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May 1990

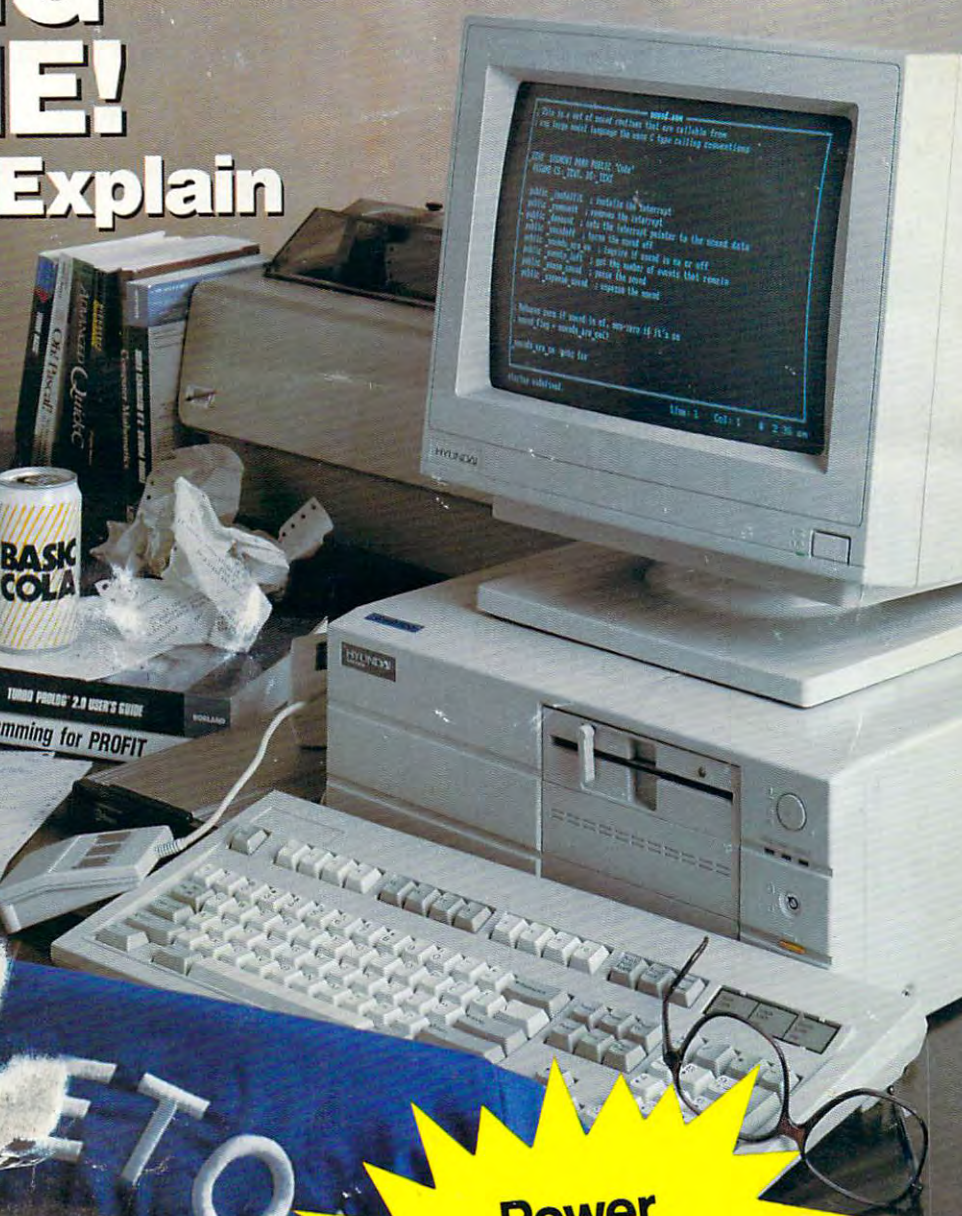
COMPUTE!

THE CHOICE OF HOME PC ENTHUSIASTS SINCE 1979

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- ▶ Coder Vocabulary
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(See page 31)

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New Compatible Games.

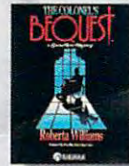
Here are just some of the hottest new computer games designed for use with the Ad Lib Music Card:



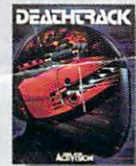
Lucasfilm's Loom



MicroProse's Sword of the Samurai



Sierra's The Colonel's Bequest



Activision's Deathtrack



Activision's MechWarrior



Taito's Bubble Bobble

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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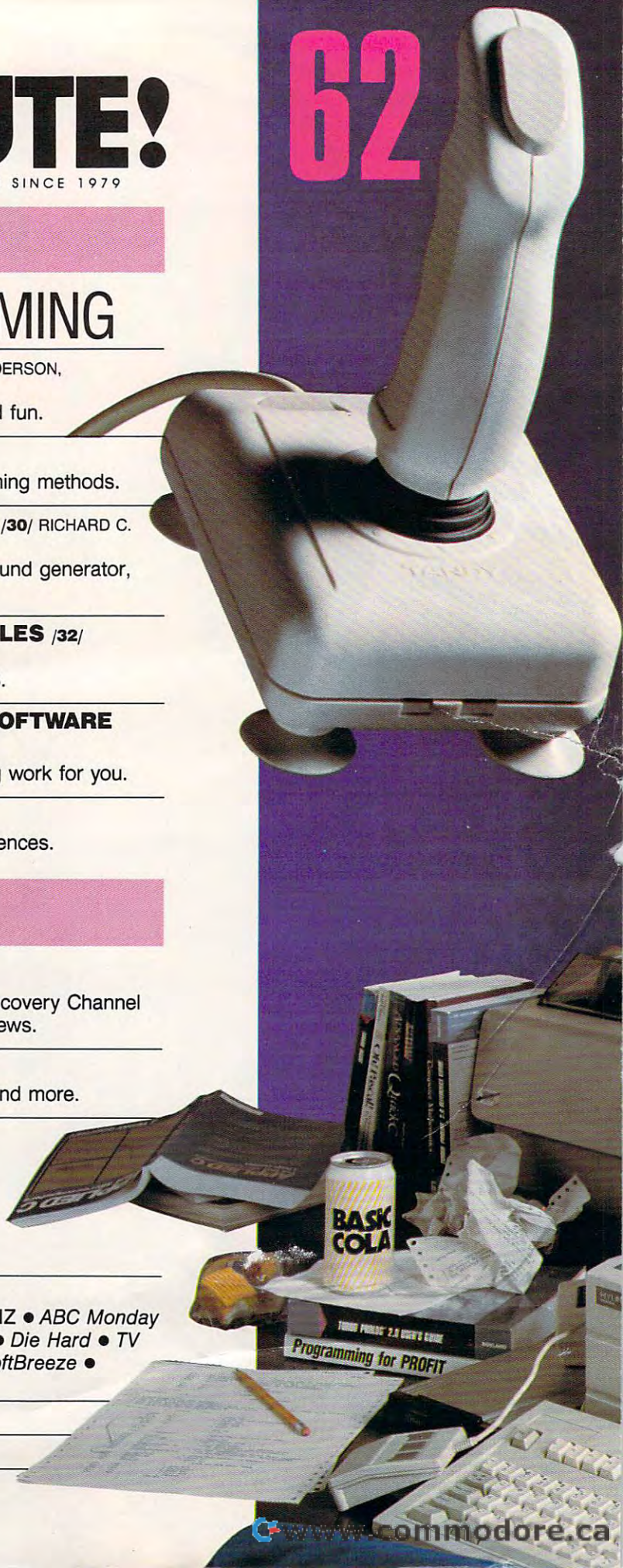
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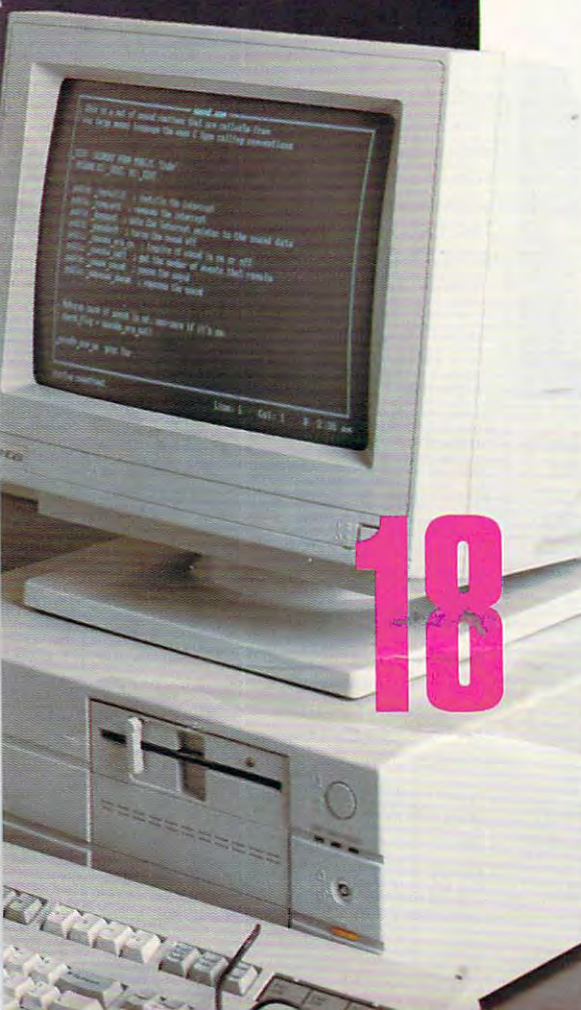
A tasty guide to hacker haute cuisine.

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P E T E R S C I S C O

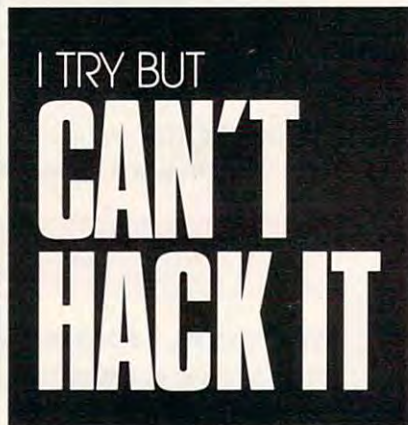
First of all, programming was *not* why I got interested in computers. I knew I was in trouble when I took my one and only college class in programming—Intro to BASIC—and *algorithm* was the first word out of the instructor's mouth. I thought, *Hey, sounds like some funky bacteria music*. I've gotten better now; I'm not nearly as innumerate as I was then, when the history of the printing press and John Donne's poetry occupied most of my time and numbers were abstract concepts under authoritarian rule. *But what does that mean exactly, two plus two equals four?*

It wasn't that long ago; I can remember clearly descending the old marble stairs at Frazier Hall at the University of Kentucky, walking slowly down to that pit of raucous machinery known as "the computer room." That room, painted institutional green, was always crowded with other students—suffering computer illiterates like me and celebrating smiling hackers that I don't remember ever seeing above ground. That room was my weekend Bastille, torturing me under its unyielding fluorescent lights, mocking me with its dark mysteries, sucking away the daylight hours. I entered determined on Saturday morning and emerged at dusk exhausted, like a brain-dead Dracula, trailing a green-and-white computer printout 20 yards long, evidence of what I considered then to be the absolute incompatibility between man and machine. At least this man.

This all happened in the early eighties, before the CRTs arrived on campus. For me, writing BASIC programs meant first finding a working keypunch from among the many relics aligned on long tables stacked with books, old cards, empty soda pop cans, and Twinkie wrappers. Having secured a stack of cards from the barely tolerant overseer, I would insert them into the machine and then begin

to tap out my meager lines of code. The square holes that filled my card represented hours of what for me were great leaps in logical thinking, like translating Fahrenheit to centigrade or determining who would win some imaginary intergalactic space race between several aliens, figments of my instructor's sci-fi-pulp imagination.

I failed, utterly. I failed to grasp the most rudimentary concepts of the programming process, though I could whip out proofs without effort in my symbolic logic class. I failed to see the consequences of every variable, though I could ferret out the slightest nuance of Gilbert Sorrentino's latest postmodern novel. I failed the final, though I promised my instructor that



I would never touch a computer again if she would just give me a D minus.

One year later, on my way to my contemporary American fiction class on the ground floor of the Patterson Office Tower, I came upon a row of computer terminals. Someone had turned off the overhead fluorescent lights. Stepping through the hall, coolly lit with a pale green glow, was like walking through a twenty-third-century monastery. Like novitiates gathered over rare illuminated manuscripts, a small group of students hunched intently over their screens, only the soft *click click click* of keys against the reverent silence.

That was the moment that I be-

came interested again. I never went back to programming. I never asked to repeat my BASIC class so that I could raise my grade. But I did overcome my aversion to the machine, my acceptance bound up in my thinking *That looks like fun*. I believed then, and I believe now, that had I worked at one of those monitors, rather than with punched cards, I would have survived that class. People talk today about user-friendly software; they ought to think back a dozen years and remember when monolithic machines stood cold and threatening before anyone who dared learn to program.

I've also discovered something else: It's OK if I don't want to write 30 lines of BASIC code just to see what happens. But just when I think my programming days are behind me, I learn I can't escape it. No computer user can, not hobbyist, enthusiast, power user, or dabbler. I run my spreadsheet from a batch file—I'm programming. I write a script to download E-mail from my GENie mailbox—I'm programming. I set up a menu system so that my wife, a computer novice, can do what she needs to do without confusion—I'm programming. I write a series of *WordPerfect* macros to speed formatting—I'm programming.

I like to think that there are a lot of people out there who, like me, have a need or a desire to learn about personal computers, but who, also like me, have little inclination or talent for learning to program. Colleges and universities are making some progress here, offering practical classes for computing in addition to the traditional programming classes for computer science majors. Some schools teach special freshman English classes using word processors.

It wasn't possible for me, when I stepped into that BASIC class in 1982, to learn about computers outside the realm of programming. But personal computers have redefined the landscape and brought the practical side of computing into sharp focus. And I *can* hack that. □

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NEWS & NOTES



Get Zenith's SupersPort 286 model 20 at Sears in the Brand Central home electronics department.

Home Office from Sears

Home-office shopping just became more convenient. The next time you're at Sears, you can pick up a dandy Zenith laptop while you're buying a rake for the yard or clothes for the kids. Zenith is offering its SupersPort 286 Model 20 laptop computer through Sears' largest Brand Central home electronics departments. The Model 20 features a 20MB hard drive, 1MB of memory expandable to 2MB, a backlit screen, and four hours of battery operation. The SupersPort 286 model 20 sells for \$2,696, an optional carrying case is \$59.99, and a modem runs \$299.99.

—MIKE HUDNALL

PAPERLESS BOOKS

After a hard day at work, there is nothing like settling down in front of your computer to read a good book. The GENie online network now distributes current, out-of-print, and original written works in an electronic form on its new SoftServ RoundTable.

Using a personal computer and modem, you can download ASCII text files containing nonfiction works and complete novels.

