).

Tandy for Timpani

Budding composers who own a Tandy 1000 SL or 1000 TL can take advantage of Tandy's proprietary digital audio chip, which boasts three voices, each featuring complex sounds. Tandy even includes a Music program with the version of DeskMate that ships with these computers.

The Music program displays a piano score in the center of the screen. Around this are located compositional tool selectors such as note duration, active voice, tempo, and meter. Cursor keys scroll the score horizontally so you can read it sequentially. Shortcut keys that move you to other parts of the piece save time.

The program includes features for cutting, copying, and pasting sections. Transpose passages with a function that's selectable from one of the program's pull-down menus. With another selection, you can change voices to different instruments. In short, almost every feature that you'll want has been included within DeskMate's familiar and easy-to-use interface.

There are, however, a few drawbacks. You only have three voices to work with, and each of these voices can be one of only four instruments: bells, a clarinet, a cello, or a piano. And there is a noticeable delay between pushing the play button and hearing your recording.

The Tandy sound chip does provide one extra: It gives you the capability of recording digitized sounds, which is something few other PC sound devices offer. Using the DeskMate Sound program, you can record, manipulate, and play back sounds on your PC that rival those of the Macintosh and Amiga. And that's something PC users have been waiting a long time for.



After having entered my notes and converting the file from my word processor to a playback file, I was ready to hear my creation. In spite of my careful efforts, there were differences in the sound between the two cards. The Game Blaster card had a richer, fuller bass, while the Ad Lib card sported higher overtones and had a brighter sound.

Rock-'n'-Roland

The Roland MT-32 sound module is in a different realm from the Ad Lib and Game Blaster cards, sporting a much higher price and a wealth of power. If you've heard Sierra games that support the Roland, you must have wondered if there was a CD player in your PC—it's that good. Some of the composition software available for the MT-32 is mind-boggling. Twelve Tone's composition program called *Sound Globes* is superb. It provides every feature you might think to use, and then some.

Power comes at a price, however. It took me three hours of experimenting before I was able to coax some simple

LEND AN EAR

Several companies have composed software solutions for PC musicians. To get into the swing of computer music composition, give these packages a listen. All of them are designed to work with IBM PCs and compatibles.

Ballade—\$195.00

Dynaware
1163 Chess Dr.
Suite J
Foster City, CA 94494
(415) 349-5700

Cakewalk—\$150.00

Sound Globes—\$175.00
Twelve Tone Systems
P.O. Box 226
Watertown, MA 02272
(617) 273-4437

Instrument Maker—\$49.95

Visual Composer—\$89.95
Ad Lib
50 Stanford St.
Suite 800
Boston, MA 02114
(800) 463-2686

Music Composer—\$69.95

Creative Music Labs
Distributed by Brown-Wagh Publishing
16795 Lark Ave.,
Suite 210
Los Gatos, CA 95030
(408) 395-3838

The Music Studio 3.0—\$99.95

Activision
Distributed by Mediagenic
3885 Bohannon Dr.
Menlo Park, CA 94025
(415) 329-0500

Sampled or Synthesized?

Your PC's speaker, and many of the add-on sound boards like the Game Blaster and Ad Lib cards, produce synthesized sounds. These sounds are usually simple tones of some sort that have been modified with electronic alterations to resemble complex sounds such as drums or acoustic instruments.

Synthesized sound is produced by hardware in a number of stages that vary, depending on the desired effects. The sound begins in the variable-frequency oscillator, is then filtered or enhanced with harmonics, and is then fed through special-effects circuitry. Finally, the sound is amplified and sent through the speaker.

Sampled, or digitized, sounds approximate actual audio events and may include human voices and real-life events. Tandy TL and SL computers and the Sound Blaster card, can make use of digitized sounds such as those in *the Manhole*.

Sampled sounds are sets of data in which the sound-pressure levels have been recorded with analog-to-digital hardware and stored in the computer (or to disk) as raw data. These sounds are then replayed using digital-to-analog hardware. The rate (or frequency) at which the recording is made has a direct effect on the playback quality—the greater the sampling speed, the higher the quality.

sounds from my computer, and another couple of hours before I could play a sequence of notes. Even with the good documentation, there is so much to *Sound Globes* that it takes time to wade through it.

For example, you can choose textures and combinations of textures for virtually any desired sound. Transpose and bend pitches with either a command embedded in the performance score or with the mouse during playback. Not only can you specify parameters in the performance score, you can also dynamically alter them as you listen, exploring different possibilities.

After several days (compared with the several hours spent with the other composition software discussed here), I had a grip on writing music with *Sound Globes*. The results sounded like professional soundtracks. Hearing my compositions played as though recorded by outstanding studio musicians in a commercial studio was thrilling. And the outstanding sound quality produced by the Roland compounded my ecstasy.

Same Old Song

For those budding computer musicians who don't plan to buy any sound hardware, there are still some alternatives for using the PC's built-in speaker. After the dazzle of the Ad Lib, Game Blaster, and Roland sound devices, it's hard to imagine how the PC speaker could possibly be of much use. But don't forget that what we're talking about is writing music. Mahler's *Fifth Symphony* makes my hair stand on end when the brass reaches its climax in the first movement, but a Gregorian chant with its single line has a profound beauty of its own.

Pianoman, a shareware composition program designed for the PC speaker, makes use of a record mode. In this mode, specific keypresses corre-

spond to particular tones. For example, pressing Z plays a G note and pressing K plays an F# note. As you press a key, the tone sounds and the program stores these sounds as a sequence in a buffer. An onscreen map shows the location of the notes. Once you've finished recording, you can edit the notes. You can also transpose passages to different keys for variations on your themes.

The nature of the PC speaker doesn't allow for changing dynamics. When you have only one note to work with, you're forced to do the most with a single line. This is a major drawback, but a clever composer makes the most of any circumstances. I found that the playback timings for *Pianoman* weren't very accurate, but a little editing fixed that. It was a stimulating challenge, and I was surprised at the results. Some of the sample music files attempted polyphonic textures using quickly alternating notes. However, I thought the monophonic tunes were better examples of good compositional technique. They were less contrived and, like a Gregorian chant, had a beauty of their own.

The Beat Goes On

The next music-composition contest I enter will be a new experience for me because I'll write and record my entry with software designed to make my PC sing. My computer never misses notes, and it's always available to play my latest idea or to help me make a final recording. Like a word processor helps a writer and a spreadsheet assists an accountant, the convenient editing features in music-composition software give a measurable edge to composers who are looking for a better method than pencil, eraser, and a paper score. □

Richard Leinecker is an assistant editor for COMPUTE!. He plays the French horn and is writing the COMPUTE! theme song.



RESOURCES

FIND SOUND ADVICE FOR MAKING SWEET PC MUSIC

Periodicals

For timely information, check up on the many computer-music periodicals available in your library.

Electronic Musician—\$14.95 per year
6400 Hollis St.
Suite 12
Emeryville, CA 94608
(415) 653-3307

Music Technology Magazine—
\$12.95 per year
Music Maker Publications
22024 Lassen St.
Suite 118
Chatsworth, CA 91311-9847
(818) 407-0744

Keyboard Magazine—\$19.95
per year
UPI
20085 Stevens Creek Blvd.
Cupertino, CA 95014
(408) 446-1105

Associations

Organizations can present a great opportunity to learn from professionals and amateur musicians.

Center for Electronic Music
432 Park Ave. S
New York, NY 10016
(212) 686-1755

Computer Musicians Cooperative
3010 N. Sterling Ave.
Peoria, IL 61604
(309) 685-4843

Computers and Music
647 Mission St.
San Francisco, CA 94105
(415) 541-5350

International MIDI Association
11857 Hartsook St.
N. Hollywood, CA 91607
(213) 649-6434

The Washington Project for the Arts
New Music Program: MIDI
Workshops
400 7th St. NW
Washington, DC 20004
(202) 347-8304

ONLINE SERVICES

If you can't find a group in your area, you can learn from other composers through online services. Communicate in conferences and send correspondence through your modem. You'll also find public domain and shareware music-composition software that you can download.

CompuServe Information Service
P.O. Box 20212
Columbus, OH 43220
(800) 848-8199 (voice)

MIDI-Net
Dallas, TX
(214) 276-8902 (modem)
Oklahoma City, OK
(405) 733-3102 (modem)

MIDI/WorldMusic Roundtable
GENie
401 N. Washington St.
Rockville, MD 20850
(800) 638-9636 (voice)
(800) 638-9636 (modem)

The Music Conference
Byte Information Exchange
1 Phoenix Mill Ln.
Peterborough, NH 03458
(800) 227-2983 (voice)

BOOKS

Computer music composition has spawned a library of books that share essential information. Get a head start on your own composing by tapping into these excellent sources.

■ *Alesis MMT-8 Sequencer*, by Dan Walker—\$24.95; *The EPS Sampling Book*, by Bobby Maestos—\$21.95; Alexander Publishing, Music Maker Publications, 22024 Lassen St., Suite 118, Chatsworth, CA 91311-9847; (818) 407-0744

■ *Computer Music: Synthesis, Composition, and Performance*, by Charles Dodge and Thomas A. Jerse—\$29.95; Schirmer, 866 Third Ave., New York, NY 10022; (212) 702-2000

■ *Creative Recording: Effects and Processors*, by Paul White—\$17.95; Music Maker Publications, 22024 Lassen St., Suite 118, Chatsworth, CA 91311-9847; (818) 407-0744

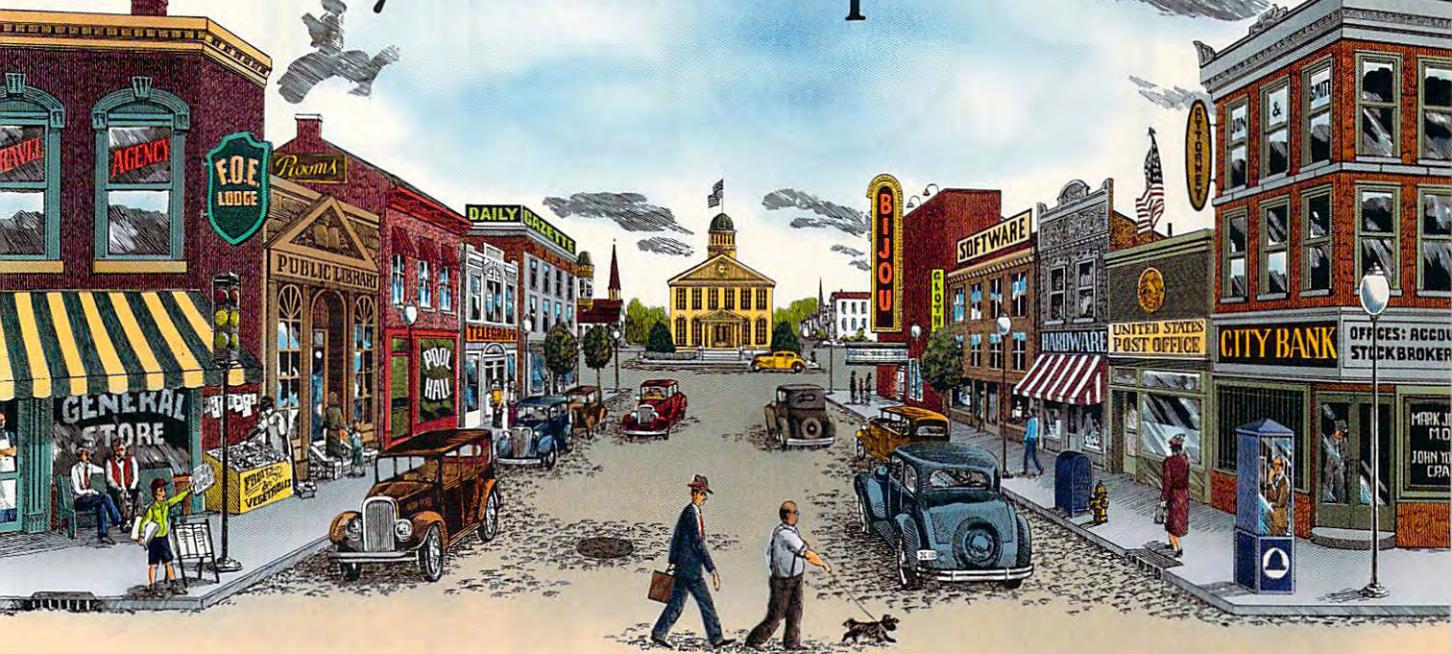
■ *Electronic Music Composition for Beginners*, by Robert Adams—\$29.75; Wm C. Brown Publishing, 2460 Kerper Blvd., Dubuque, IA 52001; (319) 588-1451

■ *The MIDI Book—Using MIDI and Related Interfaces*, by Steve De Furia, Joe Scacciaferro, and Ferro Technologies—\$14.95; *The MIDI Resource Book*, by Steve De Furia, Joe Scacciaferro, and Ferro Technologies—\$17.95; Hal Leonard Publishing, 8112 W. Bluemound Rd., Milwaukee, WI 53213; (414) 774-3630

■ *Musical Applications Microprocessor*, 2nd edition, by Hal Chamberlin—\$39.95; Howard W. Sams & Co., Department DM, P.O. Box 7092, Indianapolis, IN 46207-7092; (800) 428-7267

■ *Music Through MIDI: Using MIDI to Create Your Own Electronic Music System*, by Michael Boom—\$19.95; Microsoft Press, Sales Department, 16011 NE 36th Way, Redmond, WA 98073-9717; (800) 888-3303

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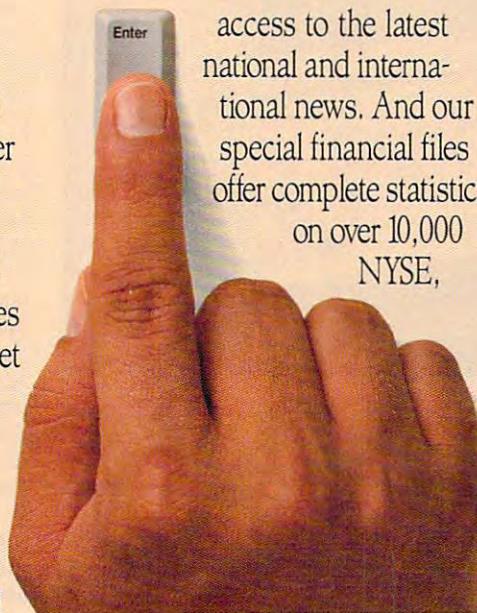
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The phrase *notebook computer* gets bandied about quite a bit these days. Depending on your point of view, it's either one of those industry buzzwords cooked up every couple of years to entice consumers to go out and buy the latest and greatest technological wonders, or it's a succinct description of the latest personal computer frontier. In its ads, Tandy touts its new 1100 FD as a notebook computer, but don't be fooled. It's a laptop—a lightweight, well-designed laptop that may be the perfect tool for home computer users looking for an affordable portable.

The 1100 FD is no UltraLite. It weighs in at a little less than 6.5 pounds, without its rechargeable battery. That's a couple of pounds more than the NEC laptop that has everybody jumping through hoops, but the 1100 FD has something the UltraLite can't match—a price tag under \$1,000.

You won't mistake Tandy's latest laptop for a Poquet computer or a Zenith MinisPort, either. It beats both on price and offers the advantage of an industry-standard disk drive (unlike the Zenith entry). In short, Tandy's machine is the laptop for the rest of us—serviceable, compatible, and affordable.

The 1100 FD uses a V20 processor running at 8 MHz—no speed demon, but enough power for the road, and a satisfactory if not overwhelming processing speed. For students interested in a computer for college, this latest Tandy laptop has enough horsepower for any projects they're likely to take on, primarily word processing, spreadsheets, and databases. For power, Tandy's newest laptop comes equipped with an AC adapter and a rechargeable lead-acid battery. The manual maintains that you can run the computer from the battery for



Mark Waggoner

3-4½ hours, depending on your degree of disk access. I found, however, that the low-battery light would come on, even after a full charge, if I left the computer inactive for a couple of days.

Besides its great price and relatively light weight, the 1100 FD has several other attractive features, including most MS-DOS 3.3 functions and Tandy's own *DeskMate* interface in ROM. The appeal here is a quick boot when you switch the machine on. There's no wait for disk reads; just hit the switch and you're up and running. To make productivity even closer at hand, Tandy has included its *DeskMate* Text program in ROM, so you don't even have to slip in a disk at all if you want to start typing right away.

For running your favorite programs, the 1100 FD comes standard with 640K of RAM. Using ROM-based DOS functions frees up the maximum amount of memory for your applications—an important point because Tandy doesn't allow for memory expansion in this system. That's not necessarily a fault, because Tandy knows its market and plans its products accordingly. The 1100 FD is aimed squarely at those users who demand functionality at a minimum price. For users who want color laptop displays, 386SX processing power, expanded-memory accessibility, there are other, more expensive machines available.

On the right side of the system is a single 720K 3½-inch disk drive. You may be able to start typing right away, but until you insert a disk there's no way to save your file. The 1100 FD ROM version of Text saves its files as ASCII, so you can port documents to most desktop word processors. You can, of course, run your own word processor from the floppy disk. But travelers seeking to keep the disks they carry to a minimum will welcome the built-in editor—it's not dif-

ficult to learn and offers all of the basic word processing from the function keys or from pull-down menus located along the title bar at the top of the screen.

The 1100 FD keyboard is well-spaced, with 12 undersized chiclet-style function keys along the top row. The short space bar adds space without hindering typing. The main keyboard has a pleasant, cushioned feel that softens the short throw of the keys. That short throw can be troublesome if you don't hit the keys assertively and dead center. That doesn't mean that you have to pound the keys unmercifully, but, if you're a fast typist with a light touch, the cushioned feel may mislead you and result in missing characters. I didn't find the keyboard especially objectionable (except for the small Enter key that requires a solid hit to activate), but I couldn't say it was state of the art. If you're considering the 1100 FD as your laptop, I recommend that you visit a Radio Shack store and spend some time typing on it. The feel of a keyboard is too subjective to leave to chance.

Also included on the keyboard is an embedded numeric keypad that you activate by pressing the special Function key (located at the bottom

left of the keyboard, between the Control and Alt keys) and then pressing the Key Pad key (located in the far upper right corner of the keyboard) simultaneously. The keypad option doesn't work in the word processing mode, but it's helpful for intensive number entry when using a spreadsheet. (Tandy's spreadsheet, called Worksheet, comes as part of the complete *DeskMate* package, which ships with the 1100 FD.)

The screen display is, to be quite honest, a singularly unflattering shade of green. By using LCD super-twisted display technology, Tandy is able to provide a measure of clarity without sacrificing pounds and dollars. It's not the kind of screen you'd want to play many games on, even though I did manage to play *Welltris* with some success in a reverse-CGA mode. Entertainment aside, text is quite readable. The screen tilts back for easy viewing from a variety of positions in varying light. A sliding bar to the left of the screen controls the contrast. If you're considering a laptop for your second computer, productivity (mainly word processing) will no doubt be your chief concern. In this area the



PRODUCTIVITY

1100 FD lives up to its potential.

When you leave the realm of Tandy's word processor, you can expect some aggravation. I tried running *Lotus Spreadsheet* for *DeskMate* on the system, but I found data entry to be agonizingly slow, even though it smoothly integrated itself into the familiar *DeskMate* interface. To be fair, the *Lotus/D* program is pretty large, and I would attribute the sluggishness I experienced to the software and not to the 1100 FD. If you want to crunch numbers and you aren't concerned with working within the 1-2-3 format, Tandy's Worksheet program runs fine on the laptop and gives you plenty of calculating power.

In another test, I loaded my traveling copy of *WordPerfect* (version 4.2) that I use on the road because it fits on one 720K disk. I found I could outtype the cursor, which is a surprise given that I'm a keyboard-watching typist and not known around the office for my blazing speed. Other laptops equipped with LCD screens have this problem when dealing with more sophisticated word processors, so the 1100 FD needn't feel like the Lone Ranger when it comes to subpar text handling.

Keep in mind that trade-offs are made when bringing any product to market, and in this case Tandy sacrificed speedy text handling for the low power requirements that an LCD screen demands (giving you long bat-

tery life) for the low cost of manufacturing such displays (cheaper than gas-plasma displays) and for a lighter weight (important when you're lugging your laptop around all day). If those requirements (battery power, light weight, and cost) are important to you, the performance sacrifice is worth it.

On the back of the system, behind a hinged panel, is one parallel and one serial port. These built-in features let you print on the road (with a portable printer) and telecommunicate with the office, with home, or with the school library. You can even hook up a mouse to use with *DeskMate*. Tandy sells a 2400-baud internal modem for use with the 1100 FD, but if you already have a desktop computer you may be better off buying one of the new pocket-size modems and running it through the serial port of both machines: twice the use at half the cost.

The entire system is housed in an off-white case. It feels comfortable under your arm, but it's a little too bulky to fit in most briefcases. Rather than the sleek, sharp lines of the UltraLite or the traditional square lines of the Toshiba series (or countless other laptops), the Tandy 1100 FD has a smooth, rounded look that I like a lot. It may seem a small point to quibble over, but aesthetics play a part in this technological world. A well-designed machine is not just a pleasure to work

with, it's also a pleasure to look at.

Beyond the hardware, the Tandy 1100 FD may finally give a lot of people reason to consider *DeskMate* as a graphical interface for DOS. By putting the interface in ROM, Tandy introduces a lot of users to an environment that allows for WYSIWYG display, task switching (a kind of poor man's multitasking), and ease of use. I suspect that a lot of 1100 FD buyers may not be *DeskMate* owners, and having it loaded on their laptop may make them converts. Of course, you can use a setup program included with the 1100 FD to bypass *DeskMate* and bring up the DOS command line when you boot up.

What makes *DeskMate* so appealing on this particular machine, however, is that it appears that Tandy has tweaked it so that its integrated applications run more smoothly on this laptop than do third-party software programs. I can't say for sure that this is true, but it makes sense that Tandy would have an advantage of knowing exactly how the hardware works so that its software operates at maximum efficiency.

What Tandy seems to be doing here is trying to broaden the laptop market beyond high-flying executives and gadget-crazy techno-whiz kids. It's the same approach that has given the company a big share of the home-computing market for MS-DOS systems, and the same philosophy that rests behind the firm's unyielding push to make its *DeskMate* interface the graphical environment of choice for users of 8088 machines.

The 1100 FD fits into that strategy by offering itself as a laptop for the common user: a fine second machine for home office workers who need portability, an easy-to-use and lightweight educational computer for the son or daughter going off to college, a solid performer for the small business with the small budget. By aligning itself with *DeskMate*, and by making good use of techniques like a ROM-based operating system and word processor, the 1100 FD goes a long way toward fulfilling the promise of a no-frills, industry-compatible laptop that all users can afford.