The electronic books, which can be read on your PC's screen or printed out, cost \$2.50 or less, plus GENie connect charges for the time spent downloading them. For more information on GENie, call (800) 638-9636.

—DENNY ATKIN

IT'S ALL DONE WITH MIRRORS

Scientists at AT & T's Bell Labs have built the first computer that uses light, rather than electricity, to process information. Such a technique may one day outpace the processing power of today's personal computers. Occupying about four square feet on a lab bench, the optical computer is a network of lasers, lenses, mirrors, prisms, and photonic devices (circuits that integrate photons and electrons to process information).

Light can carry more information than electricity can. Bell Lab scientists estimate that one small lens can carry more information than could be carried by all the telephone wires in the world.

The prototype operates at 1 million cycles per

second. An optical computer operating at several hundred million cycles per second—faster than most supercomputers—could be ready in the near future.

—DAVID ENGLISH



AT & T Bell Laboratories' technical staff members Bob LaMarche, Michael Prise, and Alan Huang pose with the world's first working optical computer.

Amiga Undercover

Commodore's new high-end Amiga 3000 workstation was shown behind closed doors at the Amiga Developer's Conference in Paris this February. Sources say the computer has a 25-MHz 68030 microprocessor on the motherboard, four 32-bit expansion slots, and a new version of the Enhanced Chip Set that supports two megabytes of chip (graphics) memory. Graphics have been enhanced, with a 1280 X 485 top resolution and a built-in flicker fixer to remove screen jitters in high resolution. The computer will reportedly run both AmigaDOS 1.4 and Commodore's version of the UNIX operating system.

A new mouse and keyboard, with connectors moved to the side of the computer, complement the stylishly redesigned desktop case, according to informed sources. A tower-case version should follow soon after release, along with a multisync monitor that complements the A3000's enhanced graphics modes. The company is expected to formally announce the computer during the second quarter of 1990.

—DENNY ATKIN

The Real Revolution

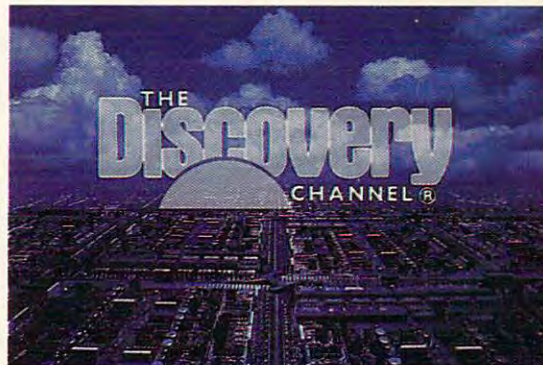
Where there was once only *Pravda*, there will soon be desktop publishing. Aldus has announced the development of a Russian-language version of its market-leading *PageMaker* page-composition program. The software uses the Cyrillic alphabet and is being developed in conjunction with the USSR's State Committee for Printing. Aldus is also working with hardware and software vendors to develop a Cyrillic keyboard driver and Cyrillic screen and printer fonts.

—DAVID ENGLISH

Amiga Christmas

Commodore is back in the black, thanks to strong sales of the Amiga during the Christmas season. Commodore International Limited reported earnings of \$11.3 million on sales of \$310.7 million for its second fiscal quarter, which ended December 31, 1989. While earnings were down from the same quarter last year, this was the first quarter where Amiga sales accounted for more than half of Commodore's revenues.

—DENNY ATKIN



Interactive videodiscs open up worlds of discovery.

The World On a Platter

If you think computer users need a healthy dose of reality, then get ready for a new line of videodiscs from The Discovery Channel. The company will adapt many of its cable-television documentaries into software-driven videodiscs.

According to Fred Bonner, vice president of Systems Development at The Discovery Channel, each interactive title will have two components. "One component will consist of videodiscs containing documentaries edited for the interactive videodisc, plus related video, stills, graphics, and other materials to provide full curriculum support," he explains. "The other component will be computer software, which will provide text and graphics giving in-depth background on the core subject, along with software which allows the user to control the videodisc via the computer."

The Discovery Interactive Library software will be available in July for IBM PC, Macintosh, and Apple IIGS computers. Current plans call for as many as 100 double-sided titles over the next five years.

—DAVID ENGLISH

Computerland in Red Square

Muscovites with enough rubles and a yearning for a personal computer can choose from major vendors such as IBM, Compaq, AST, and Hewlett-Packard at the Soviet Union's first Computerland.

Owner Michael Tseytin, a Russian immigrant who works with Computerland stores in the United States, opened the store in February in expectation of the March International Computer Technology Exposition. Computerland is a sponsor of that show, the largest computer trade show ever held in the Soviet Union.

—MIKE HUDNALL

Radio Shack for the Road

Tandy unveiled its first 286-based laptop computer in February in a play for a bigger share of the corporate and home business market. The black 2800 HD uses a 80C286 processor running at 12 or 6 megahertz and boasts an EGA-compatible LCD display with 640 X 400 resolution, an 84-key enhanced keyboard with 101-key emulation, one megabyte of RAM expandable to two megabytes, an internal 20-megabyte hard disk drive, and a single 3½-inch high-density floppy disk drive. *DeskMate* and MS-DOS 3.3 come burned in ROM.

The 2800 HD weighs under 12½ pounds (including battery) and retails for \$3,499. An optional internal 2400-bps modem lists for \$199.95, a one-megabyte memory upgrade sells for \$399.95, and a replacement lead-acid battery retails at \$49.95.

Tandy also rolled out its 2500 XL and 4016 SX desktop systems. Among its many features, the 2500 XL uses an 80286 processor running at 10



Tandy's 2800 HD puts high-performance computing on the road with one megabyte of memory and a 286 microprocessor in an executive black box.

megahertz, supports 16-bit VGA, boasts one megabyte of RAM, and offers three 16-bit expansion slots. Without a monitor, it retails for \$1,499. The 4016 SX uses Intel's 386SX processor at 16 megahertz and incorporates the same features as the 2500 XL, including sockets for a mouse, headphones, and a microphone. Without a monitor, it retails for \$1,999.

—PETER SCISCO

Turn on, Tune in, Download

The computer industry makes for strange bedfellows. When word first leaked of a joint agreement between IBM and Motorola, it sparked fantasies of ROM-based Amigas running under OS/2 Presentation Manager. The actual announcement was much less fantastic, but no less innovative—the venture

ties thousands of mobile workers to remote host computers by means of radio transmissions.

The joint project, called ARDIS, operates a nationwide radio-data information service. First users of the system will most likely be field-service personnel and salespeople. As a sign of its technological support for the system, IBM demonstrated a prototype laptop PC/radio terminal at the February public announcement.

—PETER SCISCO

Congratulations! It's a Star

A joint venture between IBM and Vassar College scientists has resulted in new information about how stars are created. Using a 140-foot radio telescope and an IBM supercomputer, scientists uncovered an expanding shell of atomic hydrogen in the Orion constellation. Orion is known as a "stellar maternity ward" because so many new stars are being formed there. Powerful forces driving the shell's motion apparently triggered a burst of star formation where the shell and a dense cloud of interstellar gas meet.

"(IBM's supercomputer) enabled us to convert a million temperature readings at various velocities in space into a detailed picture of the locations, velocities, and densities of over 30 clouds and filaments in the region," explained Frederick Chromey, an IBM scientist working at the Vassar College Observatory.

Armed with that data, scientists created a four-dimensional graphics display, with color

representing the velocity of hydrogen emissions and image brightness representing gas mass. The display confirmed the existence of the emissions, which had been found automatically by the computer, and showed how they fit into the pattern of star-forming activity.

—DENNY ATKIN



The Horsehead Nebula is a prominent feature of the Orion constellation, birthplace of the stars.

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No doubt about it: The best way to learn to service computers is to actually *build* a state-of-the-art computer from the keyboard on up. As you put the machine together, performing key tests and demonstrations at each stage of assembly, you see for yourself how each part of it works, what can go wrong, and how you can fix it.

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moving from the fundamentals to sophisticated computer servicing techniques. Step by easy step, you get the kind of practical hands-on experience that makes you uniquely prepared to take advantage of every opportunity in today's top-growth field of computer service.

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LETTERS

Chess Quest

I was recently exposed to a neat game, *Laser Chess*, on an Atari computer. The computer owner informed me that he had typed it in from your magazine.

I own an AT clone and would like to obtain a copy for my machine. Is it available for the PC?

ROY N. CAIN
POWHATAN, VA

Laser Chess is indeed available for the PC, along with eight other games, on the disk COMPUTE!'s Best PC Games. You should be able to find this \$11.95 magazine-and-disk combination at your local newsstand, or you can order it from COMPUTE! Publications. See the ad in this issue for ordering information.

Parts Wanted

I enjoyed Bruce Haase's article in the February 1990 issue entitled "Build Your Own AT." I was even motivated to try and duplicate the procedure Mr. Haase described. Unfortunately, I have had no luck finding a national supplier who sells a kit to build a computer like the one described in the article. I would very much like to know how I could get in touch with the supplier that Mr. Haase used to build the computer he described. Thank you for the helpful articles and ideas.

BOB CARRELL
VINCENNES, IN

Bruce Haase responds: The kit I used in the article came from Jameco Electronics in California. Below you'll find this company's address and a sampling of other national suppliers for PC kits or computer components. I haven't had specific experience with all of the firms listed. The majority of these firms also sell completed, assembled PCs.

Before ordering from any mail-order distributor, make sure that you know and understand the supplier's payment, shipping, guaran-

tee, and return policies. Also, you should find out what kind of technical support is available from the company and whether detailed set-up, installation, and/or assembly instructions are provided.

*Altex Electronics
300 Breesport
San Antonio, TX 78216
(800) 531-5369*

*Dallas Systems
3133 Garden Brook
Farmers Branch, TX 75234
(800) 635-5810*

*Express Micro Mart
5220 Drake Rd.
West Bloomfield, MI 48322
(800) 533-0177*

*Jameco Electronics
1355 Shoreway Rd.
Belmont, CA 94002
(415) 592-8097*

*JDR Micro Devices
2233 Branham Ln.
San Jose, CA 95124
(800) 538-5000*

*Network-PC
5020 NW 39th St.
Lincoln, NE 68524
(800) 873-9235*

Shuttle Simulator

Because I am not only a great fan of your magazine but also of the American space program, I would be grateful if you could answer a question I've had for a long time. I'd like to know if there is a realistic simulation of a space shuttle mission available for the IBM PC. I would like to know if this software supports the Tandy 16-color graphics adapter.

KRZYSZTOF K. PIERSCIENACK
SAN FRANCISCO, CA

For an excellent simulation of a Space Shuttle flight from liftoff to landing, check out Orbiter (\$49.95), available for the IBM PC with CGA or EGA graphics and the Macintosh. The program lets you perform a variety of shuttle missions, including launching and repairing satel-

COMPUTE!

THE CHOICE OF HOME PC ENTHUSIASTS SINCE 1979

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LETTERS

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lites. Orbiter is available from Spectrum HoloByte, 2061 Challenger Drive, Alameda, California 94501; (415) 522-3584.

Seeking Resources

I am interested in finding more educational programs for the Commodore 64 and 128. Is there a resource center or listing of these types of educational software for home computers?

DEBORAH STEVENS
SAN ANTONIO, TX

If you're looking for information on educational software for young children, you should find a copy of High Scope Press's Survey of Early Childhood Software, by Warren Buckleitner (\$19.95, ISBN 0-929816-00-5). This comprehensive text reviews over 350 educational programs and covers all computer models. Each program is given a rating and a short review. Many of the listings also include screen photos. The book is available from High/Scope Press, 600 North River Street, Ypsilanti, Michigan 48198; (313) 485-2000.

Home Works

Thanks for reviewing *Design Your Own Home, Architecture* in the January issue. The reviewer did a good job describing many of *Architecture's* features but may have misled readers in a few areas.

He wrote that you could not undo individual mistakes. In fact, you can undo mistakes two ways. You can press the right mouse button to instantly remove the last object drawn (such as a line, box, and so on), or you can click Undo on the menu bar to remove all changes made with the last tool that you used.

The reviewer indicated a problem with the grid function and went on to describe how it should work. We did discover, and fix, a minor implementation flaw where the grid orientation didn't align perfectly with the top left corner of the screen. However, this didn't affect the usefulness of the

grid snap feature.

There are a few important features the review missed or didn't explain fully. The predrawn architectural shapes (tubs, showers, sinks) are automatically scaled to size for commonly used scales when you add them into a drawing, reducing the need for resizing. A stud repeater tool lets you easily (in a couple of seconds) draw a series of studs or beams and shows the amount of lumber that's needed. And you get two-dozen predrawn floor plans with the program, plus four additional libraries are available.

Our goal with *Design Your Own Home, Architecture* is to provide an affordable design tool that lets home owners, contractors, or anyone else create architectural drawings without spending many unnecessary hours or days trying to figure out complex features they don't need. We think the positive comments we've received from our customers, people who have a real job to perform, indicate that *Architecture* meets that goal. For example, recently a contractor told us that he has put his high-end CAD packages on the shelf because *Architecture* does everything he needs, and much faster.

MARY CAROL SMITH
CHAIRPERSON
ABRACADATA

Clarification

A reporting error in the March 1990 issue misidentified the upgrade to Parson Technology's MoneyCounts 6.0 as MoneyCounts Plus. The correct name of the upgrade is MoneyCounts Extra. It does not, as reported, offer a portfolio manager; however, among its many features are expanded memory support and enhanced macro support (up to 128). We apologize for any inconvenience our error may have caused.

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. □



COMPUTE! SPECIFIC

MS-DOS

When it comes to transferring files from one word processor to another, *You can't get there from here* is what you hear most often. But things have changed. With *Word for Word Professional* (Mastersoft, 4621 North 16th Street, Suite B210, Phoenix, Arizona 85016; 602-277-0900; \$149), you can get there from here, and you can get there with style. Version 4.1 of this amazing product translates to and from dozens of text-cruncher formats, and it preserves the original document's formatting.

I have to admit that I'm prejudiced when it comes to *Word for Word*. It saved my skin recently, and I regard it as something of a software saint. Here's what happened.

Just before deadline, I received an article I needed to edit. I had to process the text quickly, but the file's format was strange and I was stumped. Maybe it's *Word*, I thought. I loaded *Word*, but the text looked like gobbledygook. I booted *WordPerfect* 5.0, but the text still looked like Martian. I broke out in a cold sweat.

I called the author and asked which word processor had produced the document. *PFS:First Choice* was the answer.

I grabbed my newly acquired copy of *WFW* to see if *PFS:First Choice* was supported. Fortunately, it was, and

within five minutes I had navigated *WFW*'s easy-to-follow menus and was editing the feature, with the author's formatting intact, inside *Microsoft Word*. With a shout of *Hold the presses*, I filed the feature just under deadline. *Word for Word Professional* had saved the day.

If you work with more than one word processor, *Word for Word Professional* is a necessity.

No-Lug Laptop

This year's Winter Consumer Electronics Show, held this past January in sunny Las Vegas, saw the introduction of scores of new Nintendo titles, Nintendo peripherals, and of course, new games for the Nintendo Game Boy. But it was also the site for the introduction of one of the hottest new laptops so far this year—the Psion MC 600.

Psion, famous around the industry for its hand-held MS-DOS-compatible Organizer, has created a new series of revolutionary laptops that weigh a mere 4½ pounds. These new machines, which Psion calls *mobile computers*, come in two flavors. The MC 200 and 400 use a proprietary, multitasking, graphics-based

operating system. In place of a mouse, these machines have a touch pad just above the keyboard. The 200 and 400 should sell for about \$1,000 and \$1,600, respectively.

Most PC users, however, will be interested in the MC 600, the company's PC-compatible machine. The 600's 4½-pound box is just two inches thick and houses a full-sized QWERTY keyboard. The computer's gray case is sleek and feels sturdy despite its light weight and size. The display is a 640 × 200 CGA-resolution LCD. Although the screen isn't backlit, it uses a new technology—retardation film—that provides more contrast than the usual reflective LCD.

The machine is driven by an 80C86 microprocessor running at 4.77 or 7.68 MHz, and it boots MS-DOS 3.2 from ROM. The 600 comes equipped with 768K of conventional RAM and a 1MB ramdisk. For external storage, the computer sports four solid-state drive bays. The solid-state disks the computer uses are about the size of a credit card, but they're somewhat thicker. They use Intel's patented read/write flash technology. And they are expensive. The largest storage size currently available is 512K, which weighs in at \$400. In three years, the company

hopes to offer disks with as much as 8MB of storage. The 600's power system is unbelievable. It uses eight standard AA batteries—the kind you can buy in any drug store—and Psion claims a battery life of an amazing 30 hours. (The company boasts battery lives of 75 and 60 hours for the 200 and 400, respectively.)

So how much does this dream laptop cost? A cool \$3,000. That's more than NEC's UltraLite, but the machine may be worth it. The only real problem is the solid-state disks. At \$400 for 512K, they're simply too expensive for most users. If the price of these disks comes down, this laptop could be a real featherweight contender. For more information, contact Psion at 118 Echo Lake Road, Watertown, Connecticut 06795; (203) 274-7521.

Go Fishing

Coming up with creative ideas isn't easy. Most of us are probably familiar with brainstorming—networking ideas by looking for links and associations. And most people would agree that brainstorming is easier with a friend.

But a thinkfest partner isn't always around, and unless you have tons of cash, hiring a full-time brainstormer is out of the question.

Enter *IdeaFisher* (Fisher Idea Systems, 18881 Von Karman Avenue, Ground Floor, Irvine, California 92715; 714-474-8111; \$495), a new PC product that is best described as a thesaurus for ideas. In action, this program is a brainstorming aid that's almost as good as having a partner.

Be forewarned: Before you install *IdeaFisher*, realize that the program takes a whopping 7MB of hard disk space. That's more than a third of a 20MB disk, and it's a large chunk out of almost any size

IDEA FISHING
HORSEING AROUND
ORCHARD INVASION
FUN WITH FRACTALS
MAC UTILITIES

disk. The hardest part of installation is deciding which files to remove from your hard disk to make room for *IdeaFisher*. After that, everything is easy.

After you have *IdeaFisher* up and running, there are many ways to use it. Here's one scenario.

Let's say that you've started a company and you're trying to find a name for it. First, you'd go to the program's QuestionBank and select some relevant questions about your company's product. After you had answered these questions, you'd have the program filter your answers for keywords. You'd look over these keywords and select those that seem the most promising, and you'd tell *IdeaFisher* to find associations.

Chances are the associations will number in the hundreds for any one selection, so *IdeaFisher* categorizes the group. You can select any group and move down the list. As you move through associations, each step in your path is copied into *IdeaFisher*'s notepad for review or export to your word processing program.

If you've ever brainstormed using your word pro-

cessor's onboard thesaurus, you have some idea of what *IdeaFisher* is like.

IdeaFisher's database of associations is excellent (you'll be surprised by this program's clever connections), but I do have a few complaints about its interface. It uses a menu-driven windowing environment, but mouse and keystroke commands are nonstandard. Moving and resizing windows is awkward and a little sluggish. The notepad has word-wrap; but other features, such as formatting or cutting and pasting, are missing. (The designers should take a look at the notepad in *PC Tools Deluxe* for an example of a simple but functional editor.)

If Fisher Idea Systems can streamline the program's interface, *IdeaFisher* could be an indispensable tool for anyone who needs to be creative. If you don't think the interface will get in your way, take the plunge now; otherwise, wait for the next release.

Date with DOS

If you're worried that DOS's date function might stop working when the calendar rolls

around to the year 2000, you can relax. Current versions of DOS will work fine in 2000 and, as a matter of fact, for almost a century after.

When DOS was designed, seven bits were reserved in each directory entry to indicate the year. A little arithmetic will tell you that the largest number seven bits can represent is 127. It's obvious that 127 isn't much of a number for a year, so the designers used it as an offset from 1980, the year of DOS's birth.

If you add 127 to 1980 you get 2107. Because of the way the BIOS handles numbers, however, 119 turns out to be the maximum offset instead of 127. Recalculate, and you come up with an ultimate date of 2099, which has the advantage of looking more like the last year of something.

You can experiment with DOS's DATE function yourself. Type DATE at the DOS prompt and then enter a date that includes the year 1979. Using the same procedure, try 2099. Finally, try 2100. Obviously, DOS doesn't like that year, but hopefully we'll all get a bug fix from Microsoft before that century rolls around.

—Clifton Karnes

64/128
87149

Busy Bee Software's *The Write Stuff* version 2 (for the 64—\$29.95) features a 78,000-word dictionary that supports your 1764 RAM Expansion Unit. In addition, this word processor lets you work on two documents at once, supports most dual disk drives (and two 1541s or 1571s), and lets you toggle between the normal QWERTY keyboard and the supposedly faster Dvorak keyboard. To save you the bother of flipping through the manual, this package uses an on-disk help system that lets you keep three help screens in RAM for answering your most frequent questions quickly. Also, you

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can customize the program to support your powerful utilities, such as turbo-save programs and print spoolers.

Apart from a host of advanced word processing features (including translation of *SpeedScript*, *PaperClip*, and other word processing files), *The Write Stuff* comes with a separate program for customizing menus and another for viewing files without loading them. It also contains a command called "Eat text," surely one of the more unusual delete commands in computing history. Contact Busy Bee software at P.O. Box 2959, Lompoc, California 93438; (805) 736-8184.

Free-Spirited Software

Owners of the 128 or 128D should keep an eye on Free Spirit Software (P.O. Box 128, 58 Noble Street, Kutztown, Pennsylvania 19530; 215-683-5609). I've reported on its products before; however, the company is constantly worth mentioning if only because of its commitment to the 128. *Home Designer 128* (\$49.95) is as good a CAD package as you're going to see for the 128, and *Sketchpad 128* (\$29.95) and *Spectrum 128* (\$39.95—designed for the 128D) are excellent graphics packages. BASIC programmers might be interested in *Digitaler 128* (\$29.95), with which you can include digitized speech in your BASIC 7.0 or BASIC 8 programs. BASIC 8, which adds dozens of new commands to BASIC 7.0, is also available from Free Spirit (\$39.95).

Horsing Around

In what might prove to be an extremely humanitarian gesture, or perhaps the worst thing that ever happened to you, SportTime (Department #755, 3187-G Airway Avenue, Costa Mesa, California 92626) has introduced *Horse Racing* (\$34.95) for the 64/128. Before you get visions of using your joystick to gain jockeylike control over a galloping thoroughbred, you should understand that this is not, in any way, an arcade game. *Horse Racing* is a detailed, sophisticated gambling game, and that's where the humanitarianism (or lack thereof) comes in.

What you do here is play the horses. You have between \$100 and \$1,000 at the beginning of the tournament, and

your goal is to make a bundle more. To help you, this game lets you study the records of the horses and the jockeys so that you can confidently place bets. You can buy tips from other handicappers and study the racing form to your heart's content.

Eventually, though, you'll want to place your bet. You can bet on horses to win (finish first), place (first or second), or show (first, second, or third); and if the race has more than six horses, you can try your hand at the exacta, the exacta double, and the exacta box (all combination bets that feature better payoffs but require more precision). The game even allows the quinella, the quinella box, the triple, and the triple box (for fields of eight or more horses).

This game is extremely educational. If you've watched the racing results on the late-night sports with no real knowledge of what's going on, *Horse Racing* offers an easy (and fun) way to learn. If you're considering betting on the races soon, you might well get some ideas from this package. The danger, of course, is that you'll find the game so fascinating that you'll run out and blow the grocery money on real races, but maybe this package offers gamblers a chance to relieve some of their frustration as well. Interestingly, this SportTime game will feature add-on modules in the future, so buying this product is not a one-shot deal. It's highly recommended, but don't get too hooked.

—Neil Randall



Nothing lasts forever, not even the Apple II. But the work you've done with your Apple won't ever be time misspent—even in the event you change computers—if you know how to transfer files and data from your venerable Apple II to the

next machine in your computer food chain.

If you're getting ready to abandon the Apple (I know; the thought gives me chills, too, but it *can* happen) or if you just want to share files with someone not as enlightened as you, you'll want a way to move data between computers. Two noteworthy programs help you shuffle files between the Apple II and the Macintosh or between the Apple and an IBM PC or compatible.

Apple II-to-Macintosh text-file transfer is truly simple. All that you need to make it happen is the little-known *Apple File Exchange*, a program supplied with every new Macintosh, and a 3½-inch disk drive—equipped Apple II or IIgs (the Unidisk doesn't count). Put the ProDOS text files—most likely originally written in *AppleWorks*, then saved as text by printing to disk—on a 3½-inch disk and insert the disk into a Macintosh's drive. Run *Apple File Exchange* and select the ProDOS-to-Mac option. In a few moments, the text files will be sent packing to a Macintosh-formatted disk of your choice or to the computer's hard disk drive. You can reverse the process by transferring Mac-generated text files to a ProDOS disk just as easily.

The beauty of the *Apple File Exchange* method is that it involves absolutely no cables. The two machines don't have to be anywhere near each other.

Moving Apple II files to an IBM PC-like computer is also possible, particularly if you have a copy of SoftSpoken's *Cross-Works*.

Once you've opened the *Cross-Works* box, you'll find four disks and a hydra-headed cable with five connectors. Three of these connectors are for the Apple and two are for the PC, leaving you ready for every possible port. The disks contain the software you'll run to make the file transfer and translation. There are two disks for each machine, one each in 5¼- and 3½-inch formats.

And that's where the program really shines, not only in transferring files between different computers but also in translating data from one program format to another. With *Cross-Works*, you can convert *AppleWorks* word processor, spreadsheet, and database files intact to a PC while retaining such features as centering, boldfacing, cell protection, and variables. The newest version

of *Cross-Works* supports conversions between any *AppleWorks* file and *Microsoft Works*, *AppleWorks* word processor files and *WordPerfect*, *AppleWorks* spreadsheet files and *Lotus 1-2-3* version 2.01, and *AppleWorks* database files and *dBase III* and *IV*. In fact, *Cross-Works* operates with all versions of *AppleWorks*, including 3.0.

Cross-Works can take a long time to translate a file—particularly a database file—but the wait is well worth it. If you consider your Apple II files an investment (and who doesn't?), then pick up a copy of *Cross-Works* before you pick up a PC.

For more information about *Cross-Works*, contact SoftSpoken, P.O. Box 97623, Raleigh, North Carolina 27624; (919) 878-7725. *Cross-Works* carries a suggested list price of \$99.95.

New Jersey?

Details continue to unfold concerning the next AppleFest.

According to a spokesperson from Cambridge Marketing, the company responsible for putting on AppleFest, the spring show has been moved from Boston, Massachusetts, to Somerset, New Jersey, about an hour's drive from New York City. Scheduled for May 4–6, the show will *not* be an all-educational fair (as reported here last month), though it will certainly stress educational applications "as much as recent AppleFests." In other words, look for a lot of teachers.

More importantly, it will be a hybrid show, attempting to combine with the traditional AppleFest something called ComputerFest. The latter is where the non-Apple hardware and software exhibitors will be displaying their wares. In fact, IBM has already reserved a mammoth 30 × 50 foot booth. Look for a lot of MS-DOS machines and consumer/educational products.

Cambridge hopes that by adding other types of computers to the show, it can buck the trend of recent AppleFests, where exhibitors were becoming an endangered species.

It's a good idea—a show for every home and school computer user. Cambridge must be holding its breath, however, knowing how angry Apple II owners became when Macintoshes started invading their turf. What will diehard II

users do when they stumble across the A prompt at AppleFest?

—Gregg Keizer

AMIGA

Writing a program with a bad text editor is no fun. You spend more time worrying about your typing than your algorithms.

Are you looking for an editor that lets you concentrate on your programming? Then take a look at ASDG's *CygnusEd Professional Release 2* (\$99.95). In its first incarnation, *CEDPro* was one of the most powerful text editors available for the Amiga. In its second release, the best gets even better.

CEDPro's most impressive feature is speed. You'll never find yourself waiting for the editor to catch up with you. Cut and paste operations are instant. Scrolling is blazingly fast. Using the new Turbo-Replace mode, it took only about three seconds to replace 1050 occurrences of a word in a 200K file.

You can open multiple windows on the same file, or you can edit up to nine different files at once. If you load a file that has the write-protect bit set, you can scroll through it, but not modify it. This is a handy feature if you want to make sure you don't accidentally change something in the wrong file.

New features in version 2 include unlimited undo/redo, support for custom fonts, an enhanced macro capability, a modifiable color palette, and improved requesters. Also, *CEDPro's* support for the *ARexx* interprocess-communication language has been significantly enhanced. You can easily create macros to add functions such as word counting to *CEDPro*. You can also use *ARexx* to tie the editor directly to your favorite compiler environment.

Unique to *CEDPro* is the RecoverCEDFiles utility, which searches through memory and attempts to rescue any files you lose during a crash. This feature alone is enough to make *CEDPro* my favorite editor.

ASDG's Perry Kivolowitz deserves a big hats off for the manual. This is one of the best guides I've ever seen for an Amiga program.

Whether you edit massive C programs or just the occasional AmigaDOS script file, you will find that *CygnusEd Professional Release 2* makes the job easier. For more information, contact ASDG, 925 Stewart Street, Madison, Wisconsin 53713; (608) 273-6585.

Spend Bucks on Flux

After a long and arduous day of debugging programs, your first impulse after exiting the compiler may very well be to shoot something. What better way to release that pent-up frustration than blowing away hostile aliens?

So get your therapy in *Dr. Plummet's House of Flux* (\$34.95), a new arcade game from Microllusions. Your mission is to fly your ship around a number of weird planet-scapes, rescuing astronauts and avoiding nasty alien space cannons.

There are 28 screens in the game, all unique. You'll find the varying gravity levels are your worst enemy, but don't expect any of the universe's physical laws to be the same when you change screens.