The lightweight Tandy 1100 FD laptop computer sports a nonbacklit green LCD display and a single 720K floppy drive, and it carries the *DeskMate* graphical interface in ROM.

1100 FD

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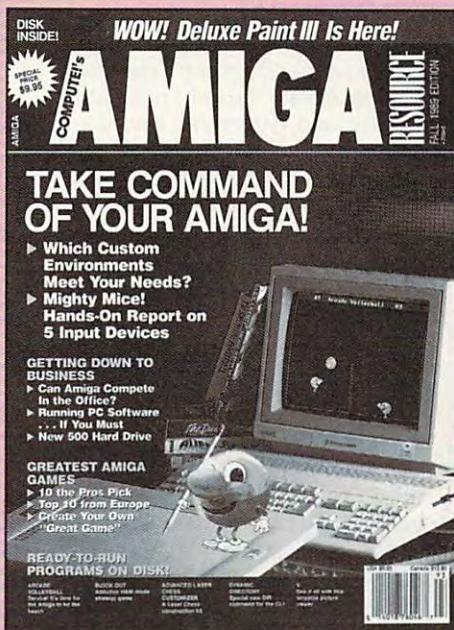
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PRODUCTIVITY IMPACT

D A V I D D. T H O R N B U R G

To my knowledge, there is no culture in the world that does not have music. Music is a communications medium that expresses ideas in ways that cannot be approached by poetry, painting, or any of the other arts. If visitors from another planet were to draw conclusions based on interception of our radio broadcasts, they would think that we are a musical species that talks for only five minutes per hour to discuss news and traffic.

Yet, for all the unheard sonatas that echo from shower stalls, an amazingly large proportion of our population restricts its music appreciation to listening and doesn't play or compose music. True, many of us were trundled off to lessons at an early age, but, for many people, these forced lessons hurt musical interest more than they helped it.

The personal computer gives us new tools that make the exploration, performance, and composition of music far more accessible than it ever was. Music synthesizers were once relegated to the professional music store. Now you can find them at K mart.

Since you may be new to electronic music, here are some of the options that are open to you. Perhaps you've never played a musical instrument but have dreamed of jamming along with Chuck Berry or Itzhak Perlman. In your case, you'd love some of the computer-assisted performance packages such as *Jam Session*, available for the Apple IIgs and Macintosh from Broderbund. This program plays rhythm and accompaniment tracks in any style you'd like, from Chicago blues to Chopin, and it lets you play riffs and melodies by pressing different keys on the computer keyboard. You have tremendous creative latitude with this program, yet it keeps you from playing "wrong" notes by restricting the tones you can generate at any given time. The music is generated by the

sound chip in your computer, so the quality isn't as good as that from a dedicated synthesizer, but the program is great fun to play with.

In addition to pianolike keyboards, synths can use guitar fret boards, drum pads, or even wind-instrument finger pieces. Traditional keyboards are the most popular, however, and virtually all low-cost synthesizers come with a traditional keyboard.

What should you look for when purchasing a synthesizer? First, be sure you like the sounds it creates. This seems obvious, but today's synthesizers have so many bells and whistles that it sometimes is easy to overlook the sound quality in making a purchase decision. When listening to the instrument in the store, bring your own headphones so you can hear the instrument without hearing the ambient store noise.

COMPUTERS HELP **MAKE MUSIC** IN MIDI WAYS

You will probably find that the department store instruments lack the depth and richness of tone that are the hallmarks of a good synthesizer—you get what you pay for. Be sure to listen yourself. Every ear is different, so reviews of synthesizers are of limited help. It's kind of like buying a wine with "a touch of oak taste and an amusing bouquet." Give me a glass and I'll tell you if I like it.

Be sure your synth has a MIDI interface. This allows you to connect your equipment to your PC, to other

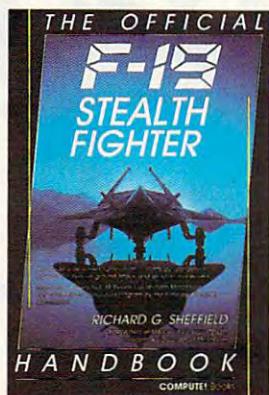
synthesizers, and to a host of other goodies you'll acquire in coming years. When you're ready to connect everything to your computer, you'll need to purchase a MIDI interface for your PC, unless you have one built in (as with the Atari ST and some Laser models). The most popular kind of MIDI software is the sequencer. This program lets your computer capture, edit, and play back performances. Think of it as a multitrack tape recorder that you can use to turn your instrument into a player piano. Once you get started, you'll find lots of other MIDI programs to keep you occupied.

The music field is very dynamic, and electronic music is growing by leaps and bounds. Looking into the nineties, I expect to see more musical compositions influenced by audience participation. The *Jam Session* program I mentioned is one example of this. Another of my favorites is in the Kodak exhibit at the EPCOT Center in Orlando, Florida. You create music by walking across colored tiles on the floor. As people move through the exhibit, the room fills with pleasant sounds whose patterns are largely influenced by the audience. Environments like these allow the audience to be listener, performer, and composer all at once.

But is it music? I hear this question a lot. It's important to realize that electronic instruments are a different breed. Just as the saxophone didn't replace the clarinet, or the piano didn't replace the harpsichord, I see no reason to think that synthesizers will replace any other musical instruments. Each instrument has its unique sounds and expressive quality. It's true that a lot of "bad" music is being created with synthesizers, but this is not the fault of the technology. Technology does not equal creativity. It never has, and it never will.

If you have a song in your heart that you'd like others to hear, you might want to look into ways to have your computer assist you in your creative expression. □

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by Richard G. Sheffield
Foreword by Major "Wild Bill" Stealey, president and cofounder of MicroProse

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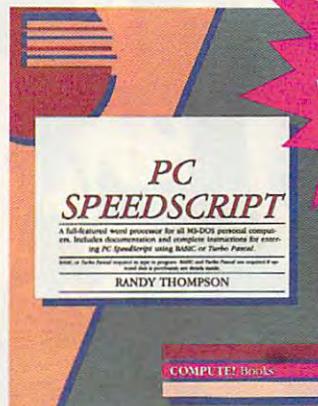
by Sandra Cook Jerome, C.P.A.
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This hands-on guide is perfect for small-business owners who need financial reports and information quickly. It is more than just another tutorial on *Lotus 1-2-3*; it's a guide to building practical spreadsheets. You get complete instructions for creating more than a dozen spreadsheets, including income statements, job costing, tax planning, balance sheets, and accounts-receivable aging. You'll even learn to write a business plan. Although written specifically for *Lotus 1-2-3* releases 2.2 and 3, the spreadsheets in *Easy 1-2-3 for Small Business* are also compatible with release 2.01.

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USER GROUPS WANT YOU!

TOM NETSEL

USER GROUPS HAVE A LOT TO OFFER, AND THEY'RE EAGER TO HAVE YOU JOIN

Recently, a woman in California called me with a problem. A relative had given her an orphaned computer and she was wondering where she could buy software for it. The computer had been out of production for several years, so I suggested she contact a computer user group in her town.

"What's a user group?" she asked. What's a user group? Everyone who owns a PC should know about the benefits user groups offer. Many cities have several groups, and even small towns support at least one organization dedicated to helping PC owners get the most out of their machines. I steered my caller to a user group in her city. I'm sure by now she's found plenty of software, advice, and computer camaraderie.

Two or More, Gathered Together

User groups are formed when two or more computer owners meet on a regular basis to talk computers. In smaller towns a single group may support several types of computers, but most larger groups are dedicated to a particular computer. In addition to MS-DOS groups, there are Commodore 64 groups, Macintosh groups, and Amiga groups, as well as groups formed around



USER GROUPS WANT YOU

TI-99s, Apple IIIs, Atari eight-bits, Tandy Color Computers, and even CP/M machines.

Most groups meet once or twice a month. Some boast several hundred members. Meetings are held in public buildings or auditoriums, computer stores, or private homes. Members range from senior citizens to children, and their levels of computer experience are equally diverse.

You don't have to be a computer wizard to join a user group. In fact, people new to computing often have the most to gain.

For intermediate and advanced users, groups usually offer a number of educational and informative programs. Many experienced computer users enjoy sharing their expertise by leading seminars and special interest groups (SIGs).

Let's take a look at a couple of typical user groups and see what they have to offer.

Who You Gonna Call?

The Connecticut IBM Personal Computer User Group was formed in 1982. A hundred or so of its 350 members meet the fourth Tuesday of every month in the auditorium of the Darien library. President John McGinley says a user group is an ideal organization for helping computer owners solve the myriad problems that can plague new and experienced users. "The absolute best reason in the world for someone to join a user group," McGinley says, "is that he has no other place to turn for help when he gets stuck."

Retail software stores may or may not offer help. Software publishers or distributors may provide telephone assistance, but lines are often busy. "When you do get through, you have to try explaining something you don't understand very well to someone who can't see your screen," McGinley says.

"When you need help, when you get stuck in front of a computer, dumbly looking at the thing and you simply don't know what to do next—that's where a user group comes in."

A California user group president concurs. "When I first acquired a computer, I couldn't wait to find a user group," says Jay Trachman, head of the Fresno PC Users Group. "I bought an XT through the mail, and I took it back to the dealer because I thought something was the matter with the machine. When I found out that there was a local user group that could offer help,



Several members of the Tucson Computer Society discuss a software program during a break at a recent meeting. Pictured from left to right are Don Williams, Lee Levin, Fred Mazoyer, and Rice Bullock.

it was manna from heaven."

User group assistance is also free from commercial pressures. "Vendors are hard-pressed economically to provide the kind of services that they should," says Lee Levin, president of the Tucson User Group. "Since they are trying to be so competitive, what normally gets left out is service. We offer an opportunity to mix and meet with other people who are knowledgeable and to provide a help line for members to call with questions about specific hardware or software. Basically, we are a resource."

The Connecticut group offers a similar help service. "Our newsletter lists a panel of volunteers available to help members with various problems," says McGinley. "This is probably the greatest benefit anyone can gain from joining a user group. In fact, my argument is that if you own a computer and you don't belong to a club, you are being foolish and wasteful of your time. You can spend hours trying to research a problem when one phone call to a local expert can solve it in ten seconds."

A tougher problem for user groups is how to attract and keep veteran users. Special interest groups (SIGs) often help. SIGs usually meet at times other than the regular meeting and are devoted to one computer topic. There are SIGs for Lotus, advanced DOS, MIDI, and various programming languages. Telecommunications, word processors, databases, and spreadsheets are also popular SIG topics. Veteran members often lead these groups, and many attend SIG meetings to further increase their computer knowledge.

Meeting in Session

User groups frequently follow traditional meeting agendas. Group business and announcements usually come first, often followed by a question-and-answer session. "At our meetings," says McGinley, "we have a Random Access Session for 30 minutes where anyone can stand up and ask a question, offer something to sell, or ask how to hook up some device. Usually we get answers of one sort or another."

In Tucson, a panel of three experts from various fields answers written questions from the audience; then the floor is opened to further questions. After 30 minutes, the group takes a 15-minute break, during which members may visit vendor tables, where other members have items to swap, or they explore the group's disk library.

Practically every group has a library of public domain software. Topeka's collection includes 500 programs. Disks are available in 5 1/4- or 3 1/2-inch formats and are sold for a dollar, says club president Robert Bowser.

"Recently we had one on a shareware program called *Family History System* that was very popular," Bowser said. "A number of people in our club are interested in genealogy, and it also attracted the interest of two or three people from the local genealogy club."

Many groups are open to the public, although some charge a small fee for nonmembers to attend. Practically all groups charge yearly

dues. In Topeka, anyone may attend meetings for three months and receive copies of the monthly newsletter before paying dues, which are \$12 per year.

At the Fresno PC Users Group, dues are \$24 per year. "But meetings are open to the public as well as members," says Jay Trachman. "We don't turn anyone away."

The Tucson group sponsors a booth at a local computer show. To attract new members, it offers a free three-month membership to anyone signing up at its booth. Last year it attracted about 100 new members this way, according to Lee Levin. Dues are \$24 per year for individuals and \$30 per year for families.

Something for Everyone

After club business is settled and all the questions have been answered, most meetings have a featured speaker. Software or hardware demonstrations by group members, vendors, or software representatives are popular user group attractions. Industry representatives often donate products to be given as door prizes. The chance to win software, a 40-meg hard card, or even a printer is an inducement for many people to join their local groups.

Newspapers often announce user group meeting times and locations. Electronic bulletin boards—sometimes sponsored by user groups—often contain meeting announcements. Another way to find a user group is to ask at local com-

puter stores. Many stores post flyers announcing user group meetings.

Relations between user groups and computer stores can vary. It is not unusual for stores to offer discounts to user group members. In Tucson, computer dealers offer their facilities to groups for meetings and provide hardware to run the group's electronic bulletin board. "A few other stores refuse to cooperate at all," says Levin.

In Connecticut, McGinley has run into a problem with local computer stores refusing to cooperate with user groups. "The argument is that the club offers free help to computer owners, recommends certain makes of computers, and helps potential buyers find the best prices," he says.

In any group there are bound to be disagreements and controversies, but, by and large, user groups are friendly organizations with much to offer their members. Not all of the benefits are computer-related. "There is a lot of camaraderie in our group," says Trachman. "The PC user group has a wonderful way of cutting across generational lines. Any given night, we have young teenagers and old fogies—and everybody in between. But at the user group meetings, they help each other, they relate to each other as *users*. It is a very beautiful thing to watch. Here is a place where oldsters relate to kids and vice versa, without a lot of the nonsense that separates the generations." □

Boston Computer Society

While most user groups boast a few hundred members, a few supergroups have membership that runs into the thousands. The Boston Computer Society, for example, has almost 32,000 members!

"Until recently we've grown at an exponential rate. Now it is starting to moderate. I think we've got everybody out there who has a personal computer," says David Strickler, leader of the BCS's Digital Rainbow group and VAX group.

A group this size packs a fair amount of clout. Members get discounts at many computer stores, and they also enjoy access to the nationally recognized speakers who address the society. "We often have some very exciting topics," Strickler says. "I've seen everything from Steve Jobs debuting his NeXT machine at the Boston Symphony Hall to Bill Gates introducing the latest versions of [Microsoft] Quick-BASIC and Quick C."

The monthly general meeting is held in various locations around the city, depending on the size of the expected audience. Special interest groups (SIGs) may meet once or twice a month, but usually at a fixed location. "SIGs range from the IBM PC users group, which tends to have colossal meetings, down to groups which may have only ten people," Strickler says.

The BCS sponsors SIGs for most major computer brands, software groups, and other interests. There is a Lotus group, an Aldus PageMaker group, a computer-aided publishing group, one for telecommunications enthusiasts, and one for amateur radio operators. There is even a church and syna-

gogue group, plus one for people interested in construction.

The BCS office, which has a permanent staff of about 15 people, is open from 10:00 a.m. to 5:00 p.m. Staff is kept busy coordinating the BCS calendar and handling the society's tremendous amount of correspondence.

Six times a month, the BCS office holds an open house. During these times members may stop by the facility and use any of the society's approximately 30 computers and take advantage of its extensive software collection. "If you are thinking about buying a piece of software, you can go down to the BCS during open house, pull a copy off the shelf, pop it into a machine, and try it out for the next couple of hours," Strickler says. "It's a great resource for learning about a piece of software or hardware before you make the investment."

BCS members with questions about hardware or software can call any of the group's volunteer experts. Many user groups provide a similar service, albeit on a smaller scale. The BCS has about 700 volunteers. For example, if you have a question about a Digital VAX, call the BCS and it will give you Strickler's name and telephone number. "You basically have free technical support," he says. "That in itself is an amazing resource for [dues of] \$40 a year."

For more information on BCS, write the group at 1 Center Plaza, Boston, Massachusetts 02108, or call (617) 367-8080.

PC PRIMER

HINTS AND TIPS FROM OUR READERS

Here's a hint that I hope will help prevent your readers from encountering problems with their AUTOEXEC.BAT file, the file containing commands to be executed each time you start up your PC.

Most MS-DOS software packages come with an install program to make putting the software on your hard drive easier. What you aren't always told by the program, though, is that sometimes these programs modify, or even replace, your AUTOEXEC.BAT file. This can cause problems with some of your software and can ruin a lot of the hard work you put into configuring your startup file.

Preventing this is easy if you take a simple precaution beforehand. To keep your AUTOEXEC.BAT file from being trashed by install programs, you hide it from those programs by *not* calling it AUTOEXEC.BAT. You'll create a dummy file that will be easy to repair or replace.

Here's how you do it: First, rename your AUTOEXEC.BAT file to START.BAT. Now, create a new AUTOEXEC.BAT file that has only one line in it, START.BAT. Reboot your machine; it should start up just as it did before. The only difference is that you're executing an additional file each time you reboot. You probably won't even notice the tiny amount of extra time spent on startup.

Now, when an install program modifies your AUTOEXEC.BAT file, you can easily copy the new lines into your START.BAT file wherever you want them, and then delete them from AUTOEXEC.BAT. This will allow you, for instance, to make sure that device drivers are loaded before the new commands are executed.

And, if the install program does replace your original AUTOEXEC.BAT file, you only have to replace one line, not the entire file.

John Straub
Ridgefield, CT

More Perfect

Defining and editing blocks of text in *WordPerfect* always seems to take a lot of keystrokes. Here's a couple of tips for speedier editing. After turning on the Block Define function (Alt-F4), press the period key to define text to the end of the sentence. Press the comma key to define text to the next comma. This tip works for any kind of punctuation. If you want to define an entire paragraph, press the Return key after turning on the Block Define function.

Sterling Clay
Pinellas Park, FL

XCOPY to the Rescue

After doing some of my work at home, I often need to take my files to the office on a floppy disk. Sometimes I need to bring an entire directory with me. It can be a hassle to copy the directory if it contains more data than

SAFER BATCH FILES

AND MULTIDISK
COPIES

will fit on a floppy disk. Using COPY *.* eventually results in a *disk full* error; then I have to figure out a way to copy the remaining files. I usually resort to using *Xtree*, but sometimes I don't have this program available on the PC I'm using. I've found an easy solution to this problem. All you'll

need is DOS 3.2 or greater.

The XCOPY command is far more powerful than COPY because it has a number of command line switches that cause it to perform copies in different ways. These are all documented in your MS-DOS manual—I'm only mentioning one of eight handy switches here.

First, make sure that you're in the subdirectory that you want to copy. You'll get started with ATTRIB, another DOS command that sets the archive bits of each file. That's a complicated way of saying that it sets a flag so that DOS knows which files it has already copied, if you use the correct XCOPY switch when copying. Type ATTRIB +A *.* to set the flags.

Now, if you're copying to drive A, type XCOPY /M A:. Files will be copied until your disk runs out of space and gives you a *disk full* message. At this point, all you have to do is insert another disk, retype the previous command (or hit F3 and then Return), and wait for it to finish copying or tell you that that disk is full again. You may need several floppies if the subdirectory is pretty full.

If you've forgotten to format enough disks, it's OK. You can stop the copy process anytime and format more. The archive bits of the un-copied files are still set, so the system remembers where it left off.

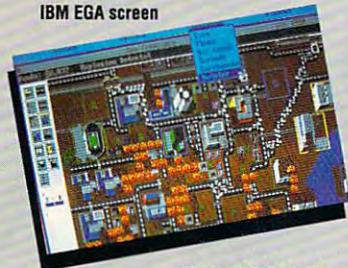
You could create a batch file that does the work for you if you anticipate going through this process often. And if you specified the full paths, you could be in any directory and perform these operations. You could create a batch file in the root directory that copies multiple subdirectories.

Richard C. Leinecker
Reidsville, NC

Do you have advice that makes a PC more productive? If so, we'd like to hear from you. Send your tip, no matter how brief, to COMPUTE! Feedback—PC Primer, P.O. Box 5406, Greensboro, North Carolina 27403. If we publish your suggestion, we'll send you a gift.

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(These comments are from the correspondence from real SimCity users. *Honest!*)

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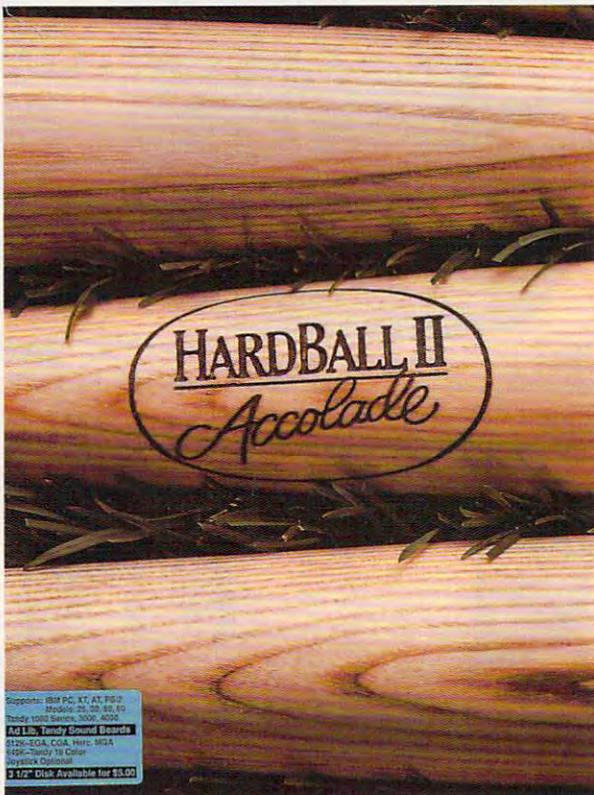


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ENTERTA

Mark Waggoner



STATISTICS AND ACTION TEAM UP FOR A WINNING COMBINATION IN HARDBALL II

COMPUTE! CHOICE

MICKEY McLEAN

ame designers have been striving to create the perfect baseball simulation for years, starting with *Major League Baseball* for the Mattel Intellivision in the early 1980s. Early releases were either arcade games or statistically based simulations. Lately, software companies have tried merging the two formats with varying degrees of success. The most recent attempt, Accolade's *Hardball II*, is the best yet.

The game's predecessor, *Hardball!*, has sold over 500,000 copies since its release. Other publishers have come up with games that have surpassed it in terms of features but

not playability. With *Hardball II*, Accolade has tapped a need for a well-playing baseball simulation that successfully mixes arcade action and statistical performance while also allowing for general-manager and field-manager duties.

Hardball! required you to pitch, field, throw out runners, bat, run the bases, and steal bases. You were a participant, not just an observer. In other games, such as Electronic Arts' *Earl Weaver Baseball*, the computer handles most of the fielding, using statistics from actual major league teams to decide the outcome. The original *Hardball!* used two fictional teams with varying player statistics that influenced the play on the field but were never updated according to game performance.

Accolade's new release addresses this problem, but there's a catch. *Hardball II* retains all of the on-the-field action of *Hardball!* as well as a similar interface, but in order to face the best the big leagues have to offer, you have to build the teams yourself. The game's team editor permits you to create any team, from the World Champion Oakland Athletics to your company's softball team. You're limited only by disk space, but the process of creating a large number of teams requires a great deal of data entry.

For each player, you must enter statistics such as hits, runs batted in, errors, as well as wins, losses, strikeouts, and walks for pitchers. Physical attributes, such as whether the player is a right- or left-handed batter and whether or not he's a fast runner, must also be entered. The pitchers on



each team's staff must be designated as either right-handers or southpaws. Their degree of control and endurance must also be included.

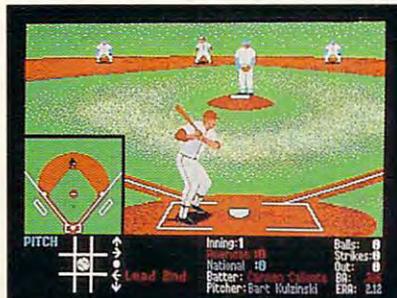
If you don't want to bother with creating your own teams, Accolade has included eight make-believe teams to choose from, including six from cities that have real major league teams. There are also two other teams, with exaggerated abilities, to help you practice.

Almost all other baseball games on the market feature major league teams, either included with the program or available separately on data disks. Peter Doctorow, vice president of product development for Accolade, offers several reasons why the Rickey Hendersons and Don Mattinglys of the baseball world were left out of *Hardball II*.

"We couldn't come to a consensus on who to include," Doctorow says. "We also like to differentiate our products from those of other companies."

"We believe the user would like the opportunity to enter his own teams. This way, he doesn't have to buy any extra disks," Doctorow adds.

Another explanation as to why major leaguers were omitted is that Major League Baseball charges a license fee, which would have added to the development cost of the software.



Choose from four different views, including from behind the batter.

One solution, should *Hardball II* become popular, is that teams created by other users may be made available for downloading through bulletin boards from around the country.

Hardball II offers many enhancements over the original *Hardball!*. The earlier game offered only one view, from behind the pitcher, which sometimes made it difficult for hitters to time their swings. The new version features a choice of four views. If you liked the original version, you can choose that view, or you can view the action from behind the batter, or from overhead. When playing against the computer, you can choose to automatically see the play from behind the batter while at the plate and from behind the pitcher when on the mound.

Statistics not only change from game to game, but are updated after every play, influencing the action on the field. If a player has a large home-run total, he's more likely to hit one out of the park than a singles hitter batting .213. The only missing option is a box score after each game—the only available stats are cumulative.

A nice touch is the addition of six major league stadiums, including Fenway Park, Yankee Stadium, Wrigley Field, Candlestick Park, Royals Stadium, and Toronto's brand-spanking-new SkyDome (minus the retractable roof—it never rains inside a PC). Accolade went to a lot of trouble to make each ballpark and its surroundings

look accurate. Fenway Park not only has the Green Monster in left field, but also the Citgo sign in the background. You can almost see the fans on the rooftops behind the right-field bleachers in Wrigley Field.

The stadiums not only look like the real thing, they play like them, too. Long fly balls that would be homers in other parks are easy outs when hit to Yankee Stadium's vast center field. You'll feel just like Carl Yastrzemski when you have to play a carom off the Green Monster. Your fielders need to be quick on their feet to chase down grounders racing across the artificial turf in Toronto and Kansas City. The only thing missing is the swirling wind of Wrigley and Candlestick.

In addition to the major league parks, Accolade offers the Hardball II Stadium with the deepest center field of them all.

Doctorow hints that more stadiums may be available soon on data disks, including some extinct ballparks such as Brooklyn's Ebbets Field.

The biggest addition to *Hardball II* is league play. You can still boot up and play a single game, but you also have the option to set up your own league using Accolade's or your own teams. If you want to start from



ENTERTAINMENT

scratch, you can place all players in a pool and stage a draft for all teams involved. Trading between teams is also possible. Seasons can range from 1 to 99 games, with the program tracking the standings throughout. The only drawback is that all games must be played out, including ones not involving your team.

One complaint from players of the original game was the inability to pick off runners or force them into a rundown. They also couldn't retreat back to bases while running the bases. The new version adds these features and more.

Other improvements in this one- or two-player game include pull-down menus that guide you easily through all options and the ability to save up to five games. As with most games released today, *Hardball II* has off-disk copy protection in the form of a code wheel.

One thing *Hardball II* is not short of is options. If you're a baseball purist and believe pitchers should bat for themselves, then toggle off the designated-hitter option. You can also choose whether or not to display each player's input and whether player statistics and attributes affect the game.

If you make an incredible catch in the outfield or blast a homer into the streets behind Wrigley, you can see it all again with the Instant Replay feature. The replay's VCR-type controls allow you to view the play in slow motion, or, if you really want to gloat, you can advance the replay frame by frame. You can also fast-forward through the replay, pause it, or repeat it.

When your team is on the field, you can perform all the tasks of a real manager except fining your players. Reposition your infielders and outfielders, change your batting order, and make substitutions. One problem, however: You can't pinch-hit for your pitcher with any player other than another pitcher. The only way to bring a big hitter off your bench to hit in the pitcher's spot is to perform a double switch, which forces you to remove another player from the lineup.

In league action, you don't have to set up a pitching rotation because your pitchers only get tired during games. Their strength is replenished for your next outing. Requiring pitchers to rest several days would have made league play much more interesting.

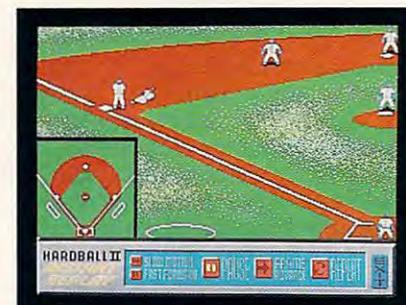
Your pitchers have access to five different pitches that can be thrown to nine spots around the plate. How well

they pitch depends on their attributes and stats. As manager, you can also warm up relievers in the bullpen and call for intentional walks.

At the plate, you can swing for the fences, take a normal cut, bunt, put the ball on the ground, or hit a sacrifice fly. You can also select which area of the strike zone to swing in.

While the stadiums are some of the most realistic around, the fans there might be disappointed if they're hoping to catch a foul ball. I have yet to see a foul ball or even a pop-up hit. Every swing has produced a ground ball, fly ball in play, or a swing and a miss. Accolade technicians say that fouls and pop-ups do exist but are very rare. Actual batters frequently foul off pitches; if that had been reflected in this game, it would have made it more realistic.

Fielding isn't as difficult as in some other baseball games. After a few games, you'll get the feel for where the ball is headed. The computer automatically selects the player closest to the ball. It's up to you to move him to the ball, catch it, and throw it to the



You can review controversial or outstanding plays with Instant Replay.

appropriate base. The keyboard controls for the game are fairly easy to use.

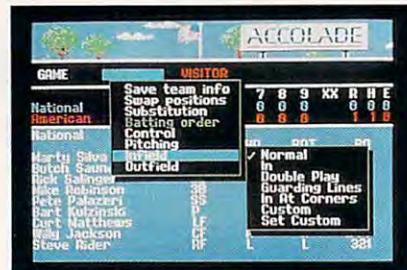
Hardball II's graphics are excellent, with large players and detailed stadiums. However, on most real baseball teams, players come in all shapes, colors, and sizes, but in *Hardball II* all the players look alike.

"We have put a lot of animation into the game," Doctorow says. "Each cell of animation takes space. If we change team colors, a player's build, race, or hair, it means more animation and more disk storage space."

The animation that is present is excellent, with players sliding head-first and making leaping catches, and left- and right-handed pitchers smoothly delivering the ball to the plate.

The game's sound leaves a lot to be desired, even with sound-board

support. The only realistic sound from an Ad Lib sound board is the organ, which plays Charge! and the national anthems (both Canadian and American). The crack of the bat sounds like a twig breaking underfoot, and the crowd may not do the wave,



Pull-down menus make it easy to choose options and manage your team.

but their cheering sounds like one crashing on shore. The only other notable sound is the music that introduces the game. Both sound and music can be toggled on and off.

Accolade's explanation for not fully exploiting sound boards and not supporting VGA graphics is that there's a low percentage of computer sports gamers who have such equipment. Doctorow says that most of the games currently in development at Accolade will support VGA.

Although *Hardball II* does not have all the features of other baseball simulations, it does have the best mix of arcade action and simulation currently available.

"We believe when you are playing a sports game, the major concern is playability," Doctorow says. "We spend a tremendous amount of time to make sure the playability is the best it can be."

If the action between the white lines is what's important to you, then *Hardball II* can provide you with everything but dirt on your uniform. If you also desire to be in control of a team, then Accolade can make a small-time Steinbrenner out of you as well. This is one baseball game that's headed for The Show.

Hardball II

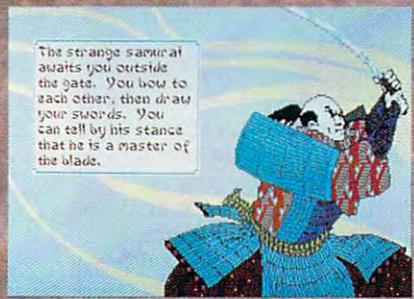
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After class, Sam Bushnell will duel with a Ninja, defend his honor, become Shogun and rule feudal Japan.

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The action is fast and furious as you take on multiple warriors in darkened castles and remote villages. You'll also defend your honor one-on-one, using authentic Samurai swordplay against skilled opponents.

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- Tell the daimyo your samurai are eager for battle.
- Visit someone.
- Leave.
- Wait till night, then quietly leave your room.

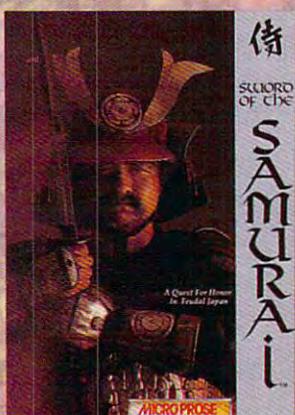


system of menus and text windows will guide you in travel and bring each adventure to life. There's even a detailed political map to show you different provinces, each ruled by its own warlord.

All with authentic Japanese graphics and music, the smoothest animation, as well as the quick thinking and heart-racing action you've come to expect from MicroProse.

Remember, in *Sword of the Samurai*, there's more than your life at stake. There's your honor. So draw your sword and sharpen your wits!

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GAMEPLAY

ORSON SCOTT CARD

Some software publishers are playing their own little games—and they aren't plugged into a Game Boy, either. One publisher recently held a telephone press conference to announce a new line of fantasy role-playing games. The company's advance work was pretty intense: a videotape with a few screen shots (which looked good), and a lot of really tacky "mood" stuff that was only a little bit worse than those hokey Time-Life ads for its *Mysteries of the Unknown* series.

The videotape seemed to be promoting fantasy role-playing games *in general*, kind of like the "drink milk" and "eat beef" campaigns. There was almost nothing explaining why this company's games were particularly good or new.

It's as if we were all supposed to slap our foreheads and say, "Fantasy role-playing games *on the computer!* What a great idea!"

My speculation is that such head-slapping is exactly what happened at corporate headquarters. "Look at those Sierra people and the guys at Lord British, raking in all that dough. Why aren't *we* getting any of that?"

After viewing the video, I knew I had to call the company's phone-in show. I figured that anybody who would spend so much money producing something so embarrassingly bad had to be either phenomenally dumb, in which case the conference would be funny, or phenomenally arrogant, in which case it would be fun to write about it.

Naturally, the company wasn't paying for the call, which I suppose was all right for the guys on a magazine expense account, but I was spending my own dimes for the privilege of waiting on hold for a half-hour. High-tech delays are like airports—you sit around a long time waiting for the chance to move really fast.

Before the audience got to the question-asking part, we listened to a

presentation from the developers that was hilariously self-revealing about the way they think. They didn't start out telling us about the game. Instead they told us about how they were going to kill the competition. Most of their time was spent presenting information about how popular role-playing games are and therefore why it's a sound business decision to publish them.

Think about this: They were talking to people who write about computer games for a living, and they're announcing to *us* that it's a good idea to produce computer versions of fantasy role-playing games!

In fact, what we were hearing was not a presentation on why their games were great or how they differed from

whole human/computer interface, and thus had produced games that captured the spirit of role-playing games instead of imitating the tedious details. I waited for a whole hour.

Predictably enough, all—both?—of the company's innovations were in the techno-nerd area, the stuff that comes out when programmers say, "Hey, look what *I* can do!" Features such as alternating day and night have nothing to do with what makes a game great; they only have to do with what makes a game slick.

One of the reporters was an editor for a role-playing-game magazine—not a computer person at all. She pointed out that most of the fun in real-life role-playing games was the give-and-take. Players in a live game come up with completely off-the-wall, wonderful, creative ideas, and the live game master has to respond to them and improvise his brains out. Can your game deal with that sort of thing, she asked?

Actually, no, said the spokesman. There's no room for improvisation. Not only are we doing the same old thing, he seemed to be saying, but that's all that *anybody* can do.

I think he's wrong. I think an open-ended story game is possible. But that would be a real revolution in computer gaming. And we'll never get that from people whose idea of how to announce a new game is to tell us that their company is so big and cool that just by entering a category they'll dominate it.

By the way, even a bad review is a good review—name recognition is everything. That's why in this column I have carefully avoided mentioning either the company or the games themselves by name. I wouldn't want to be responsible for y'all standing there in Babbage's, scratching your head, saying, "I heard about this game. Can't remember what was said, but I know I've heard of it. I'll give it a try." It'll be easy enough to figure out which games I'm talking about—but only if you remember what I've actually said. My conscience is clear. □

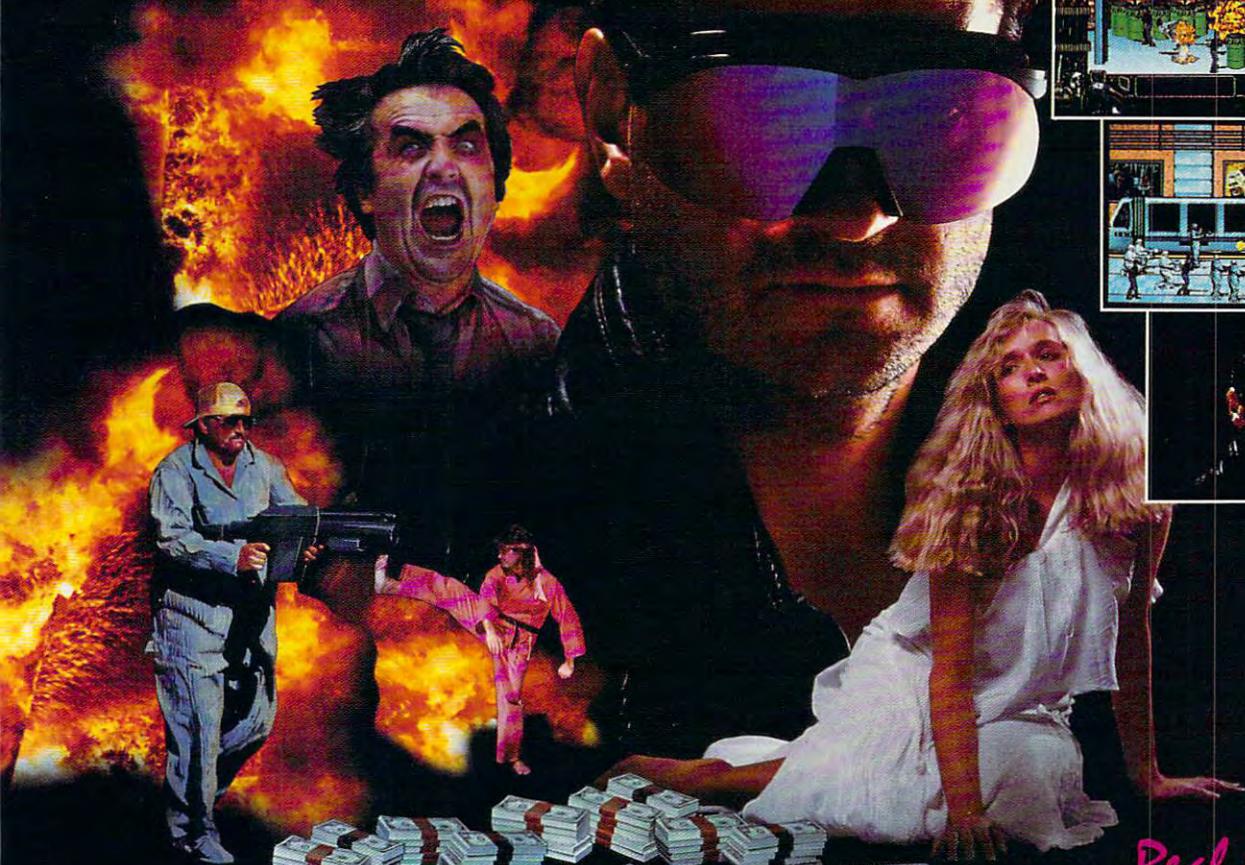
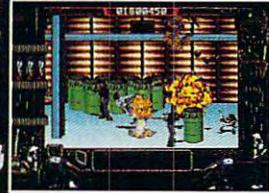
ROLE-PLAYING GAMES DON'T NEED THIS

the other games in the category—they mentioned the company's games almost as an afterthought. It seemed that what we were hearing was the presentation to persuade the company's brass to invest in this project.

I kept waiting to hear that, because the company was coming late to this genre, it had used its outside perspective to completely rethink the

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GAMES BY WIRE



MODEM PLAY AND ONLINE ENTERTAINMENT SPARK NEW FIRE FOR PC GAMERS

MICKEY McLEAN

A

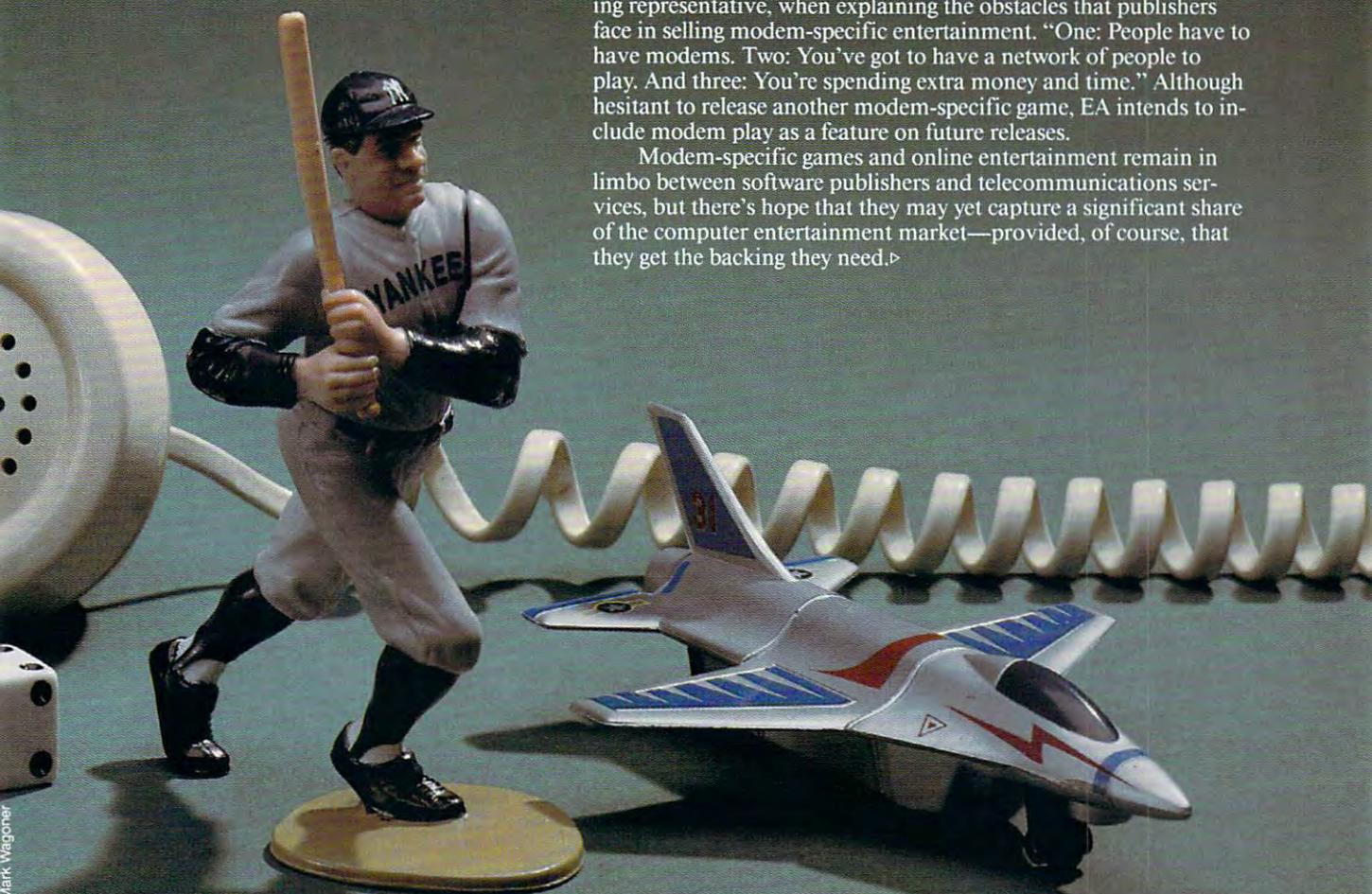
fter failing to ignite the market in the early days of computing, modem games are finally catching fire. It's a small fire at the moment, but it's growing.

The first game designed specifically for modems, *Dan Bunten's Modem Wars*, matches two opponents, either human or computer, in a strategic game of phone-line war between either a Commodore 64 or an IBM PC or compatible. Although Electronic Arts released and marketed the game, designer Bunten said it has been difficult to convince publishers of the value of modem play.

"So far it has been a real struggle," says Bunten, currently at work on a modem game for MicroProse, tentatively titled *War Room*. "Publishers are used to distributing just disks, manuals, and boxes."

"We had three hurdles," says David Dempsey, an EA marketing representative, when explaining the obstacles that publishers face in selling modem-specific entertainment. "One: People have to have modems. Two: You've got to have a network of people to play. And three: You're spending extra money and time." Although hesitant to release another modem-specific game, EA intends to include modem play as a feature on future releases.