This is a game that will keep you coming back. The unique features of each of the 28 screens keep the game interesting after hours of play. By the time you reach the last screen of *Dr. Plummet*, you'll realize why gravity sucks.

To enter the House of Flux, contact Microllusions at P.O. Box 3475, Granada Hills, California 91394; (818) 360-3715.

Set Your Sights on C

Competition is great. Software companies with similar products end up in "feature wars," and the winner in the end is the user. The latest salvo in the C programming language battle has been fired with the release of Manx's *Aztec C 5.0a*. Like *Lattice C 5.04*, *Aztec C 5.0a* complies with the new ANSI C specification, adding function prototypes and ANSI library

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FROM HOME TO SCHOOL AND BACK AGAIN, FAS-TRACK DELIVERS!

functions and header files.

This latest release compiles and links much faster than version 3.6. Programmers can now create interrupt functions and resident libraries exclusively in C and use data objects of unlimited size. The new QuikFix feature lets the compiler call a user-specified editor, such as *CEdPro* or *TxED+*, when it encounters compilation errors. Beginning C programmers will especially appreciate *SDB*, the Manx source-level debugger. Learning to program in C is much easier when you can step through a program line by line.

Aztec C 5.0a prices range from \$199 for the Professional System to \$599 for the Developer System with Library Source. Current users can upgrade from version 3.6 for \$75. For more information about this product, contact Manx at (800) 221-0440.

Quick Tip

If you've got kids between 4 and 14, grab a copy of *One to One Match* (\$39.95). This matching program teaches kids about groups and object relationships through an entertaining Concentration-like matching game. Contact Computer Sight, 4522 Santa Rita Road, El Sobrante, CA 94803; (415) 222-2638.

Fun with Fractals

If you're tired of flying around other people's scenery and would like to create some of your own, take a good look at *Scene Generator* (\$39.95) from Natural Graphics. This program creates fractal landscapes, complete with mountains, clouds, oceans, and snow. You can change a number of factors, such as mountain height and snow level. Modify the landscape to suit your whims, save your creation as an IFF picture, and add objects in your favorite paint program. It's fast and easy to use, and you can create truly impressive backgrounds for art and animations. (See the Sphere Wars picture on page 74 of the January 1990 *COMPUTE!* for an example of a *Scene Generator* background.)

This art tool is just plain fun to play with. Contact Natural Graphics, P.O. Box 1963, Rocklin, California 95677; (916) 624-1436.

— Denny Atkin

MAG

All's not well in the land of Apple. The company's income dropped 11 percent for the quarter that ended on December 6. Sales were strong for the Macintosh II line but disappointing for the Plus and SE and nearly nonexistent for the Apple II. There's talk that a low-cost replacement for the Plus could appear as early as summer and a less expensive color Mac could follow by Christmas. Even with the commitment to low-cost Macs, CEO John Sculley insists that Apple will not drop the Apple II.

Meanwhile, the company will eliminate an undisclosed number of jobs (Apple's workforce grew by one-third last year). It will also modify its employee profit-sharing plan to more closely reflect the company's "business plan." Just days after these announcements, Allan Z. Loren resigned as president of Apple USA.

If misery loves company, Apple should be feeling pretty chummy these days. Many computer-related companies have reported lower earnings, including Computerland, IBM, Tandy, and Businessland. Looks like we might be in for a bumpy ride.

Putting on the Ritz

When does a computer game become a collector's item? When it's sold in a limited-edition walnut case for \$495.

Brad Fregger, president of Publishing International, had been looking for a way to market programs to a smaller audience. He decided to try a limited-edition product so his company could produce the program in lots of 25 and sell as few or as many as needed. That was the plan behind the company's new Macintosh strategy game, *Ishido*.

To enhance *Ishido*'s value, the company agreed to publish a limited run of 1000

copies, with each copy numbered and signed by the game's designer, programmer, and producer. Within just three weeks, the company sold 10 to a distributor in Japan, 20 to a distributor in France, 40 to individuals and dealers in the U.S., and the remaining 930 to Electronics East, a distributor in Basking Ridge, New Jersey.

Because of the game's success, Accolade has signed a deal to release a mass-market version for Mac, IBM, and Amiga computers. Publishing International has also licensed *Ishido* for Nintendo's Game Boy and the various computer formats in Japan.

I've played *Ishido* a few times, and it's a terrific game. You use the mouse to place stones on a board with 96 squares. The stones must match each other either by color or by design. You can score points with a two-way or three-way match, but the real challenge is to place your stone in the middle of four other stones and make a four-way match. Believe me, it isn't easy. Think of *Ishido* as a contemplative *Tetris* and you'll understand its appeal.

Anything You Can Do

What a deal! CE Software is offering Microlytics' *Gofer* 2.0 free with the latest version of *DiskTop*. I've used *DiskTop* since its shareware days and wouldn't want to use my Mac without it. It's a powerful desk accessory that can do anything the Finder can do, including copy, delete, move, and rename files. In addition, *DiskTop* 4.0 has many extra features that make it one of the most useful Macintosh utilities you can buy.

For instance, if you need to find a file on your hard drive, you can search by name, type, creator, date created, date modified, or size. (With these last three, you can set a range.) You could search for all the *MacWrite* files that were modified or created from 7/4/89 to 3/4/90 and that vary in size from 100K to 1000K. I often use *DiskTop*'s Find command to show which files have changed over the last month. I also use it to list the larger files (250K and larger) when I need to free up some room on my hard drive.

You can launch applications and documents from *DiskTop* by double-clicking on an icon, just as you would from the Finder. But *DiskTop* provides an easier way that

doesn't involve digging your way through folders to find a file. It lets you install your favorite applications and related documents into a separate desk accessory. When you want to change programs, you just press the hot key and double-click on the name of the application you want to switch to. What could be simpler?

With *Gofer* 2.0, you can search for a word or phrase in a file, folder, floppy disk, or hard drive. Because the scrolling text-display window takes up most of the screen, you can use *Gofer* to quickly cut and paste large blocks of text from one application to another.

You also get *Vaccine*, CE Software's indispensable freeware INIT program that protects your Mac against viruses.

DiskTop 4.0 is available for only \$99.95 from CE Software, 1854 Fuller Road, West Des Moines, Iowa 50265; (515) 224-1995.

Catching Some Zs

If you use *Red Ryder* as your modem program, you'll be tickled pink with version 11. It adds ZMODEM (a fast protocol for transferring files), improves the Host Mode for unattended remote operation, and extends the Procedure language to over 200 commands. You can customize just about everything, including the dialog boxes, windows, icons, and menus.

The most visible change is a new name; this version is called *White Knight*. Rather than pay the higher royalties for the use of the Red Ryder trademark, FreeSoft changed the name. Even with the new name, it's the same reliable program that has become one of the two top Macintosh telecommunications programs (the other is *Microphone* from Software Ventures).

The package includes a free subscription to GENie and access to the restricted FreeSoft Roundtable. I tried *White Knight*'s ZMODEM with GENie, and it's much faster than XMODEM and YMODEM. It downloaded a 150K file in less than ten minutes. Not only is ZMODEM faster, but it lets you download more than one file at a time and can resume where you left off if you're disconnected.

White Knight 11.03 is available for \$139 from FreeSoft, 150 Hickory Drive, Beaver Falls, Pennsylvania 15010; (412) 846-2700.

— David English



IN FOCUS

C'MON, YOU CAN HACK IT. EVEN IF YOUR PROGRAMMING SKILLS ARE BASIC, WE HAVE THE TOOLS AND THE IDEAS TO GET YOU CODING LIKE A PRO. IF YOU'RE PUZZLED ABOUT WHERE TO START, OUR EXPERTS WILL CLUE YOU IN TO THE BEST PROGRAMMING LANGUAGES FOR BEGINNERS. LEARN THE CODE WORDS. PICK UP SOME TOP TIPS. TAKE A LOOK AT THE PROGRAMMABLE FUTURE. READ WHAT WE HAVE TO SAY AND GET WITH A PROGRAM WHEN YOU TURN TO PAGE 18. IT'S ANYTHING BUT ROUTINE. YOU MIGHT EVEN CATCH A CODE. MAKING A BATCH DOESN'T ALWAYS MEAN STIRRING UP TROUBLE IN THE KITCHEN. SO, FOR HACKERS WHO HAVE CONSIDERED PASCAL WHEN DOS IS ENOUGH, OUR HANDS-ON TOUR OF BATCH FILES OFFERS GREAT POINTERS AND A HANDY PROGRAM TO BOOT. GET COOKING AND GET YOUR HANDS IN THIS BATCH BY TURNING TO PAGE 32. IN THIS MONTH'S EXTENSIVE BUYER'S GUIDE, WE POINT YOU TOWARD THE COMPILERS, EDITORS, INTERPRETERS, AND TOOLS YOU NEED TO BE A TOP BIT BOSS—GO TO PAGE 38. THE BRITISH HAVE A DIFFERENT SLANT ON PROGRAMMING THAN WE YANKS. SEE "MY VIEW" ON PAGE 29. OUR MAY *SHAREPAK* DISK INCLUDES FOUR GREAT PROGRAMMING TOOLS THAT BUILD TSR UTILITIES, PROVIDE ONLINE HELP, CREATE PERSONAL ADVENTURE GAMES, POP UP WITH BASIC HELP, AND LET YOU SOUND OFF LIKE A PROFESSIONAL. READ ABOUT IT ON PAGE 30. "RESOURCES," ON PAGE 42, GIVES YOU THE INFORMATION YOU NEED TO

BECOME A HOME PC HACKER

GET WITH A PROGRAM!

RHETT ANDERSON, JOHN KEARNEY, AND RICHARD C. LEINECKER

Programming was once a necessary part of using a personal computer. Before the widespread availability of commercial software, PC owners had to write their own code to solve particular problems or to tackle specific tasks. These days, it just isn't practical to spend hours creating code that's already been written by experts. What's the fun of driving a new car if you have to reinvent the wheel?

As sound as that argument seems, it ignores the fact that programming can be challenging and entertaining. The satisfaction you derive from isolating a problem, designing an answer, and implementing a solution is real and lasting. To top it off, the end result is useful. If your inexperience has kept you from inserting your BASIC disk into drive A, or if words like *loop statement* and *subroutine* keep you away from the programming aisle at your neighborhood library, you'll enjoy this lively discussion about the state of personal computer programming.

Learn about the benefits of programming languages geared specifically to the novice. Pick up some valuable programming tips from an expert, and get a handle on programming lingo. All that, plus a look at the future of programming, when you GOTO page 20.>

```
IF NOT EXIST B:DOIT.OVL GOTO NODOIT ECHO off
IF not exist B:\DOIT.OVL GOTO NODOIT ECHO Please Insert Glass Castle Disk
LOCATE 11,05 ECHO Copying files
ECHO Copying files
COPY b:doitsys.flp B:\doitsys.flp ECHO Loading the configuration pr
IF exist b:doit.sys del b:doitsys.flp >nul ECHO Please Insert Cloud Ride D
```

COMPUTER PROGRAMMING OFFERS CHALLENGES AND EXCITEMENT—EVEN TO BEGINNERS



GET WITH A PROGRAM!

IT'S BASIC

BASIC was born on a time-sharing mainframe in 1964. Its creators recognized the need for a simple yet powerful programming language designed for novices and students. What they built was an easily learned language sophisticated enough for most programmers.

Then came microcomputers. In 1976, BASIC was given a makeover to accommodate the special needs of a growing legion of home computer users. Once again, the designers made every effort to retain the original concepts of simplicity and power. Then they went further and introduced an idea tailored for home computer owners: They made BASIC fun to use.

Since then, software developers have supported BASIC in such numbers that it can now be used as a total software development tool, encompassing large-scale projects and going far beyond its start as a learning instrument. With its simplicity of design, ease-of-use, and entertaining possibilities, it's no wonder that BASIC continues to be the language of choice for novices and experts alike.

Ease of Use

Practically every home or office PC sold today offers BASIC as a part of its bundled package, complete with its own interpreter and line editor. You don't have to run around to software stores and compare other language packages and compilers. You don't have to worry about BASIC being compatible with your computer or about whether you've got enough memory or enough disk drives. BASIC was enhanced for your IBM PC or compatible. It will run on your system—guaranteed. And the version of BASIC that you get when you buy your system takes advantage of your computer's special powers.

What could be better, or easier? Just turn on your computer, load BASIC into your system, punch out a few lines of code—*bingo!* You're using BASIC. You're programming with one of the easiest programming languages ever developed. No need for hours of studying programming theory; no need to struggle with unusual commands and statements.

The Fun Factor

The ease with which you can program in BASIC is what makes this language so much fun to use. Just type in some

code, run the program, and then watch amazing things happen on your monitor. The following BASIC code is a good example:

```
100 SCREEN 1,0,0,0
200 CLS
300 LINE
  -(RND*319,RND*199),RND*4
400 GOTO 300
```

This simple program illustrates what BASIC's creators had in mind—simple commands and powerful results. The first line sets the screen attributes, telling your computer to set up medium resolution and to enable color. The second line clears the screen to present an uncluttered display. The third line tells the computer that you want to draw a line with certain coordinates (screen locations) and with certain attributes. The fourth line keeps returning to line 300.



BASIC interprets and executes these lines in ascending order until it reaches the loop statement (line 400). The program will run until you stop it and, each time the LINE statement

```
LOCATE 11,05 COPY b:doitsys.flp b:doit.sys >nul
ECHO Loading IF exist b:doit.sys del b:doitsys.
setup -pB: -dB: :noflp IF not exist b:doitsys.
```

Code Words

If you've developed an interest in programming, you'll do well to learn some of the hacker's lingo. This glossary will give you access to the language of programming.

assembler. Software that assembles code from a text file into machine code in an object or executable file.

compiler. Software that compiles specific-language text files (such as those written for Pascal, C, and COBOL) into machine code in an object or executable file.

data structure. A declared structure of a predetermined size that contains data in a specific order.

editor. Software that's similar to a word processor but without any formatting codes. Programmers use text editors to write and save source code to disk that will be compiled.

executable file. A program file that performs specific operations. Under MS-DOS, executable files are labeled with EXE and COM extensions.

floating point. Math routines that allow programmers to calculate and use values that aren't integers. Programmers avoid these routines if possible because they are slow and add to the size of programs.

interpreter. Software that interprets source code so that it doesn't have to be compiled in order to run.

linker. Software that links compiled or assembled object code to executable programs.

memory model. A method of dealing with memory segments. Small and large models are the most common. Smaller models are more compact but make it harder to write larger programs. Large-model programs take up more room on disk and in RAM but easily give programmers access to the full 640K of memory governed by DOS.

object code. Executable subroutines and data that are compiled or assembled to be linked to programs. Program modules that have been compiled are called object modules and contain object code.

object-oriented programming. An approach to programming that treats data structures and sections of code as objects.

pointer. A variable that holds the address of a specific memory location.

source code. Language text that's compiled into object or executable files.

structured programming. An approach to programming in which all tasks are encapsulated, wherever possible, into subroutines.