Modem-specific games and online entertainment remain in limbo between software publishers and telecommunications services, but there's hope that they may yet capture a significant share of the computer entertainment market—provided, of course, that they get the backing they need. ▶



GAMES BY WIRE



When you play chess on USA TODAY Sports Center's board, your opponent can be around the corner or in another state.

Bunten says that although the software publishers have the ability to produce topnotch products, they are unfamiliar with the market environment modem play offers. The market needs support from publishers and/or online services to reach its potential.

"It's ongoing involvement," he says. "Publishers sell their software only once. It's not a longtime sustaining service, and networks offer that possibility. But, someone is going to have to start from scratch, bite the bullet, and do a world-class product."

"I personally believe there is no way this won't succeed," he says. "There is a critical mass of modems out there and a voting populace that's saying, 'We want these types of products.'"

The success of modem games will depend on who steps forward to claim the market. Online services should be commended for providing games, but so far those games lack quality graphics. According to Bunten, services have been buying mostly public domain programs and don't want to spend a lot of money for top-quality games.

Early Efforts

Other notable attempts at establishing new frontiers in telecommunications entertainment include Lucasfilm Games and Quantum Computer Services' *Habitat*, which was a complete online multiplayer environment. It was beta-tested on QuantumLink in 1987 and 1988 and has since evolved into Club Caribe, a simulated vacation resort on Q-Link for Commodore 64 and 128 users. Subscribers create an animated character and interact with others online at the Club's bar, game rooms, and beach.

In 1987, MicroIllusions began marketing its One-to-One line of software products. The games have options that let you play against the computer, against another opponent in the same room, or against an opponent connected by modem. Games include *Turbo*, a racing shoot 'em up; *Fire Power*, an arcade-style tank battle; and *Galactic Invasion*, a space war between galaxies.

Standard Feature

MicroIllusions is not the only company offering modem competition. Spectrum HoloByte offers flying over phone lines for its *Falcon* flight simulator.

The sports world has not been forgotten, either, when it comes to modem play. MicroSearch's *Professional Football Simulation* is set up so that two Amiga users on separate machines can play head-to-head—they can even chat.

If you're into power playing, good and evil gods can battle it out from their own domain with *Populous* from Electronic Arts, which is available for the Amiga, Atari ST, and now IBM PCs and compatibles.

Origin's futuristic tank design and battle game *Omega* allows tank designs to be transferred by modem, even through Origin's own Origin Line Bulletin Board.

MicroProse's *War Room* can be played as a stand-alone game or against another opponent via modem. The game will include the ability to converse, joke, or insult your opponent by typing in a message. Initially the game will be available for the IBM PC and compatibles and will later be released for the Amiga and the Atari ST.

Wanted: Falcon Flyer

To make it easier for you to find opponents to play modem games, bulletin board services have begun to offer special interest groups for many of the games mentioned above. Besides lists of potential opponents, these groups can provide many useful hints and tips.

CompuServe, an online service, offers the Challenge Board for modem-to-modem players. There is a separate Challenge Board for each specific modem-to-modem game. If you are a *Falcon* player, for example, you can search the Board's database for a potential opponent within your local calling area. You can also add your name to the register so that other players can invite you to play.

Caller at 12 o'Clock High

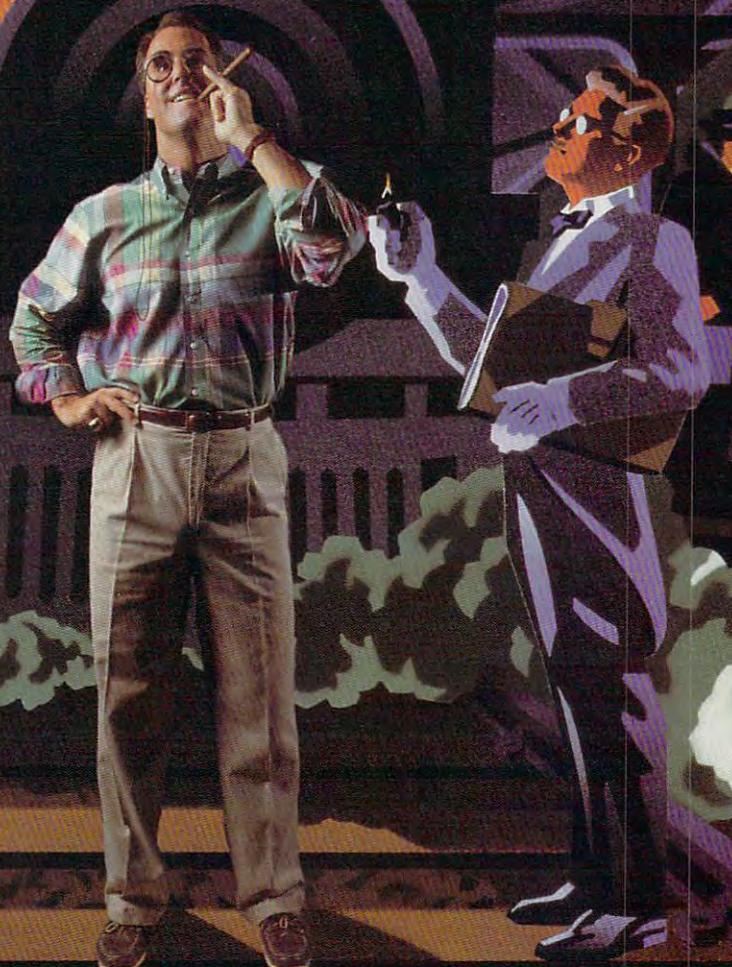
Online services aren't restricted to maintaining bulletin boards for modem game players. The most talked about online game is GEnie's *Air Warrior*, which GEnie subscribers can play on Amiga, Macintosh, or Atari ST computers. A PC version of the game requiring CGA or EGA is in beta test on the network.

The game places you in the cockpit of either a World War I- or II-vintage plane. Download the game's software and manual to your PC at no charge (other than the standard online time charges). Practice your maneuvering and gunning offline, saving connect charges. Then, log on and do battle with other subscribers. You fly as part of one of three teams in the battle. The goal is to shoot down as many enemy planes as possible before they get to you.

Not only do you get to shoot at your computer colleagues from around the country with *Air Warrior*, you can also chat with them via your plane's "radio." GEnie is also in the process of adding ground support vehicles and planes

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GAMES BY WIRE



Fly against top aces from across the nation in GEnie's *Air Warrior*.

such as bombers that allow more than one person to man the controls.

"We have up to 40+ people playing at a peak time," says Neil Harris of GEnie, which had over 177,000 subscribers in the U.S., Canada, and Japan by the end of last November and which has been adding between 4000 and 5000 subscribers a month since then.

"In the last year, [online entertainment] has been the single biggest growth area on the service," says Harris. "We measure success by online time, and fantasy and simulations have been the most popular areas. We have big plans for next year." GEnie will double its number of multiplayer titles and will no longer offer single-player games.

Harris is convinced that multiplayer games are better played on services such as GEnie rather than as stand-alones. "Multiplayer games work better online," he says. "You save time playing online compared to stand-alones. *Colonial Conquest* was a good six-player (stand-alone) game, but it takes a long time to play."

In addition to *Air Warrior*, GEnie currently offers several other multiplayer games, some with graphics and others that are text-based.

CompuServe, Prodigy, and the USA TODAY Sports Center also offer online games. Two of CompuServe's most popular games are the space battles *Mega Wars I* and *Mega Wars III*. Its newest multiplayer game is *Sniper!*, which is based on TSR's fantasy game of the same name.

Currently on Prodigy, you can play Brøderbund's *Carmen Sandiego*, a Dungeons & Dragons-style maze game called *Mad Maze*, and *CEO*, a business simulation.

The USA TODAY Sports Center offers board and card games such as go, reversi, poker, blackjack, and chess. In the chess section of the service, you can challenge some of the game's grand masters or monitor them in action against each other or against Carnegie Mellon University's super chess-playing computer, Deep Thought.

Online Performance

One advantage of playing on an online service is

that people using different computer platforms can play one another. But does the type of hardware you possess affect how well games such as *Air Warrior* perform?

"The horsepower of your computer determines how many frames per second you see on the screen," GEnie's Harris says. "With the Amiga, the game can look just like a movie."

As for sound, games such as *Air Warrior* do not currently support IBM PC-compatible sound boards, but digitized sound effects can be downloaded if you're playing on an Amiga, an Atari ST, or a Macintosh.

Air Warrior has been optimized for 1200-baud modems. There is no noticeable improvement playing the game with a 2400-baud modem. And GEnie has apparently solved the line-noise problems that plagued earlier online games. "We're generally not seeing any line noise," Harris says. "We have also seen no difference in phone-line carriers."

Shooting Holes in Your Wallet

Despite their many advantages, online games can cost big money. Some Air Warriors have been known to run up bills totaling close to \$1,000 a month. Unless you have money to burn, you will either need to control your addiction to the game or try a service that charges a flat monthly rate or that allows you to play offline.

Genie, which charges your account to a credit card, currently bills you by the minute, but it's looking at ways to help some of its subscribers control their online budget. "We may one day offer a flat fee," Harris says, "but not with our games' portion of the service."

If you are worried about keeping your children from running up astronomical VISA bills while trying to become the next flying ace, you can't lock them off from the service. Parents can control the online bill, however, by not giving their children the password. That way, kids can play only when a parent logs on for them. Setting a timer would be a good idea as well; it's hard to keep your eye on the clock when your enemy is flying up your tailpipe.

Prodigy, one of the newest online services, charges a flat monthly fee of \$9.95 and has local calling access in many major cities around the country. It offers services such as news, banking, and airline reservations in addition to graphically based games. Although the company says it will be adding some entertainment sections to its network, it's unwilling to elaborate.

Another new kid on the telecommunications block, and one who's trying to keep a lid on prices, is the Computer Sports Network, which specializes in sports games that you play offline. For IBM PCs and compatibles, CSN offers *Tournament Golf*, which requires Accolade's *Mean 18* golf simulation. To play in a tournament, you must download the weekly course and play each round offline. Once you've holed out on 18, you upload the results. Tom Brown, marketing director of CSN, says that if a player competes in all four tournaments held in any month, the month-

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GAMES BY WIRE

ly bill shouldn't exceed \$20.

CSN's latest project is *General Manager Baseball*, which incorporates Random House's *APBA Major League Players Baseball*. Like *Tournament Golf*, the actual gameplay takes place offline, but because of the length of the season (a full 162 games), it will cost more to play. To help keep your costs down, CSN has put a ceiling on its online charges. Your time downloading necessary game and opponent team files will be billed at a maximum of \$40 a month.

CSN hopes to add a football game in time for the 1990 season and to improve its existing lineup. The company is currently negotiating with Accolade for upgrades to *Mean 18*.

Game Machines, Too

Online services and personal computers haven't cornered the market for modem play. Manufacturers of dedicated game machines like the Nintendo Entertainment System (NES) and Sega's Genesis also plan to enter the marketplace.

The Japanese version of Nintendo, called Famicom, already has modem capability. In the United States, Nintendo of America is laying the groundwork for an NES network. The Nintendo Control Deck will act as the CPU, while a modem and proprietary software will provide access to services such as stock purchasing and trading, home banking, and multiplayer entertainment for players from around the country.

More than 20 million U.S. households own an NES, according to Nintendo. This year, the company hopes to give all those customers access to the NES Network.

Nintendo has also approached GENie about the possibility of NES owners logging on to their online service, with less-than-positive results.

"They have taken a good hard look and are now pessimistic about going online," says GENie's Harris. "I don't think it will happen anytime soon."

One problem NES owners face is trying to compete with PC users at games such as *Air Warrior*. "You've got to have the horsepower to play well, and the Nintendo doesn't have it," Harris says.

Sega's planned TeleGenesis network allows players to compete against one another on their Genesis game machines, which will be linked by a specially designed TeleGenesis modem. The first game to be supported by the telecommunications system is *TeleGenesis Baseball*, which offers different perspectives of the baseball diamond for each player.

Calling into the Future

What is but a spark now may yet burst into a brush fire, but it remains to be seen if modem play can grab the attention of computer gamers and, from there, a large share of the computer entertainment market.

"People three years ago didn't know what a modem could do," says Robert Gehorsam, manager of editorial product development for Prodigy. "[The modem game market] should go through extreme rapid growth in the next few years, like software did in the early eighties. I predict double-digit growth in the next five years."

Whether or not other online services or software developers agree, one fact seems certain. The lure of multiplayer, simultaneous action among computer fans may be enough to fan the small spark of current modem games into a full-scale brush fire, one that would change the face of computer entertainment. "Once you have had the experience of playing online," says Harris, "you don't want to play stand-alone games again." □

Mickey McLean is an editorial assistant at COMPUTE! Publications and a charter member of the USA TODAY Sports Center online sports/entertainment network.

GET IN TOUCH

For more information about the products and services mentioned in this article, contact the companies listed here.

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(800) 848-8199
(617) 457-0802

Computer Sports Network

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Houston, TX 77042
(800) 727-4636

Electronic Arts

1820 Gateway Dr.
San Mateo, CA 94404
(415) 571-7171

GENie

General Electric Information Services
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Rockville, MD 20850
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(818) 360-3715

MicroProse

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(301) 771-1151

MicroSearch

9896 Southwest Frwy.
Houston, TX 77074
(713) 988-2818

Nintendo of America

4820 150th Ave. NE
Redmond, WA 98052-5111
(206) 882-2040

Origin

136-B Harvey Rd.
Londonderry, NH 03053
(603) 644-3360

Prodigy Services

445 Hamilton Ave.
White Plains, NY 10601
(800) 822-6922, ext. 591

QuantumLink

8620 Westwood Center Dr.
Vienna, VA 22180
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(703) 883-0788

Sega of America

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S. San Francisco, CA 94080
(415) 742-9300

Spectrum HoloByte

2061 Challenger Dr.
Alameda, CA 94501
(415) 522-3584

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Bldg. 9 Terrace Way
Greensboro, NC 27403
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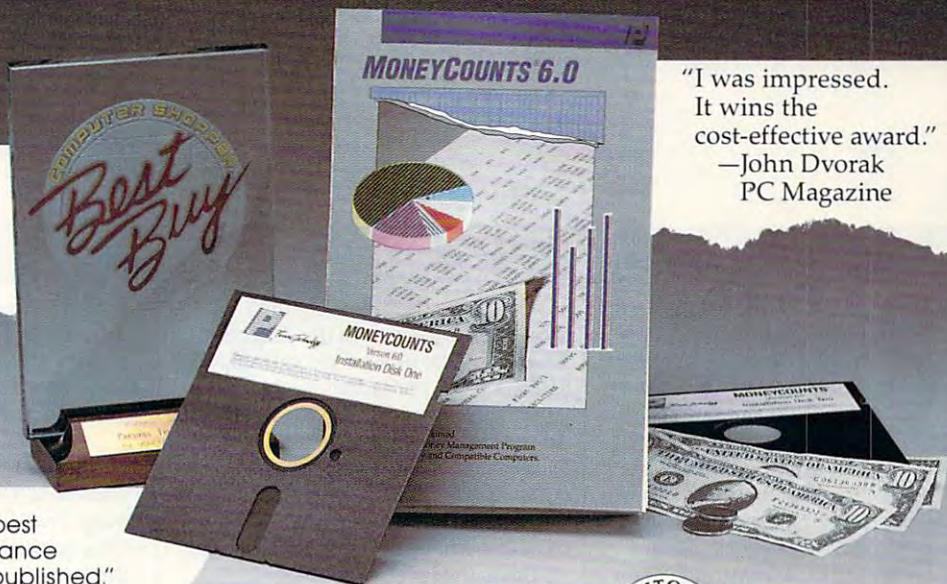
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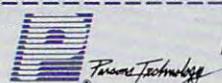
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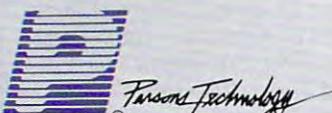
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GAMESCOPE

HINTS AND TIPS FROM OUR READERS

Here's a hint for *Battletech: The Crescent Hawk's Inception* on how to get the chameleon mech to escape from the Jenners and keep it for the rest of the game.

When you face the Jenners, run north along the west electric barrier until it's destroyed. Then immediately leave the training area and head for the northwest exit. Make sure that you've previously mapped out a path that will lead you there and that your mech will fit through.

Once you're out of the city, you can flee from the Jenners (the flee option won't work while you're in the city). Save your game before trying this—you may not make it the first time, but with a little practice, it'll work.

Also, it's not vital that you win all the training missions. Even if you lose, it still raises your abilities; so lose a lot, especially when you're only fighting one or two mechs, to improve your skills.

When you get to the sixth mission, you should save the game before training. Jenners may appear, but if you reload and try again, they may not be there. By doing this, you may prolong your training time and allow enough practice to get your skills to a rating of excellent (the best I was able to achieve was a good rating in gunnery and an excellent rating in piloting).

You don't need to train for any weapons except rifles. Don't bother with inferior weapons. Use the short-range missile pack.

*Lin Tzeng
San Francisco, CA*

Konquering Karnov

On level 1 of Data East's *Karnov*, I found a secret warp to the end of the level. Go to the first ladder and retrieve it, but don't walk any farther. Go back to the dragon at the very beginning. When you walk past the dragon, you should be behind it. Go as far

as you can to the left. Now turn around and go back to the dragon. You should be able to see your player again. Place your ladder so that it appears in front of the dragon's eye. Go up to the top of the ladder and jump as far as you can to the left. When you come down, the screens should change. Go back to the left and the end boss will appear. Defeat him and you pass the level.

You can warp like that on almost all of the levels. All you have to do is defeat the end boss. (You may have to try this trick a few times.) If you don't warp, there are other hidden items. On the first level, go and defeat the first boulder thrower. Stand where he

BATTLE BASICS, DRIVING FUN AND DR. DOOM DILEMMAS

was standing and use your ladder to get an orb to double your firepower.

*Scott Balay
Denver, CO*

Mech Mania

If you're getting blasted by baddies in Activision's *Mechwarrior* and you need a moment to cool down before you can fire back, hit your jump jets. Jumping into the air will get you out of the line of fire and make you a difficult target to hit.

Don't be afraid to take on Medium mechs at the start of the game. You're smarter and faster than they are, and you'll make more money

fighting against them. Avoid the Heavies until you have a Medium mech of your own, though.

*Bubba Hargis
Hattiesburg, MS*

Track Tips

Here are some hints for Accolade's *Grand Prix Circuit* racing simulation:

- Choose the McLaren race car—it's the fastest.
- Don't try to pass too often in the first lap. Wait until the cars are spread out, then pass them one-by-one.
- Keep away from car number 5, Tse Sakamoto. This driver will crash into you on purpose if you get too close.
- Watch your oil pressure and fuel closely when racing more than three laps.
- Brake as you come into a curve, and accelerate as you come out of it.

*Sunil Patel
Clinton, OK*

Defeating Doom

Here are a few techniques to help you win Paragon Software's *Dr. Doom's Revenge*. When you're playing Captain America as he fights the robot gorilla, always keep your distance.

Throw your shield at it as many times as you can until it gets too close to you. When the gorilla is too close to throw the shield, jump past it, run to the other side, and keep throwing your shield at the gorilla until you defeat it.

For Baltroc, the next enemy you'll encounter, you need to take the opposite approach. Get as close to him as you can. When you throw punches at him, your shield should block Baltroc's kicks. Keep punching and you should defeat him easily.

*Scott Balay
Denver, CO*

If you have game tips and shortcuts of your own, we'd like to hear from you. Send your tip, no matter how brief, to COMPUTE! Feedback—GameScope, P.O. Box 5406, Greensboro, North Carolina 27403. If we publish your suggestion, we'll send you a gift.



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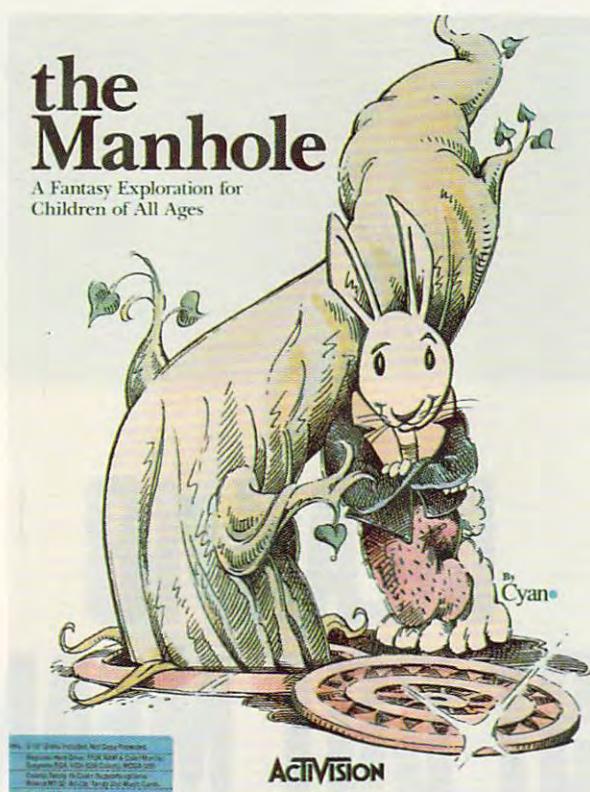
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HEIDI E. H. AYCOCK

How did I get into this teacup? Wasn't I just in that underground canal? That rabbit looks familiar. He's the one who offered me a cup of tea when I entered the fire hydrant. Am I boating through my own cup of tea? What kind of adventure is this?

It's *the Manhole*, an interactive story, a nonlinear tale. You can move through it in any direction, retracing your steps to your favorite places, trying out new pathways. Maybe it sounds like entertainment to you.

It sounded like entertainment to Activision. When the company released *the Manhole*, it didn't expect



anyone to classify the program as an educational package. The designers intended to sweep the entertainment market. Imagine their surprise when they discovered that kids might learn from their game.

They found that teachers let their students write stories about their adventures with the game; kids learned to use computers in a friendly setting; and parents sat with their children, following the free-form threads that weave through *the Manhole*.

The story passes through fire hydrants, castles, tunnels, and sunken ships. As you travel, you meet a hospitable rabbit, a sleepy walrus (who's plagued by too many visitors), a French tortoise, and a hip dragon. Each time you think you've found everything that talks, wiggles, or sparkles, you click on a new item and something else happens.

You could call *the Manhole* entertaining, but it works quite well at teaching, too. It works best at developing exploration and experimentation skills, something that's very important for young children.