— Richard C. Leinecker

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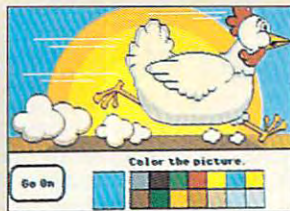
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ECHO Loading IF exist b:doit.sys del b:doitsys.
setup -pB: -dB: :noflp IF not exist b:doitsys.
```

Ten Tips of the Trade

Here are several tips that will make your programming tasks easier and make your programs run smoother.

1. If you're writing a program that uses drawing commands, plan the graphics before you begin to write the code by using an art program. If your paint program has on-screen coordinates, note the exact location of the graphics to save yourself from the trial-and-error method.
2. Make sure you know exactly what your finished program will do; keep a list of all its features. It's easier to implement features that you have planned than to incorporate features you think of later.
3. Don't shortcut error trapping. Nothing is worse than a program that crashes when a file is missing or the drive door is open. Take care of all errors, even if they're the user's fault.
4. Take advantage of modular programming; write your programs with subroutines that perform tasks. Ideally, the main body of your program should be 30 lines or less.
5. Avoid redundant code. If two routines perform identical or almost identical functions, combine them. Set or pass a flag to let your routine know which, if any, items within the subroutine should be skipped or executed.
6. If you're programming for IBM PCs and compatibles, use DOS and BIOS calls whenever possible. Don't use custom routines unless you're positive that they'll work on any system configuration.
7. Don't reinvent the wheel. There's a lot of code available in publications and on electronic bulletin boards. Unless you enjoy being a martyr or you're really trying to teach yourself something, don't hesitate to use and modify public domain code.
8. Variable names should clearly indicate the role of the variable. This, along with intelligently formatted code, will aid debugging and revising. For compiled languages, use plenty of comments. They will be there to refresh your memory long after you've forgotten the program.
9. Eloquence is golden. Clean routines that use a minimum of instructions are the hallmark of a true programmer. Keep your code simple and readable.
10. By including data within your program, you can keep the number of support files to a minimum. That will make your program more convenient for users and also reduce the risk of disk errors.

— Richard C. Leinecker

(line 300) is executed, different-colored lines will appear on your screen in different locations.

Personal computer manufacturers recognize the advantages of BASIC, and they have created variants that highlight their hardware's special capabilities. After you've played with sprites, turtles, windows, and viewports, after you've drawn a million circles and created dramatic sound effects, you'll be hooked.

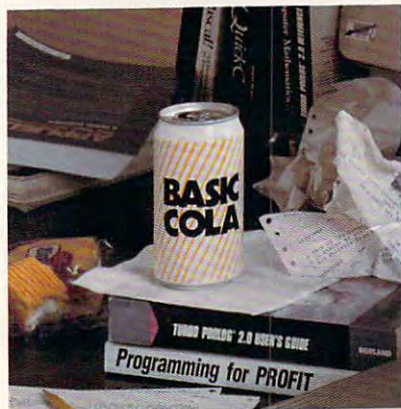
One day you'll sit back and find yourself admiring your own handiwork. You'll have typed in your code, embellished it with some special flourishes, added a menu, interactions, and even animation. Before you know it, you'll be calling someone over to watch your BASIC code in action.

There is simply no other programming language that does so much with so little training or explanation. BASIC eliminates most of the frustra-

tions associated with complicated languages, including difficult syntax and stringent design rules.

Endearing Qualities

OK, fine, you say, but what about after a few weeks or a few months? Will BASIC grow with me? Yes. BASIC is as sophisticated as you want



it to be. When you've mastered the simple graphics and games, you can start developing larger, more complex programs.

Most of the key players in the programming language market support BASIC with comprehensive packages containing compilers, editors, and other tools, many going beyond the early BASIC concepts and into highly structured environments. And the number of third-party software developers supporting BASIC is still growing. These companies offer vast libraries of programs and subroutines that you can add to your own library and use in your programs.

BASIC continues to attract serious support from user groups and freeware authors. More programmers have used BASIC than any other microcomputer language—that's some testimonial.

If you're interested in learning how to program, join the legions of others who have made BASIC their first programming language. Whether you intend to eventually develop complex programs or just want to have fun and amaze your friends, you'll be in good company.

— John Kearney

MY PAL PASCAL

Pascal is the beginner's language of choice. That's not just my opinion, it's the opinion of educators all over the world. Open a college catalog and, odds are, you'll see that Programming 101 classes study Pascal.

Like BASIC, Pascal was designed as a language for beginners—but that doesn't mean it's a language for the simpleminded. It's a complete and elegant language that includes complex data types and program control. For instance, looping constructs include FOR/END, REPEAT/UNTIL, and WHILE/END. Compare these constructs with BASIC's FOR/NEXT and unstructured GOTO statement. Structured data includes records and pointers, which are conspicuously absent in BASIC.

Pascal also allows recursion, a powerful construct that lets subroutines (called *procedures* and *functions* in Pascal) call themselves. Recursion is useful for solving certain repetitive problems, like the infamous Tower of Hanoi logic puzzle. >



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—K.C. Branscomb, President, IntelliCorp

As tax time approached, I used to get this knot in my stomach. I'd dread getting all my receipts and records together for my accountant. I had this nagging fear that I couldn't find all my backup material. But not any more, thanks to Quicken.

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I used to worry about being audited. When it actually happened, boy was I nervous! Not because I'd done anything wrong, but because I knew I'd need very detailed records. So, I went into the audit armed with Quicken, both in reports and on my laptop. Sure enough, the IRS agent questioned every expense—every trip I took, every hotel room I stayed in. Thanks to Quicken, I responded to each inquiry quickly and easily. My accountant said that being so organized made

all the difference. And when the audit was over, it turned out the IRS owed me money!

“Quicken saves me time all year long!”

I used to spend 3 to 4 hours every other Saturday writing checks and doing the books for my home and consulting business. Since discovering Quicken, I get the job done in just 30 minutes. All my frequent transactions are memorized on Quicken, so I just push a button...and Quicken writes, categorizes, and records my payments and deposits. It even prints checks for me. That frees up time for golf, skiing, and friends.

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GET WITH A PROGRAM!

With its modest but complete set of tools, Pascal tackles common problems with common solutions. Pascal users can pick up programming techniques that will translate to other languages, such as C, Ada, and Modula-2.

Pascal's block orientation means that sections of code can be considered single statements. In contrast, BASIC is line-oriented, which makes it look much different. Pascal's indented code lets you see your code at a variety of levels, making it easier to read. Here's an example segment of code that finds the sum and the product of the first ten integers.

```
BEGIN
  sum := 0;
  product := 0;
  FOR i:= 1 TO 10 DO BEGIN
    sum := sum + i;
    product := product*i
  END
END;
```

Because it's so well-defined, the Pascal language has virtually no ambiguities. This clarity leads to small compilers that produce robust and dependable code. The Pascal definition is small enough so that you can describe it in logical charts in just a few pages.

Extended versions of Pascal have become very popular, with Borland's *Turbo Pascal* perhaps being the most famous. With this powerful chart-topping compiler for the IBM PC, you can write full-blown applications like word processors and custom databases.

In addition, *Turbo Pascal* gives you an integrated system of editor, compiler, and debugger. And it's so fast that it gives you the interactivity of an interpreter and the small code size and speed of a compiler.



```
LOCATE 11,05 COPY b:doitsys.flp b:doit.sys >nul
ECHO Loading IF exist b:doit.sys del b:doitsys.
setup -dB: -dB: :noflp IF not exist b:doitsys.
```

OOP Is No Mistake

Object-oriented programming (OOP) has become a computer buzzword in the last few years. Like many buzzwords, it has been overused to the point of losing its meaning. That loss notwithstanding, OOP is an important and necessary concept that has arisen from the changes in today's computers.

To grasp the implications of OOP, you have to discard a lot of old concepts from BASIC, Pascal, and C. Instead of thinking about a main loop that performs certain functions, think of related sets of code and data as objects. Objects have code (executable subroutines) and data. The objects' hierarchy (how the objects are linked and how they communicate with each other) is similar to the structure of a tree. At the bottom is the root. Up from the root are the trunk and all of the branches. Finally, at the end of the branches are the leaves. The objects at the root level delegate instructions to the trunk-level objects, which in turn send messages to the objects at the branch levels, which then pass those messages, finally, out to the leaves, where objects are at their most specific, performing tasks like writing to the screen and disk access. This general analogy doesn't apply to all object-oriented languages, but it's a fair description of the hierarchy in an OOP language.

Good examples of objects and their relations can be seen in any windowing environment. A window is an object with attributes that are stored as data. These attributes can be the X and Y positions, the window's width and height, or any number of variables within the window. If you use your mouse to expand or shrink the window, a piece of code is executed that resizes the window. The code then updates the variables in the data section of the object. This window object may or may not interact with other objects. If it overlaps other windows, then those windows get a message and update themselves according to the new circumstances.

Objects can also have subsets. The usual terms are *parent* and *child* objects. If a window has buttons or editable text fields, these are its children. The children can go on to have other children. What's more, the child objects can interact with their siblings within the same family or affect other objects by passing messages through the parent.

To get a picture of how this works, imagine a dialog box with several choices. If you pick choice A (Close All Other Windows), the child selector button A passes a message to the parent that it has been selected. The parent then alerts all other windows that they need to close.

These are just simple examples of OOP. But with the interrelated nature of windowing environments and window-based applications, it's a natural evolution in the way we think about programming.

— Richard C. Leinecker

Pascal has taken root very quickly. Since it's easily understood by virtually all programmers, it's commonly used to teach algorithms (a sequence of steps used to solve a problem). Once you've learned Pascal, you'll be able to understand the techniques used in programming textbooks.

Like other computer languages, Pascal is dynamic. It constantly changes to encompass new ideas and techniques. Object-oriented versions are beginning to appear that extend the language from a procedural language into one that combines the best features of procedural and object-oriented languages.

Pascal borrows ideas freely, just as other languages borrow from Pascal. For example, some versions of BASIC now offer Pascal features like REPEAT/ UNTIL, WHILE/END, recursion, and records. If you're programming in a modern BASIC, you may really be programming in a language that's closer to the original Pascal than to the original BASIC.

Some people argue that Pascal is restrictive because it frowns upon such poor programming practices as GOTOs. The GOTO statement encourages code that is often called *spaghetti* because its logical flow resembles intertwined noodles. Such programs are difficult to read, to debug, and to learn from.

Instead, Pascal encourages modular programming, in which you test each procedure and function as you design and code it. This separates the main program loop from the low-level chunks of code that actually perform the data manipulation. You can take either a top-down approach (in which you design the program without worrying about the nitty-gritty details until the end) or a bottom-up approach, where you start with reusable low-level code that can be joined to make a variety of programs.

Pascal's most controversial characteristic, however, is its demand that you explicitly declare the name and type of each and every variable that

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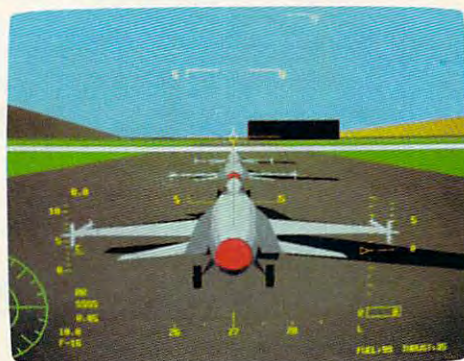
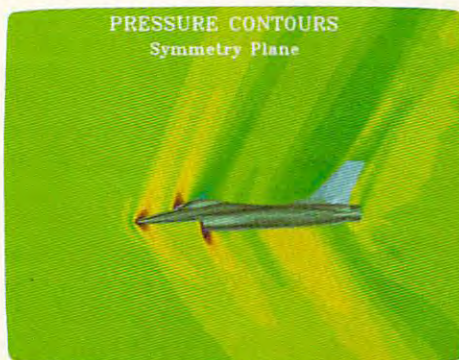
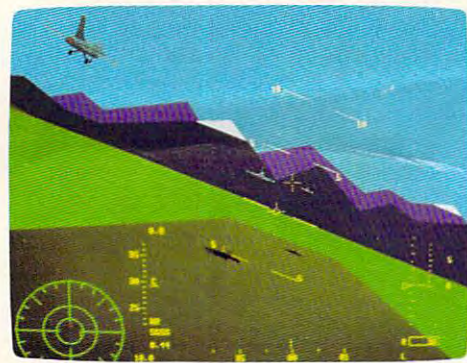
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```
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IF not exist b:doitsys.flp GOTO NODOIT • OPINION • Loading the Configuration progr
LOCATE 11,05 setup -pB: -dB: run the program.
```

Programmers' Choice—Intel vs. Motorola

I'LL TAKE INTEL

RICHARD C. LEINECKER

The Intel family of microprocessors are the brains behind IBM PC and compatible computers—the largest segment of the home and office computer markets. When IBM first began to develop its line of personal computers, these chips were the best available at a reasonable price. Since then, the Intel family has evolved to a point of sophistication that's mind-boggling when compared with the first 8088.

Intel processors were engineered specifically for a productivity-oriented machine. Specialized instructions make text handling and data manipulation fast and compact. Each register has a special forte; using each register for its designated purpose makes for fast and efficient code. Programmers can take advantage of some instructions that are a fraction of the size of comparable sets of instructions on other microprocessors.

The newer Intel models, such as the 80386 and the 80486, no longer have the memory restriction of 640K, and they average a clock speed of 25 megahertz. These new processors can take full advantage of IBM's OS/2, a fully multitasking environment. The Intel family is getting better, faster, and more powerful. Its dominance in the market underscores its effectiveness.

Anderson replies:

IBM must have picked the Intel chip by accident. After all, these chips bear little similarity to the mainframes and minicomputers that IBM was used to building. Big Blue's mistake was in saddling PC users with unreliable, incompatible software. If you crash an MS-DOS program, you can most likely blame it on the screwball architecture of the 8088.

It's true that the expensive 80386 and 80486 chips use kludges to get around the arbitrary 640K limit of the 8088, but the need for compatibility keeps software from taking advantage of it.

OS/2 is second to none in absurdity. It requires an 80386 and four megabytes of memory. Why? If you programmed the 8088 series, you'd know.

MAKE MINE MOTOROLA

RHETT ANDERSON

The Motorola 68000 series is the most powerful of the popular microprocessors. It's the engine that runs the graphics-intensive Macintosh, Amiga, and Atari ST computers, as well as high-end systems like Sun workstations and high-end home game systems like the Sega Genesis.

The 68000 was modeled after minicomputers, while the Intel processors were modeled after calculator chips. It's a full 16-bit processor, which means that data is operated on and moved in two-byte chunks. The 68000 also has some characteristics of 32-bit machines (the higher models, like the 68030 and 68040, are full 32-bit processors).

Even the lowest-numbered 68000-model chip is capable of multitasking and can access several megabytes of memory with no limitations. It has eight 32-bit data registers and eight 32-bit address registers, with a great number of addressing modes.

The newest processor in the line, the 68040 is fully compatible with the 68000, and it features a built-in floating-point math unit, an optimized integer math unit, and two 4K high-speed memory caches. Best of all, it runs at 20 million instructions per second (the Intel 80486 runs at 15 MIPS).



Leinecker replies:

The latest generation Intel chips boast all of the features that you've listed in the 68040, so where's the edge? And the Intel chips aren't restricted to word boundaries (which means that 68000 programmers have to stick to even memory addresses). Since I don't see any Motorola advantage, and I do see an Intel instruction set with superior data-handling commands, I'll pick the Intel family. If the phrase *survival of the fittest* has any meaning, then Intel's dominance makes a strong argument for it being the programmer's choice.

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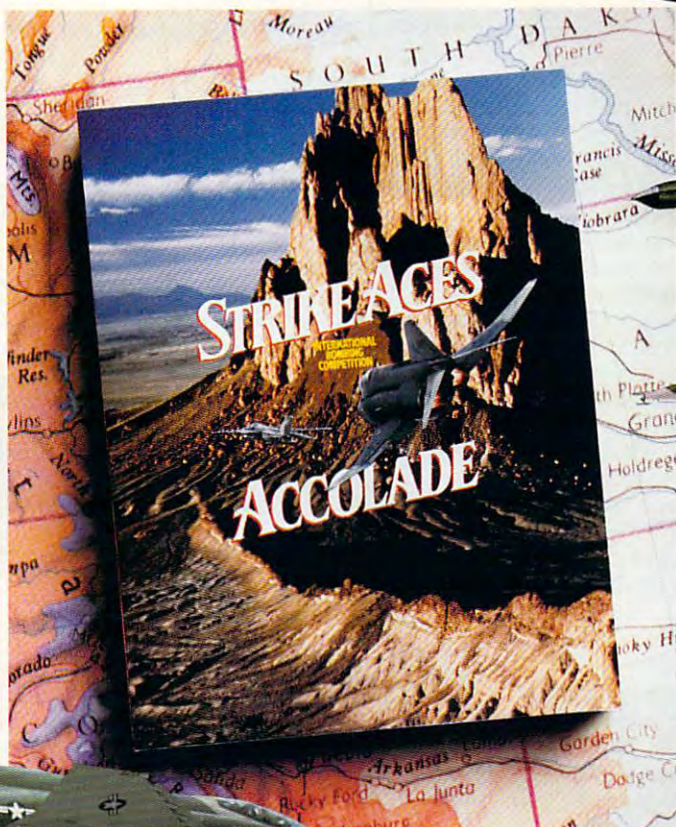
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you plan to use. If you think this feature is unnecessary, remember that even the smallest typo can wreck your program.

Pascal's restrictions may cost you time in the short run, but its logical strength and clarity go a long way toward creating solid programming techniques. In the long run, those techniques will reward you handsomely.

— Rhett Anderson

LOGO— MORE THAN A LANGUAGE

Many of today's professional programmers cut their teeth on Logo. It has all the elements of a full-blown language and performs wonderfully. Elementary and middle school teachers who've seen students progress over the years vouch for the way Logo sharpens students' cognitive processes for future programming endeavors.

Consider what you can do with Logo's turtle. (The turtle is an icon used to draw images on the screen.) If you type FD 50, that command draws a line 50 pixels from where it started. With a few other simple commands, you can also tell the turtle to pick up its pen, change its pen color, and hide itself from view.

One of the first lessons in any Logo teacher's manual instructs students to type FD 50 RT 90. That command tells the turtle to go 50 units forward and then turn right 90 degrees. The manual then suggests having students type the same command again. After issuing that command, half of a square is on the screen. If the teacher then leaves the kids alone for a few minutes, it's not long before they've repeated the command two more times to draw a square.

If this exercise seems trivial, think again. Sequencing is an important part of our formal thought processes. It helps us figure out what should happen before it happens. Sequencing also plays a major role in critical thinking, a skill highly prized among today's top educators.

After the exercise with the square, students soon move on to stars, rectangles, and pentagons. Looking ahead and anticipating future events becomes a habit. Kids begin to ask questions and experiment with ideas

of their own. It's a short road from there to abstract thinking.

Logo also lends itself well to creative writing. It's easy to put text on the screen, and the variety of graphics commands it supports enhances the text.

For science presentations, Logo is extremely versatile. Students can illustrate the development of an insect, for example. They can list facts on one side of the screen while displaying the insect in its larval stage on the other side. With a Logo program, each stage of the insect's development can be shown graphically as it's redrawn in its newly developed form. The factual information can be updated to reflect those different stages of growth. After the entire life cycle has been displayed, the program is ready to begin once again.

What would beginning programmers learn from this exercise? They would learn how to coordinate text with graphics and to integrate abstract and visual information.

You can do these exercises with any language, but what makes Logo so special is its ease of use. Drawing is a snap; all it takes is a command or two to move the turtle. Putting text on the screen is also simple, as is inviting user interaction.

Because Logo is a structured lan-

guage, you can write subroutines that you can use over again. There are no GOTO statements in Logo, which is an advantage because GOTOs often foil any attempt at structured programming.

Structured programming fosters logical organization because you must plan each subroutine so it can be used as many times as possible. It forces you to write flexible procedures—no need to write six subroutines that do almost the same thing. Instead, you can pass or set flags so that a single routine can satisfy the needs of six slightly different circumstances.

In this day of educational crises, it's important that we make the most of our resources. Logo has been around for a good while, but it hasn't been exploited to its fullest. It has an important role to play for beginning programmers, whether part of a school curriculum or at home. Its valuable lessons in critical thinking and logical structures go a long way toward promoting the skills that our kids will need in the next century.

— Richard C. Leinecker □

Rhett Anderson is an associate editor for *COMPUTE!'s Amiga Resource*. John Kearney is a systems and program analyst and freelance writer based in Plymouth, Minnesota. Richard C. Leinecker is programming manager for *COMPUTE!* Publications.

```
LOCATE 11,05 COPY b:doitsys.flp b:doit.sys >nul
ECHO Loading IF exist b:doit.sys del b:doitsys.
setup -pB: -dB: :noflp IF not exist b:doitsys.
```

Programming Environments of the Future

Computers are showing up at every turn. Your microwave, VCR, CD player, and car probably all have computers in them. Do these programmable appliances hold the key to the future of programming? Probably not. The programs that run these items are hard-coded into ROM (Read Only Memory). When you "program" your VCR, for example, you're simply entering parameters for the VCR's computer program to use. The VCR bases its actions upon your data in much the same way that a DOS command bases its actions upon the parameters you give it.

But if programmable appliances fail to affect general-purpose computer programming, metaphors like the onscreen desktop which originated in the Xerox PARC labs have had and will continue to have a profound effect on programming. Already some languages allow you to coordinate slide shows and sound effects by connecting icons (pictorial representations of data objects or devices) instead of by typing text commands.

Some of today's programming languages will last far into the next century. These languages will expand as we begin to use computers with multiple processors. Today's sequential languages will evolve to make the most out of parallel processing.

Many applications, notably databases, word processors, and spreadsheets, already include complete programming languages. And macro programming has become an art in itself. Further programming breakthroughs will occur as companies make their applications more flexible and, at the same time, easier to use.

Artificial intelligence (AI) promises to bring us the most user-friendly programming environments. AI researchers are already working to make software that understands English. Perhaps someday you'll be able to tell the computer what kind of task you want to accomplish, and the computer will program itself.

— Rhett Anderson



MY VIEW

J E Z S A N

A BRIT'S VIEW

ON
PROGRAMMING
TODAY'S
COMPUTERS

Back in the old days, people thought that buying a computer would suddenly make them computer literate. A lot of hobbyists did learn to program in BASIC, and some even took the brave step to learn assembly language. All the good commercial programs were written in machine language, especially the games. High-level compiled languages like C didn't really exist because most machines were still running from cassette tape. Only a few could afford a disk drive. No one had even heard of a hard drive.

Nowadays, people buy computers for a reason. They don't just buy them to learn, though this still happens. They buy them to play games, do their accounts, render green spheres, or publish office reports for people who wouldn't have minded if they were given handwritten notes.

We all know that most home computers are used for games—even if they were bought for other reasons. Whereas people used to buy one computer to fit all their needs, now they buy two separate computers: a game machine and a business ma-

chine. The game machine is often technologically superior, but people like to make a distinction between the fun-loving box that plays games and the serious box that works in the home or office. Usually the only difference is that the office machine doesn't have a color monitor.

These days you can use a computer without knowing how to program it. A few years ago, a program merely had to be functional and powerful. Now programs have to be easy to use. My personal rule is that if I have to read the manual, the program isn't intuitive enough. After all, we're smart enough to figure out simple things, and anything we don't understand in a program shouldn't be there, right?

The other big breakthrough of the late 1980's was the mouse. This device has had more than its fair share of blame for making programs easier to use. The Mac system had the right idea with a one-button mouse. It's very intuitive—you don't have to decide which button to press to work the program. The Amiga's two-button mouse confuses the naive user. Then there are the PC mice with three buttons. Why stop there? We could mount our keyboards on trackballs and—voilà!—a 101-button mouse. I would personally prefer laser eye tracking so we could have WYLIWYS (Where You Look Is What You Select). I can just see myself blinking my left eye for selection and the right eye to pick up a menu.

The typical American personal computer programmer writes productivity applications in C. The typical European programmer writes games in assembly language. Of course, I'm generalizing a bit, and there are exceptions to every rule. But why is there a difference in programmer styles on the same computer in different countries? I offer a view that's based on our countries' different computer histories.

The BBC computer was significant for England because it was designed to promote computer literacy. The goal was to agree on a computer

that most people could afford so the BBC could offer high-quality computer-instruction TV programs for a large audience. In addition to introducing a lot of people to computers, the BBC computer had the more interesting effect of teaching people how to program in machine code. Built into the very powerful BBC BASIC interpreter was a full 6502 assembler designed to integrate subtly with normal BASIC programs. This meant that nearly every school kid was writing assembly language programs at an early age. This also explains why there are an awful lot of English computer programmers under 20 when their American counterparts are probably in their mid- to late-20s.

I think it's fair to say that 90 percent of the people who buy computers now do not program them, whereas a few years ago, it was probably closer to 50 percent. People are now brave enough to use the technology without having to understand it, and computers are rapidly becoming a useful gadget on the scale of the VCR or cellular phone. With computer hardware, RAM prices, and user interfaces improving all the time, I would expect that, over the next few years, the next innovation will be speech recognition. This would make software even easier to use.

Similarly, the introduction of *HyperCard* on the Mac and similar programs on the Amiga make it easier for laypersons to write trivial programs that do what they want. These graphical programming languages will help close the gap between programmers and users. I look forward to the day—not far away—when nontechnical users can make their own arcade-quality videogames, control their house appliances, draw pictures and hang them up on the wall, and create video presentations. Who needs to program a computer anymore?

Jeremy "Jez" San is managing director of British-based Argonaut Software, creator of the Starglider series. □



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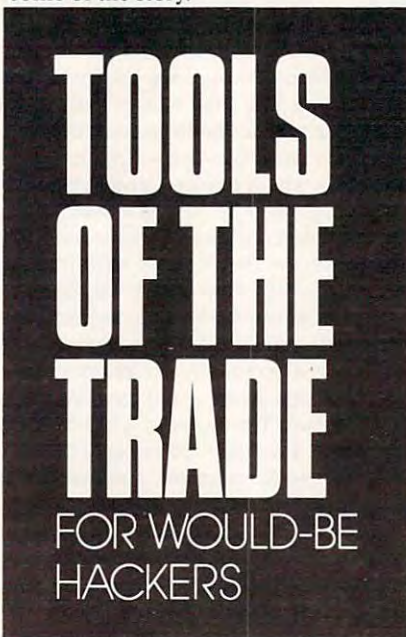
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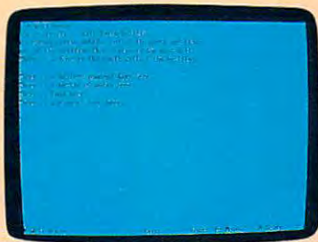


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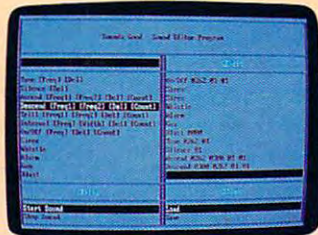
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Even if you don't have the time to learn a complex programming language or the willingness to spend uncounted hours creating a computer application, there's an easy way to study and enjoy programming. What's more, there's nothing to buy because you already

have a copy of DOS.

Batch programming, though very simple when compared with C, Pascal, or other languages, is a powerful and functional way to solve particular computing problems. When you write a batch file, you create a personal piece of software that can't be bought anywhere. The compact language of batch programming encompasses only a few commands, but it makes use of sound programming concepts. Once you've mastered them, you'll have a basis on which to build should you ever decide to tackle a more complex language.

This introduction to batch programming illustrates a few key commands and combines those commands into a small program you should find useful.

Starting a New Batch

Think of a batch program as a list of commands. Rather than your having to type those commands at the DOS prompt, your computer can execute the commands, in sequence, as they're found in your batch file.

For example, when you run your word processor, you probably use the `cd` command to change to your word processor's subdirectory, then give the command to start the word processing program. Once you've exited from the program, you must execute the `cd`

command again to return to the root directory on your disk.

You can automate this same series of steps with a batch file that looks something like this:

```
cd \words
editor
cd \
```

If you were to name this program `W.BAT`, you could simply type `W` and press Enter whenever you wanted to use your word processor. This procedure saves only a few keystrokes, but it's worth the effort to set it up. You'll save plenty of keystrokes over a year's time. If other family members use your system, they'll appreciate the convenience. A child who needs to type a report doesn't need the distraction of changing directories and remembering commands.

To write a batch file, you need a word processor or text editor that can save files in ASCII format. An ASCII file is text without extraneous word processing or printing codes. Most word processors have an ASCII option. Check your manual for instructions.

All names of batch files must end with the `.BAT` extension. This sends a signal to DOS telling it how to handle the file. The first part of the filename is up to you, but for convenience, keep it short and memorable. Some examples are `GO.BAT`, `HELP.BAT`, and `MENU.BAT`.

Batch File Parameters

Replaceable parameters bring added power to batch files. A parameter is a supplemental command that follows a program name. Your word processor probably lets you to specify the name of the file you want to edit when you

GETTING STARTED WITH BATCH FILES

start the program. When it's time to update your résumé, for example, you might type *editor resume.txt* to start the program and to bring your résumé file to the screen.

Parameter passing is easy to incorporate into batch files. In our W.BAT example, you would change the middle line:

```
editor %1
```

DOS will replace the %1 with the first parameter on the command line that executed the batch file. When you execute the batch file by typing *w resume.txt*, for example, the filename *resume.txt* is substituted for the %1 in the batch file.

If your word processor (or any other program) supports multiple windows, you might be able to use more parameters. Change your batch file to read

```
editor %1 %2 %3
```

When you type *w resume.txt job-info.txt notes.txt* after making these changes, your computer loads your word processor and the three files in turn. It's not necessary to use all the available parameters. If no parameter is passed on the command line, the batch file ignores those references.