Getting from place to place is easy. You just use your mouse to click on a door, and it opens for you. You click on the fire hydrant, and suddenly you're standing in front of it. In spite of the simple design, however, there are some problems. Sometimes you can't tell which objects are just for decoration and which are functional. You click on a torch, for example, and nothing happens. In the Macintosh version, which came out a year earlier, you could use the HyperCard trick of showing buttons, but the PC ver-

G

sion doesn't give you any hints. You've got to watch the hard disk indicator light to see if your click will have any effect.

What the PC version adds is color graphics. The pictures are two-dimensional, resembling storybook illustrations. The characters have wonderful personalities that are represented in the way they move, in their facial expressions, and in their demeanor. Of course, the VGA version of *the Manhole* is best graphically. The colors are vivid, and they'll catch any youngster's eye. It looks as though the programmers worked in VGA and then developed the EGA version as an afterthought. If you're using EGA, you won't be too disappointed, although the designers made some poor color palette choices. Some of the color combinations are dull, using browns and oranges in the dark areas, but the graphics are still delightful in spite of the limited palette.



Click on a special hole in the ship's deck and a group of colorful fish swim by you.



Mark Waggoner

As you journey, notice the animation. It's simple, card-flipping animation. You won't be impressed by the smoothness of the movement or the subtleties of the lighting. You will, however, feel as if you're taking part in an automated storybook. While this style of animation may have been partly dictated by the limitations of the development environment (memory, chip speed, hardware capabilities), it also adds a quaintness to the program that separates *the Manhole* from television cartoons and arcade games.

When the program opens, you start at a manhole cover that's barely holding back a beanstalk. The leaves move a little, tempting you to click on the manhole cover. There's a fire hydrant in the background; a few drips of water splashing to the ground call out for your mouse click. Move to the hydrant with your mouse; then click

and watch a spray of water shoot across the screen. Click on the beanstalk and watch it shoot into the sky. Now, you have three choices: up the beanstalk into the mysterious blue sky, over to the hydrant where you'll find a door, or down the manhole to the blue water below.

Already, you can see the beauty of this game. You have many choices, and most of them beckon you. If you don't have enough natural curiosity or if you can't pick out the choices very well, the game helps you along by drawing you graphically to the different options. At the same time, Activision doesn't force a choice like a cheap magician forces a card. Each direction is as enticing as the next because no direction is right or wrong.

Climb down the beanstalk to the small island where the tortoise lives. He speaks to you in French, and a small yellow fish leaps out of the water to translate. The digitized sound



LEARNING

effects aren't very good when played through the standard PC speaker. But the game does support the Tandy TL/SL sound chip and Creative Labs' Sound Blaster card, two of the few digital sound devices available for the PC. Support for the Ad Lib card and Roland sound device is also provided. If you don't use these configurations, you'll be disappointed with the quality of the voices. They're too fuzzy, so you can't understand what a character says. That's not a serious problem if you can read, but for a preschooler, the speech balloons simply aren't enough. Parents will have to read aloud what each character says. Future updates may support more digital sound systems.

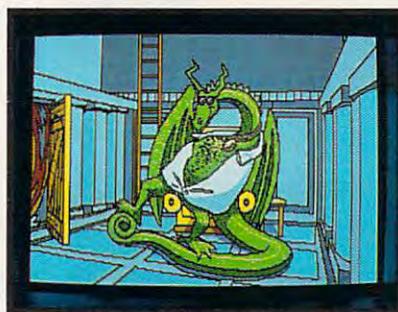
Meanwhile, back on the island, you may have grown restless. Jump in the water and watch the bubbles rise around you in shades of purple and blue. Below the surface, you find a sunken ship. You can head straight for the deck or make a pit stop in the crow's nest, where you can dance with the seahorses living there. In the ship, you'll find rooms full of more to explore—a rolltop desk houses a school of fish and an orchestra of animated musical instruments. A picture of a ship sinks when you click on it.

From the ship, you can take an elevator to the Hub of All Paths. Standing in the hallway, you can try one of four tunnels or climb up to the ceiling. More characters wait everywhere; they talk, offer you food and drink, and dance. They lead you to new corridors and to old friends. Don't think of *the Manhole* as a maze game in which you look for a way out or a fantasy game in which you score points or pick up treasures. There's no conclusive goal, nothing you're looking for as you follow the corridors and climb the ladders. Just learn to explore for the sake of satisfying your curiosity. That's how you win.

Behind all the wanderings and meanderings is an important educational element: Experimentation is encouraged at the same time as predictability is preserved.

Experimentation and predictability teach children how to learn. They try something, see how it works, and then try to reproduce that action. In *the Manhole*, everything is predictable. The trick is to experiment with everything so you can find how to activate each event. Some are simple. For example, every time you click on a certain part of the sunken ship's deck, a school of colorful fish swim by. Some cause-and-effect relation-

ships are more complicated. For example, you can visit the dragon's lair via several different routes. Sometimes the dragon is there and sometimes it's not. You eventually realize that when you travel through the tunnel to the front door of the dragon's cave he will be there, but if you climb down the ladder through the ceiling, he won't. Then, one day, you climb down the ladder and he's there. Unpredictable, you think. Finally, you realize that you can summon the dragon



Can you figure out how to summon the very cool dragon to his very hot pad?

from a special place outside the castle's tower. It doesn't matter what route you take, the dragon will always be home if you've summoned him.

Another good, educational aspect of *the Manhole* is how it exposes players to new ideas. The French-speaking tortoise won't teach any four-year-old



An elephant guides you through the twisted water tunnels in *the Manhole*.

child to speak a foreign language, but he might create an interest in other countries. In the rabbit's bookshelf, you find a set of books. They represent some of the best in children's literature—titles like *The Lion, the Witch, and the Wardrobe*, by C. S. Lewis; *Alice in Wonderland*, by Lewis Carroll; and *Winnie-the-Pooh*, by A. A. Milne. As you click on each book, the program gives you a short synopsis of the story. There's also a tome called *Philosophies of Intercultural Development*; if you click on that one,

the program tells you that this book is about nothing at all. In keeping with the theme of pathways leading through unusual places, you can go through the wardrobe in the Lewis book and find yourself near the castle where the dragon lives.

As good an educational program as *the Manhole* is, it's very demanding in terms of hardware—you must have a hard drive. More and more home computer packages require hard drives, but it's still a big investment. Activision couldn't have produced *the Manhole* without the benefit of mass storage because of the graphics, sound, and open-endedness. If you don't already have a hard disk, this program might justify buying one.

Besides a hard disk, you'll need a microprocessor with some zip. On an 8-MHz AT, the game is too slow. It plods along, seemingly ignorant of mouse clicks. You learn patience along with all the other lessons *the Manhole* teaches.

The most promising aspect of *the Manhole* is what it suggests the future of interactive computing will look like. As home computers become more powerful, we'll see more detail in these adventures. For every fish that talked when you clicked on it, there were two objects that did nothing. Perhaps future generations of interactive games will go much farther, allowing us to move in even more directions. Maybe we'll find surprises under the stairs and new friends when we climb the straw in the rabbit's cup of tea. Several events may take place at once, and the graphics will be more spectacular.

Activision has designed a wonderful little adventure through a fantasy world. It's simple enough for preschoolers, and it reinforces their exploratory learning styles. It's also fun for adults, complex and intricate enough to hold their attention. Most important, it is the beginning of a new era of home education and entertainment.

Although *the Manhole* is a closed set of events, it seems as though the possibilities are endless.

the Manhole

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LEARNING

DISCOVERIES

DAVID STANTON

Setting computers apart from other electronic products is their versatility. Businessmen can do bookkeeping on them. Teachers can use them to write lesson plans and maintain grades. Students can use them to access extensive databases. Anyone who needs a little relaxation can always play a computer game. Musicians can hook them to MIDI-compatible keyboards to compose and play songs.

One of the most exciting aspects of working with computers, though, is tinkering—tinkering with new software, tinkering with DOS, tinkering with the Macintosh's System Folder, tinkering with add-on cards, and exploring capabilities built into computers but often overlooked. How many things can we hook to a personal computer? What kinds of tricks can we perform with such connections? What can be done with what we already have, and what new gizmos can we concoct to do even more? No matter how many uses computer fans have found, more possibilities await.

Of course, unbridled experimentation with hardware involves a certain element of risk. No one wants to trash an expensive motherboard. And there will always be those who question the wisdom and purpose of exploring the outer limits of a computer's capabilities. Practical considerations must ultimately prevail at school, too. Neither students nor their teachers have time to fritter away on seemingly pointless fiddling.

Still, some of the best ideas evolve from seemingly frivolous tinkering. In that spirit, let's consider some not necessarily new but sometimes overlooked things you could try with your computer if you had any reason or desire to do so. This time, we'll focus on sound.

Check to see if your machine has a headphone or an audio output jack. Apple IIgs's, Macintosh Pluses, most Tandy 1000s, and some other ma-

chines do. If yours doesn't but your computer does have an internal speaker, it's possible (even relatively easy) to install one. The process involves opening the computer, modifying the wiring to its speaker, installing a jack, and in many cases drilling an extra hole in the computer's case. While this is no job for a novice, any electronics technician or hobbyist should be able to do it quickly and inexpensively.

Why bother? To start with the obvious, headphones can spare your family the audio annoyances that enhance computer games and educational software but have a way of driving innocent bystanders crazy. Some headphones may plug in directly. Others may require a plug converter between the connecting cord and computer jack.

MORE SOUND FOR A SONG

Your reward for figuring it all out? Less noise. At home, this is a great convenience. In school computer labs, it's a necessity. Of course, you didn't need me to tell you that, but you may not realize that a headphone jack can do more than just quiet things down around your house. It can make things louder!

Consider that your computer's sound chip probably produces much better sound than its puny internal speaker can handle. Hook up a good set of headphones, and you'll hear higher highs, lower lows, and greater volume. Even as I write, Music Stu-

dio's *Jukebox* is blasting away in my ears, demonstrating the real power of the Apple IIgs Ensoniq sound chip. Apple IIgs owners who ignore its headphone jack have never really experienced IIgs sound!

My favorite Macintosh audio experience comes free on Buick's advertising disk. It's just a short digitized musical phrase (*The great American road...*), but it clearly demonstrates the sometimes overlooked musical power of a Mac. And Tandy 1000 owners don't need an add-on board to experience the concert-quality soundtrack of Sierra's *King's Quest IV*. Tandy's three-voice sound chip and a decent set of standard headphones perform quite nicely.

Anyone with an MS-DOS computer and an 8- to 11-year-old child has a perfect excuse to buy The Learning Company's impressive new reading program, *Super Solvers Midnight Rescue*. Its arcade-game approach will motivate even the most reluctant reader. The program is destined to receive several software awards. But the real point here is that it contains some very catchy tunes that sound very impressive through headphones.

Still not convinced? OK, forget the headphones. You could use that audio jack to direct computer output to speaker/amps or to a full-size stereo or monaural amplifier. Doing so might require a specially designed cable, but making one isn't too difficult. Ten dollars, a little thought, and some elementary cable construction should get everything going. You could play *SimCity* loud enough to alarm your whole neighborhood.

And there's more. We frittered away one lazy winter afternoon running cables from computers to tape decks, to VCRs, and through VCRs to a television set just to see where we could send computer sound and what would happen when we did. Everything worked exactly as expected. Nothing at our house smoked or showed any other signs of discontent. The personal computer is made for some sound possibilities. □

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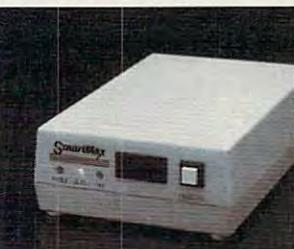
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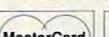
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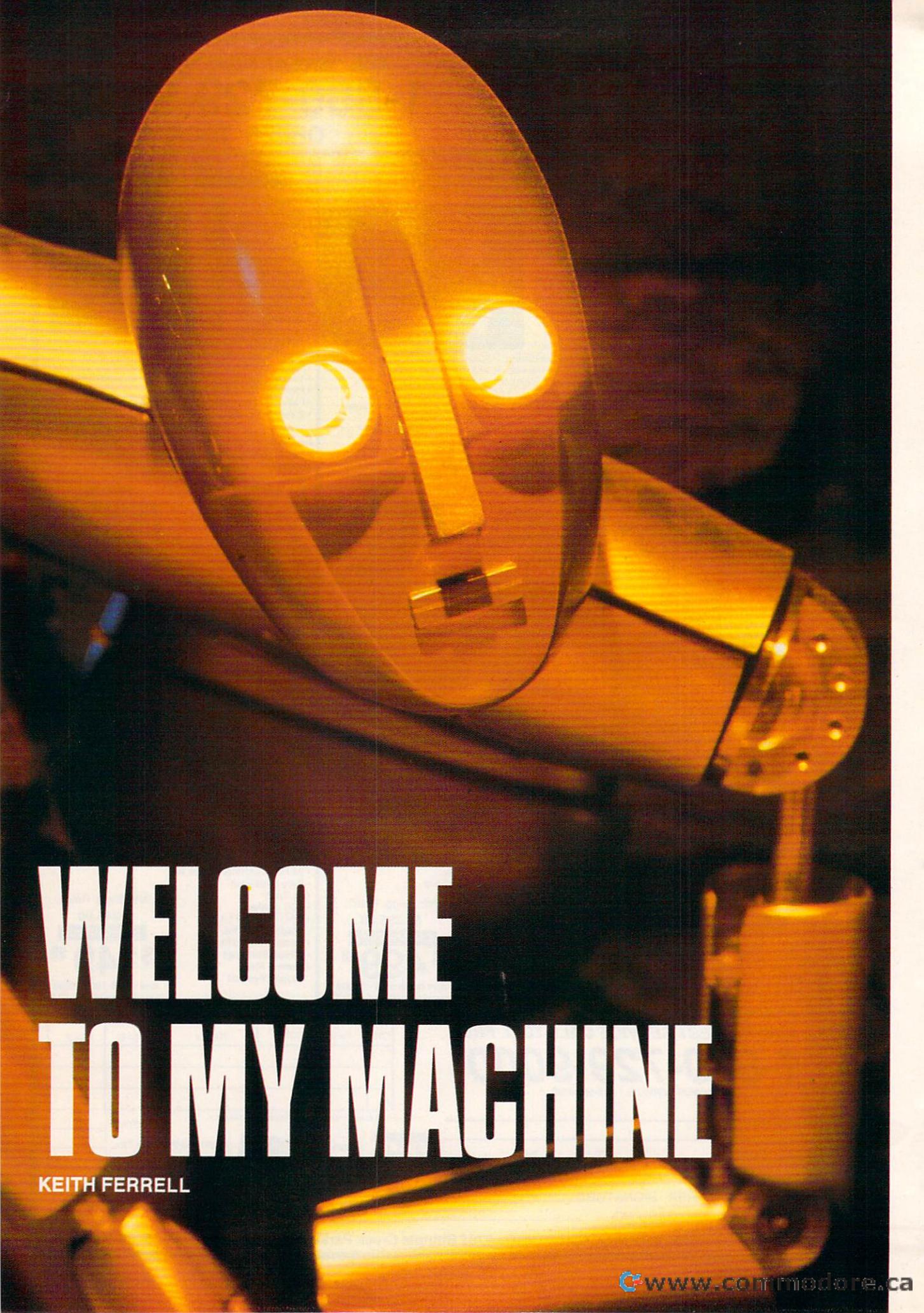
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KEITH FERRELL

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Computers are smaller than ever—except in Boston. There, on Museum Wharf overlooking the harbor, the world's largest microcomputer takes shape.

When completed in mid-1990, the two-story Walk-Through Computer will occupy a 3500-square-foot gallery in the heart of The Computer Museum, the only museum of its kind.

The Walk-Through Computer will, likewise, be one-of-a-kind.

"It will be a working computer," says Dr. Oliver Strimpel, the museum's curator and associate director. "You'll go inside and see what it's doing, with flashing lights and giant replicas of chips—a whole roomful of things, all of them doing interesting tasks."

Museum with a Mission

Interesting tasks go on in virtually every aspect of The Computer Museum. The Walk-Through Computer is only the latest in an ongoing series of exhibits and galleries aimed at increasing the public's understanding of computers. Interactivity and hands-on displays are the rule, with education taken as seriously as exhibition.

Attracting close to 100,000 visitors each year, The Computer Museum is dedicated to displaying both computers and examples of their impact on society.

Since it opened in the mid-1980s, the museum has constantly expanded both the size of its collection and the scope of its exhibits, galleries, and programs. The museum now boasts the world's largest collection of post-1950 computers, and recent exhibits have shown the impact of those computers on art, entertainment, military defense, communications, and more. There's even a unique computer fashioned out of Tinker Toys and fishing line; it plays world-class Tic-Tac-Toe.

One of the highlights of the museum is the Smart Machines Gallery, the first permanent exhibit devoted to artificial intelligence and robotics. Using hands-on displays and clearly written explanations, the gallery gives visitors a chance to see the evolution of ideas related to machines that can actually think.

"The museum's mission is to educate and inspire all levels of the public in the history, evolution, technology, and impact of computers," Strimpel explains. As he is well aware, this is no easy task. "The exhibitions have to appeal to various levels and ages of visitor."

Still, it's a task that delights Strimpel. "We

get young children. We get adults who are scared of computers and keep their hands behind their backs. I have to tell them to go ahead and touch the interactive exhibits! You won't blow up Boston!"



Museum visitors can experiment with interactive voice technology at the Smart Machines exhibit.

The Trash Heap of Computer History

Ironically, the first piece obtained for the museum was bound for a landfill.

Strimpel explains: "The museum got started as an attempt to preserve the history of computing. The particular artifact that started it off was the Whirlwind computer, which was developed at MIT in 1951. This was the first computer to use core memory."

Despite Whirlwind's importance, the machine was heading for the technology graveyard. "Ken Olsen [president of Digital Equipment] and Bob Everett [president of Mitre] decided to save Whirlwind at the eleventh hour. That was in 1974."

Whirlwind was literally on trucks bound for the dump when Olsen and Everett stepped in. "They rerouted the trucks," Strimpel says, "and preserved the machine at Digital. A few more artifacts were collected. In 1979, it was decided to found a museum."

The Digital Computer Museum was established in 1979 as a private institution for the preservation of computer history. Housed in a building at Digital's Marlboro, Massachusetts, headquarters, the museum was primarily aimed at engineers interested in the history of computers. Gradually, though, larger goals—and the prospect of a larger audience—began to take shape.

A Fine Facility

By 1983, a general-interest computer museum was becoming a reality.

The museum took shape on the top floors of

WELCOME TO MY MACHINE

a beautifully restored nineteenth-century warehouse, part of the same facility that houses Boston's Children's Museum. There's plenty of room for expansion, and there are airy and comfortable exhibit spaces. The location is ideal—the contrast of computer equipment with brick walls and wood floors encourages contemplation. The museum's atmosphere and appointments seem to say, "Take your time. Don't rush." Exhibits are carefully spaced and uncrowded. A store on the museum's first floor offers books, posters, and other computer memorabilia.

The museum opened in its new quarters in November 1984. Strimpel joined the museum earlier that year, developing the museum's popular computer graphics gallery.

In place on Museum Wharf, The Computer Museum broadened its focus and goals. "We moved in a more educational direction, trying to explain computing to the general public."

Historical work has not been forgotten, though.

"Together with the Smithsonian, we're the only museum that collects historical artifacts from the history of computing. In fact, we have a collaboration with the Smithsonian not to compete against each other—there's enough work for both of us." The two museums share a common database, and, when an important item becomes available, representatives of the two institutions discuss which site is best able to use the piece. "It's an unprecedented arrangement for the Smithsonian," Strimpel says.

Education, though, is increasingly the focus of the museum's efforts.

"We think of the original engineering museum in Marlboro as Release 1 and when we opened here in 1984 as Release 2," Strimpel says. "Now we're planning Release 3. Basically, we'll be replacing all of the galleries except Smart Machines and make the machines even more appealing to the general public."

Striking a Balance

Which aspect of the museum attracts the public most?

"The public is most interested in the hands-on exhibits," Strimpel says. "We have over 60 such exhibits here, and our visitors really like to play with computers and see what they can do with them."

Paying careful attention to the public response has helped The Computer Museum's directors arrive at a threefold approach to education.

"First is Computer Evolution—where did computers come from? The second is how do computers work—what's inside that box? The third, and the one to which the largest amount of space will be devoted, is what computers do—computer applications. The Smart Machines Gallery shows applications in the areas of AI [Artificial Intelligence] and robotics; the Graphics Gallery is applications in the area of image processing and computer graphics. We're planning new galleries that show major applications of



PHOTO: © MARJORIE NICHOLS '88

Toy robots have a serious role to play in the history of computing.

Visit the Computer Museum

On your next trip to Boston, plan a visit to The Computer Museum. It's located at 300 Congress Street. For more information about The Computer Museum, call the museum's own talking computer at (617) 423-6758.

Hours

10:00 a.m. to 5:00 p.m. Tuesday through Sunday from Labor Day until mid-June
10:00 a.m. to 5:00 p.m. Monday through Sunday from mid-June until Labor Day
10:00 a.m. to 9:00 p.m. Fridays all year

Admission

Adults: \$5
Students and senior citizens: \$4
Children under 5: Free
Museum members: Free
Friday evenings: All rates half price
Call in advance for group rates (617-426-2800)

Memberships

Individual memberships cost \$30 per year and include free admission, special events, gift shop sales, a 10-percent discount at the gift shop, a gift shop catalog, a subscription to *The Computer Museum News* (a bimonthly newsletter), and *The Computer Museum Annual* yearly report and history of the museum.

Student memberships cost \$20 per year and include the same benefits as the Individual membership.

Family memberships cost \$45 per year and include the same benefits as the Individual membership for up to four immediate family members.

Contributing memberships vary in price and include the same benefits as the Individual membership, plus they are recognized in *The Computer Museum Annual* for their contributions, and their guests receive free admission to the museum. Contributing memberships include Friends (\$100), Supporters (\$250), and Donors (\$500).

For membership information, contact Membership Coordinator, The Computer Museum, 300 Congress Street, Boston, Massachusetts 02210; (617) 426-2800.

personal computers. That will show all of the applications of personal computers, from music to art, to organizing your life, organizing your money, communications, learning . . . about 12 different areas," Strimpel says.

Counterbalancing that exhibit will be another new gallery. "At the high end, we're planning an exhibit called The Networked Society. This will show how computers are used throughout the whole of society. Every time you pick up a telephone, you're using a computer. Every time you use an ATM, or make an airline reservation, or take out insurance, or go through a supermarket checkout line. The new gallery will show how computers are integrally tied in to all those activities," Strimpel says.

Computer Culture

As The Computer Museum, Release 3, takes shape, the essence is beginning to shift from historical computer hardware and software per se, to the computer's impact on our world. Examining that impact includes bringing in exhibits from outside the museum to complement those developed internally.

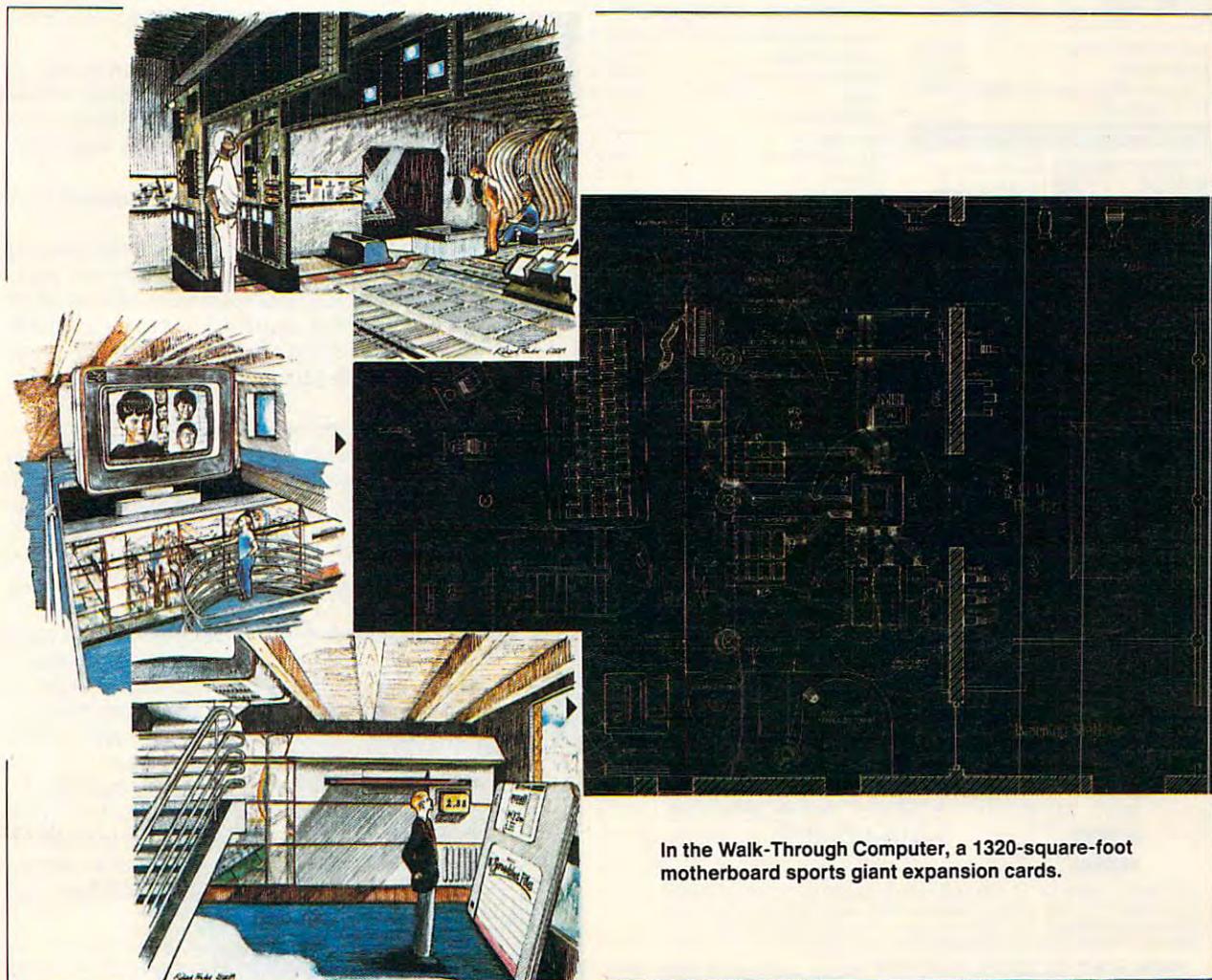
A recent success was "Computer Art in Context: SIGGRAPH '89 Art Show." For three

months in 1989, the SIGGRAPH exhibition displayed works of more than 50 computer artists from around the world.

The sheer variety of materials and media included in this exhibition gave visitors a sense of the artistic range the computer makes possible. Two- and three-dimensional works were on display side by side with kinetic sculptures and computer animation, interactive environments, and polydimensional films.

The arts play a large part in the museum and have proved to be among its most popular attractions. To that end, Strimpel points out another of The Computer Museum's ambitions.

"We feel very strongly that we want to get shows that are of international-jury quality. Not shows that we put together ourselves, though. The art community is sufficiently divided about what is computer art and what is good art, that we don't want to add yet another voice to that argument. Rather, we'd like to be the venue for internationally significant shows. While we don't *develop* shows on computer art, we do feel it's important to show the public that computers can do beautiful things. That's a very simple message. It's definitely part of the museum's interest."



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WELCOME TO MY MACHINE

Where Past Meets Future

From networks to computer art, desktops to mainframes, the acceleration of the computer revolution all but forces The Computer Museum to focus on the present and the future. Strimpel is determined, though, that the history of computing not be neglected. Preserving that history was, after all, the original impulse behind the museum.

"The history of computing goes back to prehistoric times, when people used devices to count their belongings. Then we moved on to counting sticks and other devices, on through instruments such as slide rules and so on," Strimpel explains.

"We have a reasonable number of mathematical instruments that predate the computer era," he says. "We also have quite a few punch-card machines from the early part of the century up through the thirties and forties. We have calculating machines from the late nineteenth century, such as the Comptometer and Leibnitz machines."

Strimpel does have a few regrets. "We don't have any Babbage material," he says wistfully, referring to the nineteenth-century English mathematician and inventor. "Most of that's at the Science Museum in London. There's only a finite amount."

Modern technology may play an unexpected role in bringing Babbage to The Computer Museum, however. "We're talking about the possibility of getting a hologram made of the Analytical Engine."

Where does Strimpel see the museum in ten years?

"I see the demand for the museum growing. Computers are becoming more and more important, moving into more and more spheres of life. As a result, there's a great demand for everybody to know something about computers, how they work, a little bit about where they came from, and so on."

"The museum can play a unique role in that. We have the history, we have the collection, the three-dimensional space, the exhibitory knowledge, and the knowledge of hands-on, interactive, informal education. The whole point of the museum is to offer that informal education—come and spend hours. Go at your own pace."

"I think that the kind of learning that can go on in museums can be very profound. Many great people say that they first decided to do physics or whatever as a result of a formative experience in a museum at an early age."

The thought gives Strimpel pause.

"That's really what I want the museum to provide. I think that's fundamental. If we influence a significant number of people to make important career decisions as a result of a visit to The Computer Museum, I think we'll have succeeded."

Keith Ferrell is features editor of COMPUTE!. He visits The Computer Museum every time he gets to Boston.

www.commodore.ca

HINTS AND TIPS FROM OUR READERS

There are many online resources only a modem call away. Here are a few suggestions for using a modem to help educate yourself and your children that might even convince non-modem owners to go out and buy one.

GENie now has online tutoring, classes, round-table discussions, and educational software that you can download. It's all in an area called the Computer Assisted Learning Center (CALC). The only CALC service that has an extra charge are the classes—all of the others are available at standard GENie connect rates. All you need to access these services is a computer, a modem, and terminal software.

To get started, you'll need a GENie account. If you don't have one, set your terminal software to half duplex and dial 1-800-638-8369; when you're connected, enter HHHH, and, at the U#= prompt, enter XTX99638,GENie. You'll need to have a major credit card or checking account number ready.

Once your account is active and you've logged on, type CALC at the main GENie menu and you'll find yourself at the Computer Assisted Learning Center.

The first CALC menu entry gets you to the bulletin boards. These are discussion areas for questions, answers, and comments. Before you read any messages, take a look at the index of topics so you'll know which discussion is where. It would be a good idea to capture the index to a disk file for reference. Having this reference handy will help you keep connect time to a minimum, allowing you to get more bang for your buck.

The second menu choice leads you to the realtime classrooms. These aren't staffed at all hours of the day. To find out when the instructors are in, you'll have to read the hours on the bulletin board, Category 1, Topic 7. You'll also need to know the corresponding number for the subject that

you want. I found an easy way to do this. I went to the bulletin board menu, typed 1 for a category listing, and found Social Sciences was the fifth category. I went back and entered the realtime classroom, chose topic 5, and found myself in the Social Science tutoring area. When you first enter a classroom, type a question mark for a list of commands. When an instructor is at the other end, you'll be able to get most questions answered. The instructor should be able to help clear up cloudy areas with students' assignments and even help them with homework.

The third CALC menu choice gives you access to the software libraries. Most of these programs are free, although some of them are shareware.

MODEM PEN PALS

AND ONLINE LEARNING

They've all been tested to make sure they're virus-free. You'll find drills on almost every subject, games that reinforce learning, imaginative and creative software such as *Life*, and programs that help teachers. And if you compare the cost of connect time to the cost of purchasing commercial software, it's a bargain.

Other CALC menus let you register for the structured classes, send feedback to CALC, view announce-

ments, and take a survey. There's plenty to do, and, with careful usage, you should get more than your money's worth. Using a modem for online tutoring and education might be just the thing to get your child excited enough about learning to noticeably improve the next report card.

Electronic Pen Pals

It's hard to get kids to write, but practicing is the best way for them to improve their writing skills. Having a pen pal is a good way to practice communication skills and interact with someone in a different locale.

Having a pen pal has one disadvantage—there's a lag in time between sending and receiving letters. Younger people have trouble staying interested in something that doesn't provide results for days or weeks. Immediate feedback is always more effective, and your modem can give your kids the immediate response from a long-distance pen pal that will keep them writing.

How can you find electronic pen pals? You could start by posting messages on bulletin boards in your area. You can also post messages on national services like CompuServe and GENie. When your child finds a pen pal, he or she can keep in touch using electronic mail on commercial services or private messages on BBS systems. Cost isn't that big a concern. If they compose their letters offline and upload them to their pen pal, it shouldn't cost much more than sending a regular letter. In any case, it gives kids (and adults, too) a reason to write more often and develop an important skill. And it's fun, too.

*Richard C. Leinecker
Reidsville, NC*

Do you have advice that makes a better teacher out of your PC? If so, we'd like to hear from you. Send your tip, no matter how brief, to COMPUTE! Feedback—Homework, P.O. Box 5406, Greensboro, North Carolina 27403. If we publish your suggestion, we'll send you a gift.

REVIEWS

SAVE BRITANNIA, ORGANIZE YOUR OFFICE, BE PERFECT, BEAM ME UP, TYPE WITH EASE, EXPERIENCE MEGASPEED, CRUISE IN STYLE, WIN A CHAMPIONSHIP, AND MORE.

ULTIMA VI

Afat, black cauldron stands alongside a stack of medieval shields and a massive two-handed sword, whose hilt leans precariously on a VGA monitor atop Lord British's desk. No, these aren't props scattered about to impress visitors or frighten away uninformed burglars, but the genuine articles vital to intrepid players of *Ultima VI: The False Prophet*, an impressively realistic fantasy role-playing game from Origin. The game commences with a movielike sequence so stunningly detailed and colorful that the introduction alone outshines most of the adventure games I saw last year. I enjoyed the VGA version, which draws on all 256 colors and employs them in a variety of exotic effects.

Your adventure commences, as it does in *Ultima IV* and *V*, with an urgent summons from Lord British. Only you, the Avatar, can save Britannia from a new race of gargoyle monsters—but things aren't quite as clear-cut as on your recent visits (you can play *VI* without having tried *IV* and *V*). The actual goal of the main quest becomes apparent only as you solve a substantial collection of miniquests, so I'll just say there's a surprising plot twist that's more reminiscent of what you might find in a novel than what you'd find in the plots around which role-playing games typically revolve. Though you may find more than one way to complete the game, there's but one satisfactory conclusion to the main quest. And though you probably thought Garriott, as Lord British, stayed in his castle while you were out

questing away in each *Ultima*, he reveals that he's also represented by another character in the game: Shamino, who appeared as a king in *Ultima I*, accompanies your party in *Ultima VI*.

While the tale is set in the land of Britannia again, numerous innovations—from the subtle to the shocking—give it the appearance of a whole new world. Have you ever noticed that many items, such as torches, are referred to only by name in an *Ultima*? For the first time, every single item is represented with its own picture. The detail of the game's graphics has increased fourfold, and many of



Save Britannia by defeating Gargoyle monsters in *Ultima VI: The False Prophet*.

the figures are animated. The effect: unsurpassed realism in every aspect of the adventuring experience.

Ultima veterans won't believe their eyes when they first reach a city, castle, or other structure (including, for the first time, pyramids). Rather than stepping on an icon representing the city and then waiting for its interior to load from disk, you'll simply stroll right through the main gate and down the streets of towns built right into the surface map; this feature accelerates gameplay by eliminating disk access. Dungeons and mazes are more interesting owing to the im-

proved graphics in the game's 1024 × 1024 map grid. There's more to this world than meets the eye.

You'll still face monsters galore, but combat assumes a fresh face as well. Instead of waging battles in a special combat arena, which requires disk access in the most recent *Ultimas*, you'll hack and slash and cast spells with the fiends right there on the main map. To simplify combat, you can put the entire party in auto mode and then lean back and watch them carry out the strategies you've assigned. (Incidentally, instead of the party icon, the game places all six party members on the screen.)

Magic spells are easier to cast, since their names are now spelled out in English in the menus; when cast, a spell's name is spoken aloud in its original Britannian, which you'll hear as digitized voices. Audiophiles using Ad Lib and Roland MD-32 sound boards can expect to hear some amazing sound effects and music.

The new combat and magic systems make *VI* far easier to master than any previous *Ultima*, so newcomers to the series won't have to memorize so many commands or thumb through the manuals as they play. Even veteran Orc-slayers will appreciate the new icon-based interface. Controlling your crew and manipulating all those artifacts, weapons, armor, and other items proves a remarkably more intuitive process, but anyone preferring the original keyboard commands can use them.

Ultima VI caps a decade of dungeoneering in grand fashion. To celebrate, Origin plans a special ten-year anniversary edition of the game, which it says will be available only through direct order. The company would not divulge any details, but rumors abound. Two of the best: Lord

British will autograph each one with the purchaser's name, and the manual will be bound in genuine dragonhide.

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PERSONAL OFFICE

Top Ten Software's *Personal Office* brags: *Working at home has never been this easy*. I agree. This software combination creates a smooth-working, complete office workstation. I found no flaws working through the tutorial, and soon I was effortlessly zipping in and out of a word processor, spreadsheet, database, communications program, and desktop organizer. How convenient not to have to return to DOS when you want to change to a different application. An integrated MS-DOS shell lets you do command line chores without exiting the program. The main menu lets you access all programs by highlighting choices with a cursor or pressing one of the ten command keys. And pressing F9 brings up help screens.

The word processor offers extensive options, including cut and paste; italic, bold, condensed, or underlined text; insert and overwrite modes; and word count. A notable feature is mail merge, which inserts fields from the *Personal Office* database into your document. With that capability you can personalize all kinds of business form letters, giving your home office a professional air and your business correspondence a personal touch. Save and Save As commands allow you to keep your original document on disk and also save an amended version. The only feature missing in this exemplary module is a spelling checker.

The spreadsheet module is almost as good as a full-blown spreadsheet program. The screen's first line under the menu bar shows the cell where the cursor is located, whether the cell is empty, and whether calculation is automatic or manual. The next line shows the cell's actual contents and the percentage of memory left for your data. Among the math functions are Sum, Average, Maximum, Minimum, Pi, Square Root, Absolute

Value, True/False, and Cosine/Sine. This spreadsheet is small compared with dedicated programs; however, with 52 columns and 200 rows, you can do a lot of figuring.

The database performs well. A powerful search feature lets you set up a simple or complex search path to find particular records. Another powerful aspect is the module's ability to sort records in a variety of ways. This database holds over 1000 records with 14 fields in each record.

I have high praise for the mailing-label function, which is part of the database. You can print as many labels as you want, and they can be of almost any shape or size. I liked being able to print a message on the bottom of each mailing label, such as *Urgent—Open Immediately*.

The communications program, when coupled with a modem, gives you access to online information, facsimile services, and other electronic networks. It supports many transfer protocols including ASCII, XMODEM, YMODEM, Batch YMODEM, Kermit, ZMODEM, and YMODEM-g.

Over half of *Personal Office*'s 200-page manual is devoted to explaining how the communications



Personal Office meets your home office demands with one convenient package.

module works. Fifty pages are devoted to the script language alone. The program has an error-correction feature called Microcom Networking Protocol, which enhances noise-free communications.

The desktop program contains eight features, running the gamut from a calendar to an expense calculator. Two unique features are postage and conversion calculators. Postage Rate calculates the cost of mailing a letter or parcel through the U.S. Postal Service; the four rates are first, priority, fourth, and special. This feature won't become obsolete at the next postage-rate increase, either, because you can change the rates.

Overall, the documentation is excellent, with a clear table of contents

and index. Customer support is described on the first page and can be contacted by modem, fax, or phone. A practical, easy-to-understand tutorial guides you through all of the programs.

Personal Office works well as a small-business or home office mainstay. If you want an integrated package that handles several jobs well and boasts an attractive price as well, you should consider it.

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WORDPERFECT 5.1

FAST LOOKS

In its long history, one common complaint against the PC's leading word processor was that it forced you to memorize scores of awkward key combinations. Its reliance on the Ctrl, Alt, Shift, and function keys makes *WordPerfect* no different from other MS-DOS-based word processors, yet critics focused on that particular element, often ignoring the program's otherwise fine design—including excellent support for practically every printer ever built.

Well, believe it or not, the latest upgrade to *WordPerfect* (version 5.1) adds menus and mouse support. After some initial skepticism, I found that even an experienced user can find menus helpful. Newcomers to this package will find that menus make navigating the program's complex array of options quite manageable.

The program's menu bar is unorthodox in that it remains hidden until you summon it with a hot key (you can set this up to be the Alt key; the default is the Alt-= key combination). You can also set up the program so that the bar remains visible at all times.

The company hasn't totally embraced the idea of a mouse. For example, you can use a mouse to pull down menus and to respond to *WordPerfect*'s many Yes/No prompts, but you can't use it to scroll through a document.

Besides menus and mouse support, version 5.1 incorporates 30 fea-

tures beyond version 5.0. These include the ability to construct tables; warm links to *PlanPerfect* (5.0), *1-2-3* (2.x), and *Excel* spreadsheets; support for scientific equations; automatic label making; support for 40-character filenames; dictionary-based hyphenation, and a shortcuts keyboard that links often-used commands with keyboard macros.

This latest update to *WordPerfect* will almost certainly keep this word processor at the top of the hill.

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STAR TREK V: THE FINAL FRONTIER

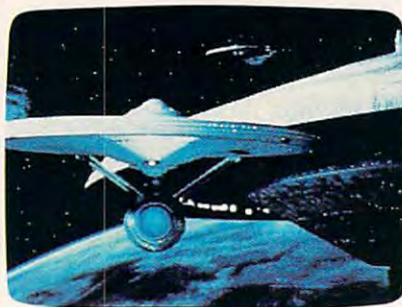
Space, the final frontier. These are the voyages of the Starship Enterprise. Its latest mission: to boldly go where no PC game has gone before.

Star Trek V wasn't a big success at the box office, but the computer game should do well at the software store's checkout counter. Actually four games with some stunning VGA graphics wrapped around them, Mindscape's *Star Trek V: The Final Frontier* is a package that should please arcade gamers, simulation fans, and Trekkies alike.

Most of the similarities to the movie end after the series of animated opening screens. The game starts with a view of the main bridge view screen. You give orders to each crew member by pressing function keys. For instance, pressing F3 will bring up a digitized picture of your helmsman, Commander Sulu, and a set of possible orders, such as Warp Speed and Plot Course.

As you begin your journey to Sha Ka Ree, your warp engines suffer an antimatter imbalance, and your ship is thrown into a perilous wormhole (and the first arcade sequence). Reminiscent of the wormhole scene in *Star Trek: The Motion Picture*, this sequence requires you to maneuver

your way through a twisting energy tunnel while avoiding (or destroying) asteroids that threaten to collide with the Enterprise. While you're at it, you



It's intergalactic adventure at warp speed in *Star Trek V: The Final Frontier*.

can use your tractor beam to capture dilithium crystals, which will provide extra power that you'll need later in the game. Using a combination of keyboard controls and orders to your crew, you'll find this wormhole sequence relatively easy to get through after a practice run or two.

As your ship emerges from the wormhole, you find yourself smack in the middle of a Klingon space minefield. Two counterrotating concentric rings of space mines are circling your ship. You can destroy the mines with your phasers, but there's a catch. These are gravitic mines, attracted to your ship. The rings begin closing in on the Enterprise as soon as you appear. To make matters worse, you must move closer to the mines to get within phaser range. As you approach the rings, the attraction increases and the mines close in even faster. With quick action (and a little extra phaser power from Scotty), you can blast a hole through the rings or destroy the minefield completely. Don't hang around for long after you escape, though, or you'll find your ship attracting stray mines.

After a safe escape, you're back on course to Sha Ka Ree. Here the game once again gets in sync with the movie as the encounter with the god-creature is chronicled in another series of animated pictures.

Before you're able to return to the Enterprise, you encounter Klingon Commander Klaa, who wants to take you back to the Klingon Empire for trial and execution. You've got to defeat him in hand-to-hand combat before you can return to the ship.

The Enterprise view screen is replaced with a view of Admiral Kirk and the Klingon, ready for combat. This sequence, similar to the fight scene in *Star Trek III: The Search for Spock*, is basically a slower version of

an arcade karate game. You've got to duck Klaa's blows while trying to knock him out. All you have to do to defeat the Klingon is stand there, wait for him to move, and punch him before he can punch you. It gets a little tougher on higher levels, but this is still the weakest portion of the entire game.

After you defeat Klaa, you beam back to the Enterprise and head back to Federation space. As a "guest" on your ship, Klaa proposes a duel using the Enterprise's Starship Mission Simulator. Since there was no ship-to-ship combat in *Star Trek V*, this is the only way that Mindscape could reasonably work in a space-battle sequence.

Hokey premise or not, this final sequence is where the game really shines; it's worth the entire price of the game. You're taken back to the bridge view, and your goal here is simple: Destroy the Klingon Bird of Prey. A 3-D wire-frame view of the enemy ship appears on the main view screen. Unfortunately, it's not always easy to keep the Klingon ship in your sights, as it has a cloaking device. Be prepared for some heated, fast-paced opposition. Your ships are evenly matched, and at higher levels you may encounter two or even three Klingon ships!