At Your Command

A batch program exchanges information between you and your computer; options are presented, instructions are given, and a procedure is carried out. Batch programming is nothing more than setting up this exchange.

You need only learn a handful of commands—ECHO, IF, GOTO, PAUSE, and REM—to write effective batch programs. Your DOS manual offers additional detail about these commands and describes a few others, but our discussion here will get you started.

ECHO displays information on your monitor's screen. When you invoke a batch program, its commands are echoed onscreen as your computer executes them. If you want to create a nonthreatening interface for the users of your system, you'll find these displays messy and annoying. To suppress the command display, start your program with the command **@echo off**. (The @ is only for users of DOS 3.3 and later versions. The symbol prevents the *echo off* command itself from being displayed. This feature isn't available in earlier DOS ver-

PROGRAM: START.BAT

```
@ECHO off
cls
IF (%1) == ( ) GOTO menu
IF %1 == disktest GOTO disktest
IF %1 == write GOTO write
IF %1 == da GOTO da
IF %1 == space GOTO space
IF %1 == word GOTO word
IF %1 == maze GOTO maze
IF %1 == games GOTO games
GOTO menu
REM commands to run main menu selections follow
:disktest
chkdsk /f
GOTO end
:write
ECHO Put commands to start word processing program here.
ECHO Use the same set of commands that were developed for the example
W.BAT.
ECHO If you use a replaceable parameter, use %2 rather than %1. The command
ECHO to load the program and call a file becomes START WRITE [filename]
PAUSE
start
:da
ECHO Place disk in Drive A
PAUSE
dir a: /p
GOTO end
REM commands to run game programs follow
:space
ECHO Put commands to run "Space Crazy" here.
GOTO end
:word
ECHO Put commands to run "Word Play" here.
GOTO end
:maze
ECHO Put commands to run "Endless Tunnel" here.
GOTO end
REM screen display for Games Menu follows
:games
cls
```

```
ECHO .....
ECHO *
ECHO *                               Fun and Games
ECHO *
ECHO .....
ECHO *
ECHO What would you like to play?
ECHO Type START and the name of the program you wish to run.
ECHO *
ECHO SPACE   SPACE CRAZY
ECHO WORD    WORD PLAY
ECHO MAZE    ENDLESS TUNNEL
ECHO *
GOTO end
REM screen display for Main Menu follows
:menu
ECHO .....
ECHO *
ECHO *                               Sam and Ed's Computer System
ECHO *
ECHO .....
ECHO *
ECHO What would you like to do?
ECHO Type START and the name of the program you wish to run.
ECHO *
ECHO DISKTEST  Check the disk for logical errors.
ECHO WRITE     Run word processing program.
ECHO GAMES     Display the Games Menu.
ECHO DA        Get directory of disk in Drive A.
ECHO *
GOTO end
:end
```

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GETTING STARTED WITH
BATCH FILES

sions, so if you're using one of those, omit the @.)

You can also use ECHO to print instructions or error messages or to ask the user for additional information. For every line you want to print onscreen, you need one echo statement. Here are some examples.

ECHO Good Morning, Bob.
ECHO Please place your archive disk in Drive A.
ECHO Type START followed by the name of the program to run.

Each echo statement is limited to 127 characters, but to ensure readability you should keep them short. If you want to write a longer line, use a carriage return before the line reaches the right edge of your screen and continue the line as a new echo statement. Remember to precede each line of your message with the ECHO command.

REM is short for REMark; it's used to document your program. Your computer won't process program lines that begin with the REM command. Use REM statements to describe certain sections of your batch program. Well-placed REM statements keep your batch file organized, and they're often crucial should you want to modify a program months after you've written it.

The PAUSE command stops the procedure and displays the message *Strike a key when ready*. You could use this command to create a delay when your user needs to change disks or to stop processing when your program is about to begin a lengthy or potentially damaging procedure. That way you have an opportunity to break out of the batch program. For example:

ECHO OFF
ECHO You have just requested a full compression
ECHO of all the files on your hard disk.
ECHO This will take several minutes.
ECHO Press Ctrl-Break to abort this procedure or PAUSE

GOTO guides the execution of your program from one place to another, rather than following the batch file line by line from the top down. This permits you to write programs that can handle more than one eventuality. GOTO is used in conjunction with a label. You'll see several examples of labels in the program that ac-

companies this feature (see the box on page 34). To create a label, type a colon followed by the label name.

Whenever your program runs across a GOTO command, it will jump to whatever label you've specified.

IF gives your program decision-making power. You can use it with GOTO to perform a specified task when certain conditions exist. IF can be used in three different forms, but the following example illustrates only one of them: comparing two strings.

IF string1 == string2 COPY A:*.* B:

This statement compares two strings and, if they're equal, directs your computer to copy all of the files on the disk in drive A to the disk in drive B. You can use the IF command to perform any number of DOS functions. In most cases, at least one of the strings comes from outside the program in the form of a replaceable parameter. Note the double equal sign; it's required in batch files.

On the Menu

The program that accompanies this article, START.BAT, shows how you can use some of these commands. It's short enough that you can type it in and begin experimenting. START.BAT allows computer users, even those unfamiliar with your system, to execute the commands necessary to run their favorite programs.

With this program, anyone who sits down in front of your computer and doesn't know what to do can type START, and the program will offer a menu of choices. All that remains is for the user to type START [menu item]. If the user already knows which program to run, typing START [menu choice] will bypass the menus.

Most of the programs in START.BAT are fictitious. Running them will just print a brief message on your screen. Replace the examples with your own programs and insert the necessary commands.

Here's how the program works: First, ECHO is turned off and the screen is cleared with the DOS command CLS. Then, the third line checks to see whether a parameter was passed when the batch file was executed. If a parameter was passed, the program jumps to the label that matches the parameter. If no parameter was passed, the program jumps to the menu section, from which it presents information to help the user make the next decision.

Take a minute to examine line 3, as this technique is very important to any batch file that uses parameters. The purpose here is to see if a parameter was passed and, if not, to give the user enough information for another try.

We achieve this goal by testing for a null, or empty, string. Unlike many other languages, batch commands don't allow the use of a pair of double quotation marks to test for an empty string. For example, in BASIC you could write the line `IF AS$ = ""` to perform this test.

To circumvent this batch file limitation, borrow a lesson from algebra: Add the same thing to both sides of an equation. In the case of line 3, we can add parentheses. Now, as your computer executes START.BAT, if no replaceable parameter was passed when the batch file was run, the %1 disappears and the line is evaluated as `IF () = () GOTO menu`. If, however, you had typed START GAMES, line 3 would be evaluated as `IF (GAMES) = () GOTO menu`. Since (GAMES) and () are not equal, the program moves on to line 4, which also uses the value of the replaceable parameter to jump to the appropriate part of the program.

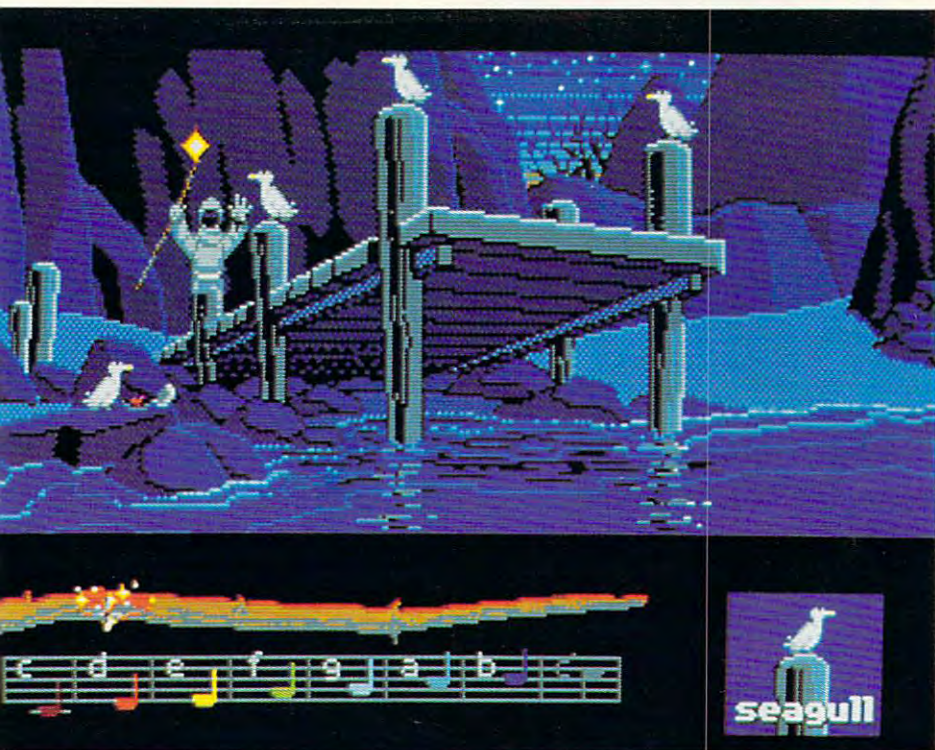
There's a GOTO end line after most sections of START.BAT. This prevents your computer from running all of the programs listed in your batch file one after the other. Alternatively, you could replace the command GOTO end with START, which would rerun the batch file and display the menu on the screen.

Enhancements

For simplicity, I've used boxes of asterisks to frame START.BAT's screen displays. You can create smart-looking boxes for your own menus by using your computer's line characters. Check an ASCII chart for values between 179 and 218 for a look at these characters; your word processor probably has an option that lets you enter them.

If writing the START.BAT program sparks your interest in batch files, you can examine the examples in your DOS manual and the batch files that come with commercial software. Many of the INSTALL.BAT programs you've run so often push batch programming to the limit. You can learn a lot from those examples. □

Tony Roberts is editorial operations director at COMPUTE! Publications. He writes the "IntroDOS" column for COMPUTE!'s PC Magazine.



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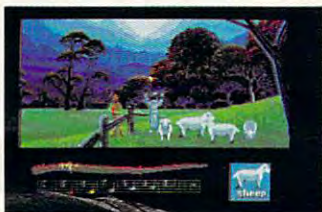
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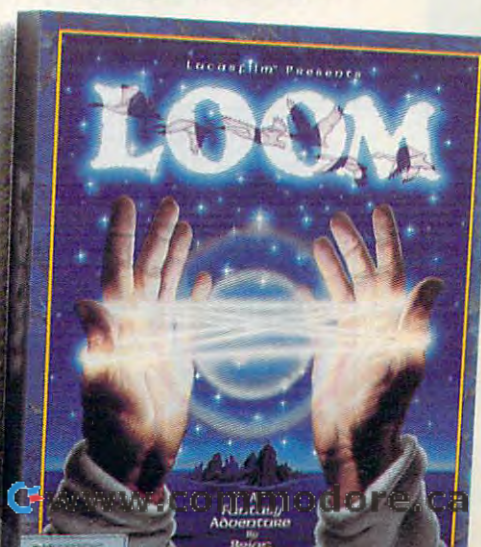
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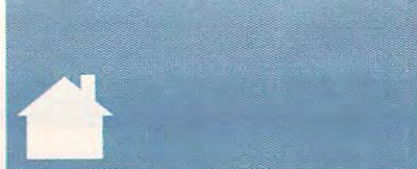
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C-terp 3.0 is a C interpreter and complete development environment. It's compatible with *Microsoft C Compiler 4/5.x* and *Turbo C 1.0/1.5/2.0*. This package features full K & R C plus ANSI enhancements, a multifile reconfigurable editor, and interactive debugging.

Dr. Pascal 2.0

Visible Software
512K required
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Dr. Pascal is an integrated program-development system with editor, formatter, Pascal interpreter, and visible program execution. The program works as a stand-alone package or with other software. For the beginner, *Dr. Pascal* offers online command help and comprehensive error checking. The visibility feature lets you view the inner workings of a program as it runs, or it shows you why a program isn't working properly. This package isn't appropriate for certain applications, such as Pascal systems with more than 64K of source code.

Eco-C88 Rel. 4.0 C Compiler

Ecosoft
256K, DOS 2.1 or higher, and two disk drives required
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Ecosoft's *Eco-C88* features ANSI enhancements such as

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Lahey Personal FORTRAN 77 includes the complete ANSI 77 standard. The package also includes a source online debugger, over 190 compile-time English-language diagnostic messages, and C-language interfaces with *Microsoft C* and Borland's *Turbo C*. You can add more features to *Personal FORTRAN 77*, purchase the *Lahey Personal FORTRAN 77 Toolkit* separately for \$49, or buy both *Personal FORTRAN 77* and *Toolkit* for \$199. Lahey provides free technical support, an electronic bulletin board, and newsletters.

Lattice C Development System of DOS & OS/2

Lattice
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Lattice C supplies a total programming environment featuring an integrated, programmable screen editor; an LASM macro assembler; a Code-

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The *Let's C* compiler from Mark Williams offers an integrated edit-compile cycle that automatically points to errors. The compiler also features both a small and a large memory model and an integrated command line interface. In addition, *Let's C* includes the MicroEMACS full-screen editor with source code. The package also offers 8087 sensing and support. Mark Williams offers a 60-day money-back guarantee.

Microsoft QuickBASIC Version 4.5

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Microsoft QuickBASIC is a menu-driven programming environment with many features for the beginner. QB Express is an interactive, on-disk tutorial that introduces you to *QuickBASIC* and guides you step by step through an electronic card-file application. QB Advisor is a hypertext-based online help system that lets you copy and paste program examples into your own code. An integrated debugging feature is also included with the package. Microsoft offers a 30-day money-back guarantee.

Microsoft QuickC Version 2.0

Microsoft
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QuickC provides an integrated C language programming environment. Like Microsoft's other Quick languages, *QuickC* offers many features to aid the novice programmer. It features an interactive on-disk tutorial, online help with cross-referencing, and context-sensitive help. With *QuickC's* Advisor, you can place the cursor on any word, menu, dialog box, or error message, click the mouse, and find instant reference information. Microsoft offers a 30-day money-back guarantee on *QuickC*.

Microsoft QuickPascal Version 1.0

Microsoft
512K and DOS 2.1 or higher required
\$99.00

Microsoft QuickPascal is a menu-driven compiler with many features for the beginner and the advanced programmer. For the beginner, *QuickPascal* offers Express, a computer-based training system featuring an online tutorial and hands-on self-paced lessons. In addition, Quick Advisor supplies online help and a reference system. With *QuickPascal* you can copy and paste prewritten code from Quick Advisor into your program. Also, two levels of menus aid the beginner. Easy Menus lets the beginner concentrate on mastering the program's fundamentals. Full Menus accesses the complete range of *QuickPascal* capabilities for the experienced user. Another feature of *QuickPascal* is Smart Editor, which color-codes keywords, user comments, user code, or data, allowing the programmer to spot errors easily.