Combat is similar to what you'd find in a flight simulator, but without gravity or ground to worry about. Unlike some space-combat games, the action here is truly three-dimensional. You can't just turn left or right to aim at the enemy—you have to be on the correct vertical axis, too. Space-game and flight-simulator enthusiasts will really enjoy this portion of the game.

The first time you play *Star Trek V*, you must complete all four scenarios. After you've won once, though, you can skip to any sequence. You'll probably take advantage of this feature. The wormhole and minefield sequences aren't hard to master. The hand-to-hand combat game is boring even the first time—I welcomed the opportunity to skip it.

The game's graphics are superb. While the screens look good in EGA and Tandy modes, the MCGA/VGA screens are fantastic. Instead of just using a better palette for that version of the game, Mindscape included dazzling 256-color pictures. They're not digitized, either. This is some of the best art I've ever seen in a computer game. Sound is poor, though—the game supports only the standard PC speaker.

Star Trek V: The Final Frontier truly captures the spirit of the Star Trek universe, even if it does stray

from the movie's story line. But that doesn't hurt it—this is one game that's actually better than the movie.

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MINDSCAPE

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TYPEWRITE 3 IN 1

Some of us learn to type by the hunt-and-peck system. I used this method when I was in school. Red-inked corrections contrasted nicely with the black typewriter print. A learned peer once wondered aloud why I didn't save everyone some trouble and do my work in longhand. What embarrassment I could have saved myself if only I had learned to type with Computer Trends' *Typewrite 3 in 1*.

This package combines a learn-to-type program, a mini word processor, and a typing game. It excels on all three counts. It's easy to install, very easy to use, and the manual is clear and concise. You can access the manual onscreen or summon online, context-sensitive help.

The learn-to-type module strives to avoid tedium. The beginner's level has more than 50 individual lessons, covering enough key combinations to include commonly used words. Both a keyboard chart (illustrating the position of the key and the finger you should use to type it with) and a window into which you type the designated letters are provided. When you become more proficient, you can remove the keyboard chart from the screen. You can have letters randomly generated, or you can concentrate on trouble areas for which you need practice. Setting the choices is easy. You can also create your own lessons (you might want to use specific text to test the typing of prospective employees) and edit existing ones.

The reporting facility of the learn-to-type program lists the letters in the lesson you just took, the letters with which you made mistakes, your accuracy percentage, and your typing speed in words per minute.

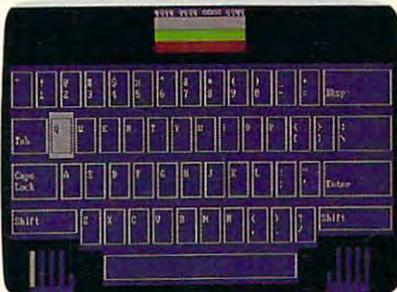
The mini word processor, al-

though not loaded with features, may be just what you need if you're just learning to use a computer. Among its features are word-wrap, paragraph reformatting, margin control, page numbering, footers, and the ability to create mailing labels.

While the clear manual is to be applauded, Computer Trends did make compromises in keeping it concise. To learn how to use the editing keys in the word processor and how to execute commands like copy, cut, and paste, you have to refer to the online help; the information isn't in the manual. To get help, you have to read the step-by-step instructions for operations, close the help screen, return to the text, and then remember the steps. I found it almost impossible and resorted to writing the steps down.

The game portion of the program was developed to strengthen typing skills. In it, a Raider Key chases your Player Key around the keyboard. You have to type a randomly generated letter as soon as it appears on the screen in order to elude the Raider. Like other portions of the program, the game module allows you to keep progress reports on each player.

The administrative portion of the program allows you to save, edit, sort, and print detailed progress reports on



Improve typing speed and confidence and have fun with *Typewrite 3 in 1*.

each person who uses any part of the program as well as institute a password system. Unfortunately, you can only save the progress reports if you have a hard drive. With floppies, each person prints his or her report immediately after completing a session.

Despite its documentation omissions, *Typewrite 3 in 1* is an excellent buy. It will quickly set you on a course to keyboard fluency. ▶

LYNNE FREY

IBM PC and compatibles—\$29.95

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RoboMan

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Pick up a copy of **RoboMan** at your local computer store—or call TOLL FREE 1-800-635-2425. Be sure to check out **Shuffle Mania!**, **Oligopoly**, **NFL Challenge**, **Basketball Challenge**, **PRO Challenge**, and **Bermuda Square**, other examples of First Class Software from XOR.

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LUCKY STAR 386SX

There are hundreds of companies peddling IBM compatibles. But finding an exceptional one at a reasonable price is as difficult as finding the Holy Grail. Lucky Computer has recently come to the rescue with an 80386SX-based, AT-bus personal computer that offers hard-to-beat features at a relatively low price.

The 386SX processor is the cousin of the more powerful 386DX chip. This means the Lucky Star can run any software that's on the shelves today and also run tomorrow's 32-bit OS/2 programs. In addition, it can take advantage of both extended and expanded memory.

The unit I reviewed came with 2MB of 80ns RAM in one-megabit chips. There's room for an additional 2MB of RAM on the motherboard. This means you won't have to go out and buy an upgrade board to add extra memory, plus you'll save additional money because one-megabit chips are less expensive, in the long run, than the 256K variety. At today's prices, you could populate the motherboard with 4MB for right around \$400.

This unit also comes with Super VGA, and the 256-color, 640 × 400 graphics are astounding. The images are incredibly clear and sharp, and they're as close to photographic-quality as I've ever seen on a personal computer.

The Lucky Star's compact tower case is a real advantage if the top of your desk, like mine, is usually full. When the time came to install my Ad Lib and Game Blaster sound cards, I anticipated a tight squeeze getting them in. I couldn't have been more wrong. There was plenty of room—in fact, there was room to spare. A clean, roomy, and uncluttered case is the mark of a good general design. If the engineers took the time to make sure the various components fit into the case properly, they probably took the time to make sure other engineering and design aspects were just as sound.

There's plenty of room to grow, too. Six 16-bit slots and two 8-bit slots are more than most people will ever need. My own AT has six slots, and I've often wished for two extra slots for my assortment of music cards.

The same might be true for a home-business computer that has two serial cards, a fax card, a graphics adapter card, and another card or two. With just the basics, you can easily fill six slots. Having two more slots gives you some breathing space.

The 44MB hard drive came formatted with DOS 4.01 already installed. The computer was up and running in a matter of minutes. I did, however, have to run the Setup program before the system would work with my printer.

When you first boot the computer, you can press the Delete key and go into a diagnostic section. The



The Lucky Star 386SX offers hard-to-beat features at a relatively low price.

diagnostics have easy-to-use menus, and the results of each test are easy to understand. When I ran the parallel-port test, I was instructed to run the Setup program so the system could recognize the printer port. The new setup took about 15 minutes (including the time it took to read the manual). After that, the documents went to the printer without a hitch.

If I had to choose one word to characterize the Lucky Star 386SX, it would be *speed*. This computer has a fast processor, a fast hard drive (28 ms), and the extra memory to let you do things even faster.

Let's start with the speed and power of the processor. Programs that require processor-intensive tasks are extremely fast on this computer. These kinds of programs include compilers, assemblers, graphics-processing and -conversion programs, and desktop publishing software. In each case, they operated significantly faster than on my AT. Spreadsheets and databases also benefit from a faster processor because they crunch numbers and manipulate large amounts of data.

The hard disk access on the Lucky 386SX is on par with most ATs. It didn't outperform any of the drives that I regularly use, but it was

about the same speed. There were no problems or errors.

Taking advantage of the large amount of memory, I installed both a ramdisk and a disk-cache program. This greatly increased the computer's productivity. I directed temporary files to the ramdisk when I compiled my programs, and this reduced the number of times the computer had to access the hard drive. With the disk cache installed, repeated readings of files were as close to instantaneous as you can get.

If you're looking for solid and reliable equipment that won't be outdated tomorrow—but at a price that you can afford today—consider Lucky Computer's 386SX. You can't go wrong with this powerful package.

RICHARD C. LEINECKER

Lucky Star 386SX Basic System—\$1,295
Review configuration (44MB hard drive, 2MB RAM, Super VGA, 1.44MB 3½-inch and 1.2MB 5¼-inch floppy drives, and minitower case)—\$2,074

LUCKY COMPUTER
4151 Beltline Rd.
Suite 120
Addison, TX 75244
(214) 702-8588

FAST LOOKS

STREET ROD

Vou're barreling down the highway in your cherry street rod at 90 mph as the tach pushes into the red. Signs and telephone poles fly by, and the engine's roar is music to your ears in *Street Rod* from California Dreams.

Street Rod tests your steering, reflexes, and cool as you drag down a quarter-mile straight or negotiate a two-and-a-half-mile course. But watch out, Jack! You could blow an engine, drop a transmission, get pulled by the cops, get bumped by your opponent, or even crash.

Strategy and style set *Street Rod* apart from other racing games. If you're to beat the King (top rod) by the end of the summer, you must know your engines and keep them in shape by tuning and checking them regularly, using the best parts, and spending your money wisely. At Bob's Drive-In, where street rods meet, you get a chance to check out the competition, even pop the hood, before making a challenge.

Style counts in this game, too. The Geek might race any car, but to challenge the truly cool opponents,

you must dazzle them with the right paint job, custom sticker, and body work. The King won't race just anyone.

The game's EGA and Tandy 16-color graphics are impressive (CGA is OK), and I like the attention to detail, such as the drive-in waitress on skates and the reflections in the rearview mirrors. A mouse, joystick, or keyboard may be used to drive and make selections, though controlling speed and steering with keys is a bit too challenging for me at 90 mph.

If you're ready for customizing, cruising, challenging, and charging ahead with a mean machine, Bud, burn rubber. This game's for you.

MIKE HUDNALL

IBM PC and compatibles with 512K—\$49.95

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(408) 435-1445

OMNI-PLAY BASKETBALL

Pulling a pro basketball team out of the division cellar and making a run for the World Championship is no mean feat, as I discovered midway through my third losing season in SportTime's *Omni-Play Basketball*. As a hard-core roundball fan, I've seen my share of computer basketball games. This is one of my favorites.

Like SportTime's other offerings, this program excels in its use of statistics. With *Omni-Play Basketball*, you help create a whole basketball world.

Continuing its tradition of marketing game-specific add-ons, SportTime plans several modules for this game, including *Pro League*, *College League*, *Fantasy League*, *Side-View Game*, and *Print Utility*. Using any of these modules requires first purchasing the centerpiece game, which incorporates the SBA League and End-View Game modules. As owner, general manager, and coach, you try to fashion a championship team.

In creating your own league, you define the number of minutes played per quarter, the number of games in a season (up to 21), and the playoff format (best of one, best of three, or best of five).

As Owner, you watch your team

through nine seasons. As General Manager, you make trades, recruit hot rookie talent, and improve your team at training camp. As Coach, you lead



You can coach your team to the world championship in *Omni-Play Basketball*.

your team on the floor, selecting defensive and offensive setups, calling strategic timeouts, monitoring injuries, and making key substitutions during crucial game periods.

Each player in the League is rated, on a scale of 0–9, for outside shooting, inside shooting, control, and speed. Make trades by bartering players, and sweeten the pot with Trading Points, awarded after each season (the teams finishing at the bottom get more points than those at the top). The program governs all arbitration. As your players age, you must seek other talent to blend in with your team.

Omni-Play Basketball puts a premium on strategy rather than on joystick reflexes. However, action-oriented hoops fans do have some control over players. The computer guides players through their defensive and offensive patterns, letting them set picks, dribble, pass, shoot, block, take charges, and steal. To get into the heat of the game, however, guide the action with joystick or keyboard commands.

Player control lacks the precision I would like. You can't, for example, switch defenders to stay in your opponent's face. Instead, the computer guides the entire team, and you must pick opportune moments for making specific playing decisions.

Defensive control can cause severe coach's anxiety. It's easy for the other team to break a forward into the lane or to free a guard on a pick (especially if you're playing the computer, which sees the floor better than Magic). I found my guys jumping around like aerobics-class dropouts while some Detroit sharpshooter launched a three-pointer.

Offense presents its own problems. Shooting and passing are governed by the fire button. A quick press

makes your player pass in the direction you've selected; a longer press makes your player shoot the ball. Frequently I tried to make a downcourt pass to a streaking forward, only to have my guard hurl an 80-footer. I wish SportTime had given me the option of two fire buttons: one for pass, one for shoot.

Serious hoops fans, not just arcade junkies, will relish the coaching control, which is where this game excels. From the bench you set up options to take advantage of your team's strengths and your opponent's weaknesses. For offensive rebounding strategy, you can direct your team to Hit the Boards or Protect the Fast Break. For offensive ball handling, have your team Work Inside or Work Outside, or set the variable to Normal for a mix of offensive shots.

If you're interested only in making the coaching calls, letting the computer guide the players, you can set the offensive variables to Work Clock (to eat up time on the shot clock before taking a shot), Quick Shot (to shoot as early as possible), or Mix (a combination of the two).

Defensive Rebounding strategy allows you to select Hit the Boards, Foul, or Set Up Fast Break. Position your players to Expect Inside (if you think your opponent will drive the lane), Expect Outside (if you anticipate perimeter shooting), Try Steal, or Normal (a steady, all-around defense). If the computer is guiding your players, you can also set your defense in Man to Man, Double Team, or Mix.

The Roster Option screen, a subset of the Coaching screen, is where you decide who will play. You can select View Stats for the game (including a Hot quotient, so you can track shooters on a streak) and, by choosing Subs, make key changes in your lineup. One especially nice touch, the Auto option, automatically selects your best lineup according to the strength guidelines you select (Outside, Inside, Speed, Control, or any combination of the four).

Omni-Play Basketball supports CGA and EGA graphics (the label also lists VGA, but it's no different from a 16-color EGA display). The players are small and interchangeable; there are no distinguishing characteristics between a 7-foot center and a 6½-foot guard.

The unspectacular graphics are a small trade-off for minimal memory requirements, smooth animation, and a depth and verisimilitude that many sports games lack. The only key element missing in this armchair coach's dream is a rookie lottery. Other than

that, *Omni-Play Basketball*'s expandability, strategic bent, and overall loyalty to the game earn it a place on my All Star roster.

PETER SCISCO

Amiga—\$49.95
Commodore 64/128—\$34.95
IBM PC and compatibles—\$49.95
College League—\$19.95
Side-View Game—\$19.95
Pro League scheduled for spring release

SPORTTIME COMPUTER SOFTWARE
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(800) 752-942

BASIC TOOLS

Believe me, I never thought I'd be excited about BASIC. But that was before I saw Finalsoft's *Basic Tools*. It adds a long list of functions that can dress up any BASIC program and elevate it to the level of commercial-grade software. Diehard BASIC programmers have been doing this for years, but now this comprehensive package makes the process easy.

Demo programs for the new techniques are printed in the manual and stored on disk. The fully commented code should answer most of your questions, but you can also consult the explanations in the manual. I'm equally impressed with the simplicity of the function calls. This is an idea whose time has come—simple calls for complex operations.

The first part of the tutorial covers windows—how to open, close, move, hide, and show them. With several calls, you can easily change many of the window attributes, including window title, footer, border type, and shadow. After running the canned demos, I tried an experiment. First, I moved a window across the screen and changed its color according to the screen position. This illustrated not only the ease of moving a window but also the visual effect of the different color combinations.

You can open up to ten windows simultaneously. The only difficulty I encountered with multiple windows was remembering which was currently active. You must hide the windows in the opposite order they're shown so the screen can be restored correctly.

Basic Tools fully implements text-scrolling capabilities within windows. It handles the clipping rectangles, text colors, and text-positioning for

you, along with some of the other nasty things that window text introduces.

When I read the manual for the first time, I came upon the SCINT10() function for calling BIOS video interrupts. Being able to do interrupts directly from BASIC is a welcome addition, but I would have liked to have seen a call for doing DOS and other BIOS interrupts.

There's also a memory-resident help module that can provide on-screen help for the functions at any time. It doesn't have a lot of detail—it's meant to provide quick help for those times when you can't remember an exact function call.

In addition to the Window Manager commands, there's an entire set of commands controlled by the File Index Manager. Included in the library of functions is a set of dBase-like commands for handling file records and fields. When used in conjunction with the window functions, they provide a powerful arsenal for writing BASIC programs.

Before you can use the File Index tools, you have to create an Index File with a special utility. (This should sound familiar to dBase programmers.) The same utility rebuilds and initializes your data files.

Once you've created the Index File, you'll be ready to access it from your code. Records can be updated, deleted, read, and written with easy-to-use commands. Other functions do such things as get file-structure information and tell you which is the next free record.

Finalsoft did everything possible to make *Basic Tools* powerful and easy to use, but it's difficult to do both. For instance, the File Index Manager isn't as easy to use as the Menu Manager. And without the included examples, it would have taken me much longer to learn *Basic Tools*. Finalsoft must have anticipated this last problem because it has included excellent example files.

If you want to add a professional touch to your BASIC programs without having to reinvent the wheel, *Basic Tools* is for you. The commands are functionally useful and relatively easy to use, and the Windows Manager will give your programs a professional appearance. That's a combination that's hard to beat.

RICHARD C. LEINECKER

IBM PC and compatibles—\$79
FINALSOFT
3900 NW 79 Ave.
Miami, FL 33166
(305) 477-2703

TAX SHOP 1040

hh, April! The weather warms. Minds wander. Hearts go pitter-patter. People seem to be lost in a daze.

Yes, Virginia, it's tax time again. And to help you through the writeoffs of spring, the kind folks at TenKey offer *Tax Shop 1040*. It's a program that turns your PC into a tax assistant, and the payoff is a smoother road to a finished tax return.

Tax Shop 1040 lets you choose your own approach to preparing tax forms. With the first approach, you can start with the various supporting schedules and complete the forms and schedules one at a time. After you complete each form, the appropriate information is automatically carried over to your 1040.

With the second approach, you start with the 1040. As you work on it, you can use the F5 key to zoom to a supporting form or schedule whenever it's needed. For example, if your total tax picture includes business income (figured on Schedule C and shown on line 12 of Form 1040), you can zoom from line 12 directly to Schedule C.

The program's onscreen displays closely resemble actual tax forms. A pop-up calculator and notepad are available, and a summary of how your return is shaping up is just a keypress away. The program also includes online help (with a topic index), a tax planner that lets you do what-if analyses, and a question-and-answer interview routine that's designed to help you focus on the necessary forms and schedules.

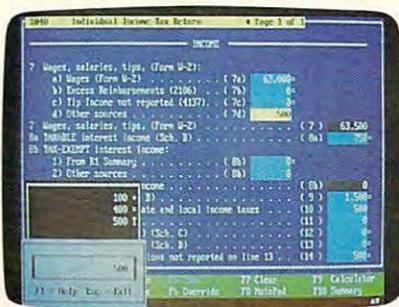
Tax Shop 1040 lets you print out a complete IRS-approved 1040 form on your dot-matrix or laser printer. Because it's IRS-approved, you can use *Tax Shop 1040* to prepare ordinary mail-in returns. The package also interfaces with a large number of optional state income-tax-return preparation packages.

A particularly intriguing feature of *Tax Shop 1040* is its ability to let you file your tax return electronically, which speeds your refund. Here's how it works. After preparing your return, *Tax Shop 1040* converts your tax data file into an IRS-compatible format. You then send the file with the ELF (Electronic Filing) extension to the IRS.

How does it get there? Since the IRS doesn't presently accept electron-

ic filings from individuals, you must do your filing through an approved intermediary (an Electronic Return Originator), such as TenKey. You simply send TenKey your tax file, along with a completed IRS Form 8453 (U.S. Individual Income Tax Declaration for Electronic Filing), plus attachments and a processing fee. Form 8453 is required by the IRS for each return that's filed electronically. It indicates that you've given your OK to have your return filed electronically. Your W-2s go with it. It also includes direct-deposit information—in case that's how you want your refund handled.

You can transmit your return to TenKey in one of two ways. If you choose the so-called Diskmailer ap-



Understand your finances and avoid tax-ing headaches with *Tax Shop 1040*.

proach, simply use *Tax Shop 1040* to create the ELF file and mail the ELF data disk to TenKey (along with your payment, a signed 8453, and its attachments). Alternatively, you can transmit your tax return to TenKey with a 300-, 1200-, or 2400-baud modem. *Tax Shop 1040* even includes automatic-dialing software. To help you with the extra charges, TenKey lets you deduct \$1 from the \$12 processing fee for each mailing or modem transmission.

TenKey forwards your tax return by modem to the IRS. Within a few days, you'll receive an acknowledgment that the IRS has accepted and filed your return. According to TenKey, your refund will be deposited into your checking account within about ten days. Refunds that can't be directly deposited may take a few days longer.

The instructions that accompany *Tax Shop 1040* quote an IRS official as saying that the IRS is shooting for a "98-percent paper-free tax system" by the year 2000. As this is being written, however, there are a few constraints to keep in mind. Several forms, including the 1040A and 1040EZ, can't be filed electronically—electronic filers must use the regular 1040. Forms

2210, 4868, 4952, 4972, 6251, 8615, and 8814 also can't be included in an electronically filed return.

In addition, only returns with a refund due can be filed electronically. If your return shows a zero balance due, or if you owe tax, you can't (as of this writing) take advantage of electronic filing. Finally, electronic filing can't presently be used for filing amended returns.

The *Tax Shop* package includes two wire-bound manuals. One is a user manual that describes the functions of the program; the other is a guide to the tax forms. The language in the manuals (especially the use of the word *clients*) suggests that this package is aimed at tax professionals. Diligent taxpayers, however, shouldn't find the manuals too specialized to be useful.

TenKey offers *Tax Shop* in several versions, including *Tax Shop 1040*, discussed in this review. *Tax Shop 1040A* (designed for preparing forms 1040A and 1040EZ) is also available, but it doesn't include the electronic-filing option.

Does *Tax Shop 1040* make tax preparation fun? Not at all—but it does make preparing your taxes easier and faster. Two out of three ain't bad.

STEVE HUDSON

ing ghosts, shooting ghouls and monsters, and climbing and jumping. In addition to a lot of levels, you get a wide variety of screens.

Here again, though, some problems exist. Your character is always out of position, either above or below the game's ledges and objects. That programming oversight makes the game hard to play. Also, the moving objects interacted graphically with the background in some unexpected ways; in some instances, an image would change color slightly, depending on the background over which it moved. That's not a fatal flaw, by any means, but a sign that shortcuts were taken to keep the game's retail price low.

If you like to zap ghouls and ghosts and you're the type that never reads instructions anyway, *Frightmare* might be worth a look. At least its reasonable price won't zap your bankroll in return.

RICHARD C. LEINECKER

IBM PC and compatibles and Commodore 64 floppy disk—\$14.95

ACCOLADE
550 S. Winchester Blvd.
Suite 200
San Jose, CA 95128
(408) 985-1700

IBM PC and compatibles—\$69

TENKEY
7650 Municipal Dr.
Orlando, FL 32819
(407) 351-0966

FRIGHTMARE

Ghosts and ghouls will be after you in *Frightmare*, an Accolade title released under the Avantage budget label. In typical arcade fashion, you must avoid the bad guys, destroy them with your arsenal of weapons, and progress through various levels.

The premise: You're having a bad dream; the farther you progress, the closer you are to overcoming your nightmare.

I had some problems getting started, due mostly to errors in the documentation—even filenames are listed incorrectly. Also, the directions mention only joystick control, but I couldn't get mine to work. Finally, after experimenting with the keyboard, I was able to start the game and control the character.

Once underway, I had fun dodg-

FAST LOOKS

MECHWARRIOR

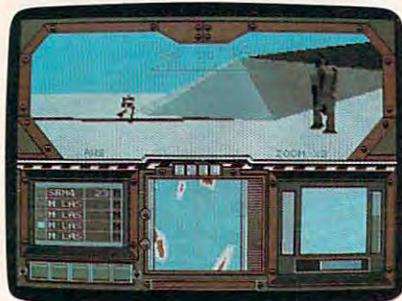
The mission was almost complete. If I could just make it around this hill and rescue the hostages, I'd be back home enjoying a drink in no time. Rounding the corner, I spotted trouble—trouble in the form of an 85-ton giant robot aiming four medium lasers between my eyes. I hit my jump jets and ran for home, the right side of my torso a smoking mass of molten metal.

This is the universe of Activision's *MechWarrior*, a simulation based on FASA's Battletech role-playing game. You pilot a giant war robot armed with lasers, particle cannons, and a variety of other deadly weapons. To the people around you, you seem to be an everyday Mech-driving mercenary, taking your lethal war machine into combat for any ruling power who will pay the price.

Your real goal is much more noble, however. You're out to find the marauders who killed your family and exact revenge upon them. You can't do this alone with your tiny Jenner Mech, though. You'll need an entire

lance of powerful mechs before you can take on the evil Dark Wing, scourge of the inner sphere.

First, though, you'll need some C-Bills, the local currency. So hire yourself out as a mercenary, kick some titanium tail, and build up your bank account. As you make more money, you can afford to hire pilots



Engage robots in mechanical mayhem for cash and glory in *MechWarrior*.

for your team and outfit them with mechs. As your team builds experience, you can move the members up to larger, more powerful mechs.

The main screen provides you with a number of icons that you can use to select these and other options. First you'll want to visit the Mech Complex and rearm and repair your Jenner. This will probably wipe out your bank account, so it's time to go into combat. Select the Contracts icon, request a mission, and then haggle your price.

When you've agreed on a fee, click the drop-ship icon and head into combat. The screen will change to show the view from your mech's cockpit. Familiarize yourself with the instruments, but don't take too long, as the enemy will probably be breathing down your mech's neck.

Operating a mech is like a combination of driving a tank and flying an aircraft. You can move the mech in one direction, swivel its torso, and fire in another. If you get into a bad situation, you can hit your jump jets, take off, and escape the line of fire.

The view from the cockpit window is excellent. Three-dimensional shaded polygons represent terrain and the other mechs. A sophisticated heads-up display projected onto the window makes targeting the enemy a snap.

Most mechs have a variety of on-board weapon systems. Be careful not to fire too quickly, though. The more you shoot, the hotter your mech gets. If your mech gets too hot, it will shut down, and you'll be a sitting duck.

If you accomplish your mission, you'll be rewarded financially and

with a percentage of the salvaged parts from the enemy mechs. Fail, and your reputation declines along with your bank balance.

When you have enough money, visit the local bar, hire some mech pilots, and outfit them with the best hardware you can afford. Combat gets a lot easier when you have three hired mercenaries helping you achieve your goal.

Keep an eye on the local news nets for information about the best areas to find mercenary jobs and for rumors that will eventually help you track down the Dark Wing. The local bartender is usually good for a few clues, too.

Although the game doesn't take advantage of the full VGA palette, the EGA and Tandy 16-color screens are excellent. The 3-D shaded polygons used for the cockpit-window views display the excellent quality and smooth animation I've come to expect from Dynamix, the developer who created *MechWarrior* for Activision. Sound support is good, too, taking advantage of the Ad Lib and Roland cards.

This is one of the most addictive games I've encountered in a long time. The combination of role-playing, strategy, and war-game elements wrapped around the robot simulation keep *MechWarrior* from becoming dull. The game is true to the Battletech saga, but even if you haven't played the noncomputer role-playing game, you'll still enjoy it.

DENNY ATKIN

IBM PC and compatibles with 512K; EGA, VGA, or Tandy graphics (640K required); 8-MHz or faster processor recommended—\$49.95

ACTIVISION
Distributed by Mediagenic
3885 Bohannon Dr.
Menlo Park, CA 94025
(415) 329-0500

COLLEGE BOUND

Once you've been accepted to college, you need to think about being away from home cooking, the family car, and your high-school sweetheart. You also need to plan a strategy for surviving final registration. And you might think about how you're going to deal with a roommate whose idea of a good time is throwing the wildest party of the century in your room the night before

your chemistry final. MCE's *College Bound* can clear your thinking on these topics and make your academic journey less perilous.

From the program's main menu, you can view one of six segments. Introduction explains the purpose of the program and presents the pros and cons of small and large schools. Away from Home provides suggestions for combating homesickness, making friends, and acting responsibly. Roommates covers desirable roommate characteristics, the dynamics of living together, and how to cope with an undesirable roomie.

Other program segments focus on the pluses and minuses of operating a car or bicycle and contrast dorm life with off-campus housing. Signing Up for Classes, the final section, helps you avoid the pitfalls of registration day and explains adding and dropping courses and the credit systems.

The majority of the program consists of pertinent onscreen infor-



Master Dorm Life 101 before you reach the ivory towers with *College Bound*.

mation, explanations, and suggestions. Interspersed throughout are graphics, preference tests, and quizzes employing multiple-choice, true/false, and fill-in-the-blank formats.

Overall, the quality of the writing is competent, as are the blocky yet colorful drawings. Sound is nonexistent. An appropriate musical score or some suitable sound effects might have livened up the program.

For the most part, the text and graphics flow smoothly from screen to screen. Control, via the keyboard, is effortless. Multiple-choice and true/false selections present few technical difficulties. However, in trying to serve the needs of thousands of prospective buyers with potentially tens of thousands of questions, the developers have had to rely on generalities. This unavoidable trade-off leads to blandness and naivety. Comments such as "Some colleges are quite large, some quite small," or "Be nice, say nice things, and be yourself" do nothing for the college-bound student who

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PREScripT

Do you long to give your Hewlett-Packard LaserJet printer PostScript capabilities, yet balk at the high price of many adapters? If you do, then check out *PreScript* from Pan Overseas Computer.

The program comes in two versions. The standard version, priced at \$195, offers Adobe-compatible typefaces in Courier, Helvetica, Times Roman, and Symbol, with bold, italic, and bold-italic fonts. The deluxe version, at \$395, adds Avant Garde, Bookman, Helvetica Narrow, New Century Schoolbook, Palatino, Zapf Chancery, and Zapf Dingbat typefaces, again with bold, italic, and bold-italic fonts. The fonts are scalable, and while the documentation does not specify maximum size, 300 point prints very nicely.

The program requires an 80286 or 80386 computer, uses DOS 3.1 or higher, and is something of a memory hog. It demands 2 megabytes of extended memory on top of regular system memory, and the deluxe version will take up 2.5 megabytes of hard disk space. *PreScript* operates as a TSR (Terminate and Stay Resident) program, so you can drop in and out of printing applications without reloading. To change printers, you must reboot.

Program documentation is clear and specific, and *PreScript* installs smoothly. The documentation con-

tains specific setup instructions for *MicroSoft Word* 5.0, *WordStar* 5.5, *WordPerfect* 5.0, and such popular graphics programs as *PC Paintbrush*, *Ventura Publisher*, *Pagemaker*, *PFS*, *GEM*, and *CorelDraw*. An entire section is given over to the installation and use of the program in *Windows*.

Since my first interest is in word processing, I followed the setup instructions for *WordPerfect*. The setup went very smoothly for both *WP* 5.0 and 5.1, although some modification of the instructions is necessary for 5.1. The interface with *WordPerfect* is transparent. The only weakness in the program appeared when the text was printed. *PreScript* is slow, very slow. Two minutes were required for each text page, in contrast to the 11 seconds required under Swfite's *Glyphix* program.

According to POC, *PreScript* is fast, so I called the Technical Support department to see if I had done something wrong. They were most cooperative and helpful and, after some questions about my machine configuration, told me that the cause was that my extended memory is located on an expansion board. POC claims that, for computers with extended memory on the motherboard, about 20 seconds per text page would be the normal printing speed.

Even accepting this limitation, I would be disappointed in a program that required twice as much time for printing as *Glyphix*. POC must have some reservations of its own, since it markets a speed-up card, the POC Laser Interface Card, for \$295.

Test prints of all the fonts in the deluxe packages produced highly presentable copy. You can probably find a font to suit your taste from *PreScript*'s wide selection.

WordPerfect has inherent graphics capabilities. A sample page of two complicated graphics figures printed very nicely under *PreScript*. Again, the program was a little slow in comparison with *Glyphix*, but not nearly as slow as with text. *PreScript* required almost 5 minutes to print the page that *Glyphix* printed in 2½ minutes.

Turning to a more specifically graphics-oriented program, I followed the setup procedure for ZSoft's *Publisher's Paintbrush* and installed it quickly and easily. The program went smoothly through its paces of constructing and printing a few graphics figures. Again, the output was most satisfactory.

POC emphasizes the compatibility of *PreScript* with *Windows*; that's what I expected and that's what I found. The procedure for installing

PreScript in *Windows* is a little lengthy, but the instructions guide you through the process. If you're a *Windows* user, you'll find that *PreScript* meshes smoothly and seamlessly with that interface and even offers a preview feature that permits you to view your document before it's printed.

Overall, *PreScript* emerges as a well-designed, well-documented program. It's clear that POC has gone to some lengths to ensure its compatibility with the popular word processing and graphics programs. My sole criticism: its speed. That can be offset in part if your extension RAM is on the motherboard, and it can be further improved if you wish to acquire the POC speed-up board. If PostScript emulation is on your wish list, *PreScript* may well be a likely candidate.

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ton. Both populations will move to the center of the world and fight until one or the other side is destroyed. You can play against the computer, play against another human via modem or null cable, or have the computer play itself.

Because *Populous* is so complex, it will take you a while to get a feel for the game. Stick with it—this game offers more than just a few irreverent chuckles. Its easy-to-use interface and intricate strategies make *Populous* so absorbing you'll swear it's—dare I say it?—almost divine.

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THE FOOL'S ERRAND

Suffle a deck of tarot cards and lay them out one by one until the Fool shows his simple face. If you could ask him what he'd been up to, he would probably tell you to play *The Fool's Errand* and see for yourself. Here's one game in which you play the Fool as you wander in search of the 14 lost treasures of the ancient kingdom of Tarot, guided only by a magically corrupted and obscured map provided by the Sun. Finding your way will mean solving bewildering puzzles and thus earning pieces of the map.

Along the path from obscurity to heroism, you run into characters such as the High Priestess and Death, or astral figures, like the World and the Moon. The High Priestess, who has hidden the treasures, will trade your life for a dark quest she wants you to complete. The Moon, who calls the Sun a trickster, gives you advice on how to read the map. Each character provides clues, but each also sets a puzzle before you to stymie you on the path to success.

For a puzzling fool like myself, these 56 brainteasers are the real treasures. Some still seem simply unsolvable. Others were a snap. My favorites were the mazes. The Maze of Hedges opens with very few walls—just an en-

trance, an exit, and a few barriers. It looks so simple, but move a few steps, and a wall pops up. *Oh, hidden walls*, you think. *No problem. I can deal with hidden walls*. So you go a little farther and a great gust of wind blows you clear across the maze. Puzzled, you move a few more steps, unveil a few more walls, and *whoosh*, another wind whisks you across the maze. These bothersome breezes are random, so you can't use them to get out of the maze. Just go with the flow until you



Test your puzzle savvy and patience as you seek treasure in *The Fool's Errand*.

reach a wind-free zone. In another maze you must contend with hidden walls and hidden passages. If you measure fun by how much frustration you're willing to withstand, these mazes break the scale.

Other puzzles, though less spectacular, are equally entertaining. A series of buttons, when pushed in the right order, will reveal a phrase, boggling your brain for hours. Even after documenting what each button did, I had trouble solving these puzzles. For a mental rest from exasperation and logical calisthenics, I enjoyed the word searches.

Despite the neuron-wrenching challenges, *The Fool's Errand* is a perfect escape from real-world tension. Although you can't create characters and define them by 20-zillion attributes, the game has all the magical aura of a fantasy role-playing adventure. The puzzles are more interesting, the path more defined, and the story less dependent on ax-wielding ogres.

Aesthetically and technically, the game easily distinguishes itself in the world of magical mystery tours. Although you need a full 640K of RAM to run the game in VGA, the graphics are well worth it. However, if you live in a 16-color world, you'll be pleased, too. CGA players need not apply.

The cards have all the feel of a traditional tarot deck—beautiful images that reflect the nature of the character represented. The puzzles, particularly the jigsaw puzzles, are sharp and interesting. The font used for the

story scroll, alas, is choppy. But that's my only complaint with the visual effects.

The sound effects aren't any more impressive than the typeface. But the game doesn't rely on sound anyway.

Because *The Fool's Errand* comes on four disks, you really need a hard disk to run it. And no wimpy 256K or 384K of RAM for this game; you need 512K for EGA and Tandy graphics. Thankfully, the game works as well with a keyboard as it does with a mouse or joystick.

Even though *The Fool's Errand* requires a lot of horsepower, the fun is worth the requirements. I still haven't solved all the puzzles, so I still haven't seen the finale. But, I'm no fool. I'll keep trying.

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DR. SWITCH

Growing numbers of applications offer the option of dropping to DOS from within the program. Once you're at the DOS prompt, you can theoretically run another program, although all too often you don't have enough memory to allow the new program to execute. *Dr. Switch* solves this problem—and then some.

The program moves your original application out of main memory, storing it to the most efficient available medium—expanded or extended memory or disk. Then *Dr. Switch* frees all available memory—saving a few kilobytes for itself and DOS functions—for use by the next program.

Doing all of this is simple, although the program's command structure may take some getting used to. The structure isn't complex, but it must be combined with the shell-to-DOS command of the original application, along with the path of the application you're getting ready to run. The program's straightforward manual walks you through most of the possible command combinations.

And the effort is worth it. Shell-

ing to DOS takes on a whole new meaning with *Dr. Switch* on call.

More memory available means you can run even large programs while other large programs are on hold. When you've finished, exit the new program and return to your original—exactly where you left off.

Or exit and move with *Dr. Switch* to the next program on your list—again and again! As I wrote this article, I shelled out of *Quattro*, into *Agenda*, out of that, and into and out of two other programs. All effortlessly.

Now, if only I can find my way back to where I started.

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SWORD OF THE SAMURAI

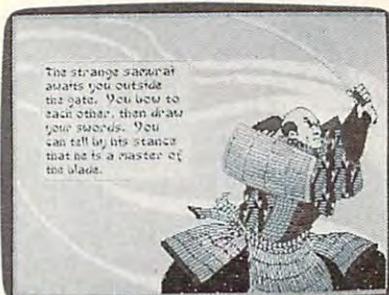
You creep noiselessly through the dimly lit halls of your daimyo's castle, intent upon finding his sleeping quarters. You plan to silently dispatch him to the land of his ancestors with a single blow of your *no-dachi* (great sword). You'll then take over his title and castle. Suddenly, there's an excruciatingly loud creak as you step forward—the daimyo's trick nightingale floor has betrayed you. His guards will be here shortly and the only course of honor left to you as a samurai warrior is *seppuku* (ritual suicide). Luckily, your son is ready to take your position.

You may find yourself in this situation as you play *Sword of the Samurai*, a richly detailed evocation of sixteenth-century feudal Japan, when the code of the samurai placed honor and duty above all else.

You start as a young samurai of moderate honor and work your way to more exalted honor through the game's many adventures. Engage in political intrigue, worry about marrying well, form and break alliances, duel with swords, engage in military battles, and attack neighboring provinces during the game. You'll probably also have to rescue a kidnapped maiden. You may even risk dishonor or suicide by practicing treachery.

As your martial and diplomatic skills increase, you will become *hata-moto* (lieutenant), then *daimyo* (provincial ruler). Then you must work to conquer the remaining 47 provinces to become *shōgun* of all Japan, second only to the emperor.

Sword of the Samurai provides rousing gameplay for all tastes. There's arcade action in sword-fighting duels and melees. During these, you get overhead views of your war-



You can experience a slice of exciting samurai life in *Sword of the Samurai*.

rior character in mazelike castles, villages, or rice paddies while he fights hordes of guards or peasant bandits. There's strategic action in planning and directing battles between armies of foot soldiers, archers, mounted swordsmen, and musketeers with primitive harquebuses. And if that's not enough, during the course of play you move your character from place to place, meet with rivals and superiors, marry their daughters, hold tea ceremonies, deliver stinging insults to provoke duels, and offer to battle enemies to defend and enhance your clan's honor.

Your rivals and enemies act based on what you do. There's an incredible range of scenarios in this game. As you scheme to gain power and wealth, each action prompts logical responses from your rivals. With so many possibilities, each game takes on its own character, often markedly different from previous games.

You can be playing five minutes after removing the shrink-wrap, but don't skip the manual. Its 102 pages are full of fascinating details (like the nightingale floors—you can spot them if you're careful because the pattern of the flooring is subtly different) as well as an excellent portrayal of the culture of feudal Japan and its many subtleties. MicroProse has done an outstanding job; the game teaches you about another culture and even gets you thinking like a samurai.

When you start the game, you can practice duels, melees, or battles. Get in shape before launching into the

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full-scale game; it's frustrating to work through an hour's political intrigue only to be skewered by a rogue Buddhist monk in a sword duel.

Sword of the Samurai provides first-class graphics in VGA and EGA; even the CGA is acceptable. It sets the oriental mood with Japanese music that's recognizable on a plain-vanilla PC speaker but is glorious with an Ad Lib music card. I applaud the game designers who have made sure that the game plays well from the keyboard without a joystick.

After many hours of living in ancient Japan through this game, I have only one complaint: I find the stylized Japanese lettering used to present text throughout the program a little difficult to read, even on my VGA Plus monitor. My eight-year-old son has a particularly hard time with it, though he loves the game.

Oh, oh. Here come the guards. I hope my son has better luck with these thrice-cursed nightingale floors. They won't take me without a fight. Perhaps I can flee down this hallway and find the daimyo yet. To pay by seppuku for the dishonor of being caught in treachery is bearable, but only if I kill him first. Daimyo, here I come!

RICHARD O. MANN

IBM PC and compatibles—\$54.95

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POP QUIZ



Nothing fills a student with dread faster than hearing a teacher utter two words: *pop quiz*. Now a program called *Pop Quiz* makes life easier for teachers and students alike by offering flexibility and teaching potential.

With *Pop Quiz*, teachers enter their own questions and answers, correct and incorrect, on any topic. From this information, it designs true/false, multiple-choice, matching, or short-answer questions in any mixture or proportion.

If you want certain questions to appear on every exam, mark them as critical when you generate a quiz. Suppose you have 100 questions on U.S. history and you want a 25-question quiz with 20 percent of the questions true/false, 30 percent multiple

choice, and the remainder short answer. *Pop Quiz* pulls the questions at random, arranges them in the proper format, and prints them in minutes. A single student can take an exam at the computer, and *Pop Quiz* keeps track of the score.

Teachers should be careful when testing a student at the computer. The option that deals with short-answer questions is the weak link in *Pop Quiz*'s chain. A student's answer must exactly match the teacher's. For example, in asking what two minerals make up bronze, *Pop Quiz* expects you to answer *copper and zinc*; if you reverse the order and type *zinc and copper*, the program marks your answer incorrect. To its credit, however, there is an option that accepts either close or exact spelling.

Students can use the program as a study aid by entering their own data and using *Pop Quiz* as a flash card to reinforce their knowledge. The program works on any PC with a hard drive or two floppy drives. It's menu-driven, and up to 250 questions fit on a standard 360K disk.

Pop Quiz is a quick-and-easy tool for generating and revising quizzes—even if students won't appreciate it.

TOM NETSEL

IBM PC and compatibles—\$49.95
Teacher's edition—\$99.95

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STARFLIGHT 2: TRADE ROUTES OF THE CLOUD NEBULA

Space travel and conquest have been the twin themes of many an adventure game. Typically in these games, you travel through the galaxies shooting any object or creature in your way, with success depending more on your reaction time than on your skill. *Starflight 2: Trade Routes of the Cloud Nebula* takes a more realistic, in-depth approach to space travel.

Your mission is to find the source of the fuel substance known as

Shyneum and obtain the technology of your enemy, the Spemin. To accomplish this and to generate revenue, you must communicate with alien species encountered as you travel through space and gather information leading to goods, life forms, and minerals needed for trade. As in



Bargain with aliens and explore hundreds of planets in *Starflight 2*.

real life, prices and availability of items are constantly changing.

The game begins in Starport Outpost 1. This is your home base, where each journey begins and ends. Starting with a minimum of funds, you create a crew, train them, and equip your starship. The outpost contains six modules for completing these tasks and a docking bay for boarding your starship.

Select a crew from five different species (Human, Velox, Thrynn, Elowan, or Android), each with its own unique strengths and weaknesses. Any combination of these beings can be selected to make up your crew, and pictures of the beings, as well as information on their abilities, appear on a screen.

After selecting the crew members, decide whom to train and how much to train them. The rate of learning and durability of the species vary, and how much you will train them depends on your capital and the maximum skill level of the crew member. Of the six crew positions, initially the navigator and communications officer are the most important. The next position of significance is the science officer. He will take the sensor readings and analyze the planets you visit. Crew members selected for these three positions should be trained to the highest possible level. The better the training of individual crew members, the better their performance and your chances at success.

After your crew is trained, you supply your starship with weapons, shielding, engines, and other equipment. Initially, most of this equipment is beyond your financial means. Since communication is more appro-