Personal Cobol

Micro Focus
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\$149.00

Personal Cobol is an integrated program-development system specifically designed for the IBM PC. This stand-alone package features a full-screen text editor, a syntax checker, and a source-code generator for interactive screen displays and for automatically maintained index files. Also, *Personal Cobol* offers an interactive source-level debugging-and-analysis function. The package contains 54 function-key-driven help screens.

PowerBASIC 2.0

Spectra Publishing
640K required
\$129.95

Formerly *Turbo Basic* from Borland, this development environment offers enhanced speed, context-sensitive help screens, and integrated debugging. In addition, *PowerBASIC* features fixed- and floating-point decimal BCD variables, user-defined dynamic data structures, modular compilation, an object linker, and the built-in commands ARRAY SORT, ARRAY SCAN, ARRAY INSERT, and ARRAY DELETE.

Power C

Mix Software
320K and DOS 2.0 or higher required
\$19.95

Power C is an ANSI-compatible C compiler featuring unlimited program size; graphics for CGA, EGA, VGA, and Hercules; autosensing of 8087/80287; and mixed model programming (near and far pointers). In addition, the *Power C* book includes a step-by-step tutorial and many example programs.

Prospero Fortran

Prospero Software
512K and OS/2 1.0 or higher, or DOS 2.1 or higher required
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Prospero Fortran is a compiler to use with either MS-DOS or OS/2. The package conforms to the ANSI X3.9-1978 standard and supports a comprehensive set of language extensions. A multiwindow programmer's editor and a symbolic debugger are also included. Probe, *Prospero Fortran's* source-level symbolic debugger, allows you to step through a program at the source-line level.

Prospero Pascal

Prospero Software
512K and DOS 2.1 or higher required
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Prospero Pascal is a superset of ISO Standard Pascal. In addition to the standard features, this package offers a number of extensions including dynamic strings, single- and double-precision floating-point arithmetic, an assembler-level interface, and separate compilation of program segments. Moreover, *Prospero Pascal* offers a high degree of portability.

Smalltalk/V

Digitalk
512K, DOS 2.0 or higher, and one of the following graphics boards required: CGA, EGA, VGA, AT & T 6300, Toshiba T3100, or IBM 3270; mouse recommended
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Smalltalk/V 286

Digitalk
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Smalltalk/V 286 is Digitalk's PC-based object-oriented development environment. The package features multitasking portable code, more than 100 classes and 2000 methods, and object-oriented Prolog. *Smalltalk/V 286* also includes all *Smalltalk/V* source code, pop-up menus, and mouse support. *Digitalk* offers a 60-day money-back guarantee and reduced-price product upgrades. Product support includes a user newsletter, technical phone support, and bulletin board support.

True BASIC

True BASIC
512K required for Mac, Amiga, Atari ST, and Apple; 254K and graphics adapter required for IBM and compatibles
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True BASIC is a structured programming language that offers speed, graphics, and flexibility to beginning and advanced programmers alike. Its portability allows programs to run on Macintoshes, IBM PCs and compatibles, Amigas, and Ataris. The package features a full-screen editor, mouse support, and a visual trace for easier debugging as your program runs.

Turbo Pascal 5.5

Borland
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\$149.95

Designed to be a high-performance native code compiler, the smart linking and intelligent overlay manager in Borland's *Turbo Pascal* make it well suited to building large programs. *Pascal* has adopted extensions from the C++ object-oriented programming language, including static objects, object constants, static methods, constructors, and destructors. This package also features an online tutorial and a hypertext help system with copy and paste. >

Watcom BASIC Interpreter

Watcom
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required
\$250.00

Watcom BASIC offers a seamless program-development cycle. The interpreter integrates the full-screen Editor so that programs are edited and then directly executed. Also, comprehensive diagnostics explain errors and mark the source statements where the errors occurred. A subset of ANSI BASIC X3.60 standard, Watcom BASIC also includes long variable names, control-structure statements, Watcom GKS Graphics, and a library of ANSI standards.

Watcom C7.0

Watcom
512K and DOS 2.0 or higher
required
\$395.00

Watcom C7.0 is a complete development system that includes a 100-percent ANSI C compiler. The package also includes a runtime library, the Watcom video debugger (with mouse support) and loop optimizations for even faster code. In addition, Watcom C7.0 includes a copy of Watcom Express C, one of the fastest C compilers available.

Watcom Express C

Watcom
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This C development environment features an integrated text editor, an ANSI C compiler, a linking loader, an ANSI runtime library, and a full-screen debugger. Watcom Express C's seamless environment lets you edit, compile, execute, and debug without leaving Express C. Documentation includes online help, reference cards, and the C Library, C Language, and Graphics Library references.

Zortech C++ Version 2.0 Developer's Edition

Zortech
512K and hard drive required
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Zortech's developer's package offers many features such as C++ Tools, the standard library source code, and programming support built into the compiler. It includes compatibility with MS Windows, portability from Microsoft C, an MS-DOS C++ source-level debugger, and a free TSR library.

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Sage Software
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required
\$199.00

Demo II lets the programmer build interactive demos to test how ideas will look, feel, and respond without providing the real code. With Demo II, you don't have to wait for the finished product to find out if your idea does the wrong things the wrong way. Sage Software offers a 30-day money-back guarantee.

graphics-MENU

Island Systems
BGI version: Borland's Turbo C or Turbo Pascal, IBM PC with graphics, and hard drive required;
Meta version: MetaWindow (from Metagraphics Software), IBM PC with graphics, and hard drive required
BGI \$99.00
Meta \$149.00

graphics-MENU is a utilities package that allows the developer of graphics applications to quickly create a user-friendly interface and spend more time focusing on the internals of the application. The package features mouse handling and full keyboard support, pull-down menus and pop-up message boxes, disabled entries and divider lines, and shadowed menus to create a 3-D effect. In addition, the package includes two utility programs: CurEdit and Color Customizer. CurEdit helps you create custom cursor icons and associate them with any mouse button or key combination. Color Customizer lets you specify color via an on-screen palette. MenuDesigner is included with the Metagraphics version and is available for the BGI version for \$49. This utility enables you to create horizontal and vertical menu structures onscreen.

KEDIT 4.0

Mansfield Software
256K required
\$150.00

KEDIT is a general-purpose text editor. The package features expanded memory support that allows editing of larger files, selective-line-editing capability, and enhanced programmability. KEDIT supports many of the commands and features found in XEDIT, IBM's mainframe text editor for the VM/CMS system.

Matrix Layout 2.0

Matrix Software
640K, DOS 3.0 or later, 3MB of free disk space, hard disk, and graphics card required
\$199.95

With Layout, you create programs by designing an object-oriented flowchart and then choosing the language you want for the finished program: Microsoft C, Lattice C, Turbo C, Turbo Pascal, or Microsoft QuickBASIC. Layout also features CASE technology, hyper-text databases, and graphical user interfaces. A Layout videotape is available for \$9.95.

Microsoft Macro Assembler Version 5.1

Microsoft
320K, DOS 2.1 or higher, and two disk drives required
\$150.00

Microsoft Macro Assembler makes your programs run faster by linking assembly-language subroutines to your BASIC, C, FORTRAN, and Pascal programs. The package includes an online tutorial and help file to aid newcomers in debugging their Macro Assembler programs. The package also includes four manuals: Programmer's Guide, Mixed-Language Programming Guide, Macro Assembler Reference, and Microsoft Code-View and Utilities Manual.

Object Professional 1.0

TurboPower Software
Turbo Pascal 5.5 required
\$150.00

Object Professional is a library of over 30 object types containing more than 1000 methods to help you create object-oriented programming. The package features multiple overlapping and resizable windows. Object also helps you build your programs from object types such as stacks, linked lists, and virtual arrays. TurboPower offers free technical support.

PCYACC Version 2.0

Abraxas Software
640K required
\$249.00

PCYACC is a complete language-development environment that generates ANSI C source code from input Language Description Grammars for building assemblers, compilers, interpreters, browsers, and much more. The package features example application sources to be used as skeletons for new programs. Abraxas Software offers a 30-day money-back guarantee.

PUBLISHERS' NAMES AND ADDRESSES

Abraxas Software
7033 SW Macadam Ave.
Portland, OR 97219.

Borland
1800 Green Hill Rd.
Scotts Valley, CA 95066-0001

Digitalk
9841 Airport Blvd.
Los Angeles, CA 90045

Econosoft
6413 N. College Ave.
Indianapolis, IN 46220

ImageSoft
2 Haven Ave.
Port Washington, NY 11050

Island Systems
7 Mountain Rd.
Burlington, MA 01803

Lahey Computer Systems
P.O. Box 6091
Incline Village, NV 89450

Lattice
2500 S. Highland Ave.
Lombard, IL 60148

Mansfield Software Group
P.O. Box 532
Storrs, CT 06268

Mark Williams
601 N. Skokie Hwy.
Lake Bluff, IL 60044

Micro Focus
2465 E. Bayshore Rd.
Suite 400
Palo Alto, CA 94303

Microsoft
16011 NE 36th Way
Box 97017
Redmond, WA 98073-9717

Mix Software
1132 Commerce Dr.
Richardson, TX 75081

Prospero Software
100 Commercial St.
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Portland, ME 04101

Sage Software
1700 NW 167th Pl.
Beaverton, OR 97006

Solution Systems
541 Main St.
Suite 410
South Weymouth, MA 02190

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1030-D E. Duane Ave.
Sunnyvale, CA 94086

True Basic
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TurboPower Software
P.O. Box 66747
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P.O. Box 7788
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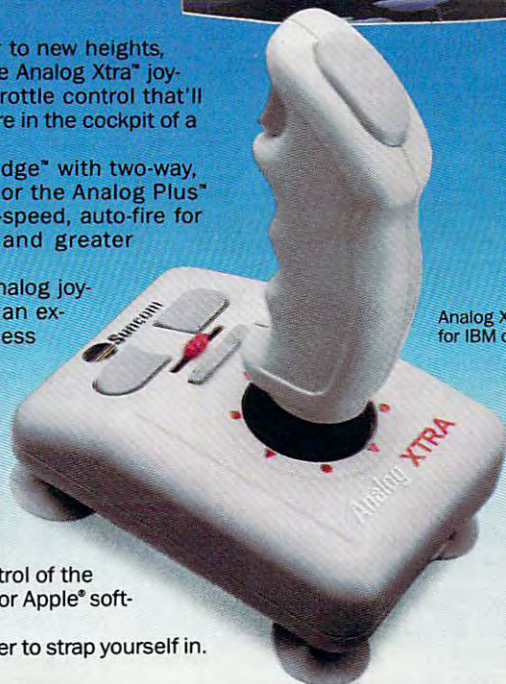
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RESOURCES

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Online Help

With online services, you can chat with programming professionals and with programmers who are just starting out. Most of the companies with major language products have support areas where you can ask questions about specific products.

GENie
GE Information Services
401 N. Washington St.
Rockville MD 20850
(800) 638-9636 (voice)
(800) 638-8369 (modem)

If you have a GENie account, you can check out the popular programming areas listed below. To get to these areas, either type the keyword and press the Enter key or type *m* followed by the page number and the Enter key.

- Language main menu, keyword LANGUAGE or page 516
- Object Oriented Programming, keyword OOP or page 165
- Microsoft languages (*QuickBASIC*, *Microsoft C*, *MASM*, and others), keyword MICROSOFT or page 505
- Forth, keyword FORTH or page 710
- Borland languages (*Turbo C*, *Turbo Pascal*, *Turbo BASIC*, and others), keyword BORLAND or page 765

CompuServe Information Service
P.O. Box 20212
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(800) 848-8199 (voice)

On CompuServe, most of what you'll be doing falls under IBMNET. Type *GO* and the area's name and then press the Enter key.

- IBM File Finder, keyword FFN-1
- IBM Programming, keyword IBMPRO
IBM Programming subareas:
Assembler, OS Services, C,
BASIC, Other Languages, and
Debugging Tools

BOOKS

Reference books are the staple of a programmer's library. You'll need a variety of books in order to have a comprehensive set of tools. Most bookstores carry these or comparable titles. If your bookstore doesn't have these books in stock, ask if it will order them for you.

- *Advanced MS-DOS Batch File Programming*, by Dan Gookin; TAB Books, Blue Ridge Summit, PA 17294-0850; (717) 794-2191; \$22.60
- *C Programmer's Toolkit*, by Jack Purdum; QUE, P.O. Box 90, Carmel, IN 46032; (800) 428-5331; \$39.95
- *The IBM Programmer's Challenge: 50 Challenging Problems to Test Your Programming Skills with Solutions in BASIC, Pascal, and C*, by Stephen Chen; TAB Books, Blue Ridge Summit, PA 17294-0850; (717) 794-2191; \$14.60
- *Mapping the IBM PC and PCjr*, by Russ Davies; Chilton Book Company, One Chilton Way, Radnor, PA 19089; (800) 345-1214; \$19.95
- *Programmer's Guide to PC and PS/2 Video Systems*, by Richard Wilton; Microsoft Press, 16011 NE 36th Way, Box 97017, Redmond, WA 98073-9717; (800) 883-3303; \$24.95
- *QuickBASIC Programmer's Toolkit*, by Tom Rugg and Phil Feldman; QUE, P.O. Box 90, Carmel, IN 46032; (800) 428-5331; \$39.95
- *Turbo Pascal Building Blocks, Second Edition*, by David D. McLeod; COMPUTE!'s Bookshelf, P.O. Box 5188, Greensboro, NC 27403; \$19.95 (plus \$2.00 shipping)
- *Turbo Pascal Programmer's Toolkit*, by Tom Rugg and Phil Feldman; QUE, P.O. Box 90, Carmel, IN 46032; (800) 428-5331; \$39.95
- *The Waite Group's MS-DOS Developer's Guide—Second Edition*, by John Angermeyer, Kevin Jaeger, Raj Kumar Bapna, Nabajyoti Barkakati, Rajogopalan Dhesikan, Walter Dixon, Andrew Dumke, Jon Fleig, and Michael Goldman; Howard W. Sams & Co., 4300 W. 62nd St., Indianapolis, IN 46268; \$24.95

Periodicals

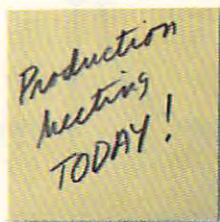
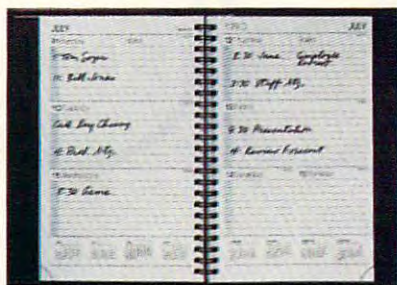
Magazines bring you current news, tips, events, and information. And they're delivered right to your door so you don't have to hassle with a modem or online connect time. Here are several magazines that cater especially to programmers and programming issues.

BYTE
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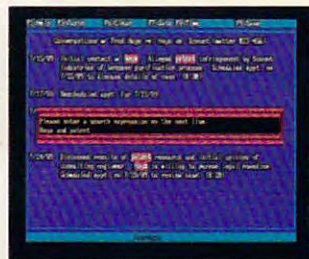
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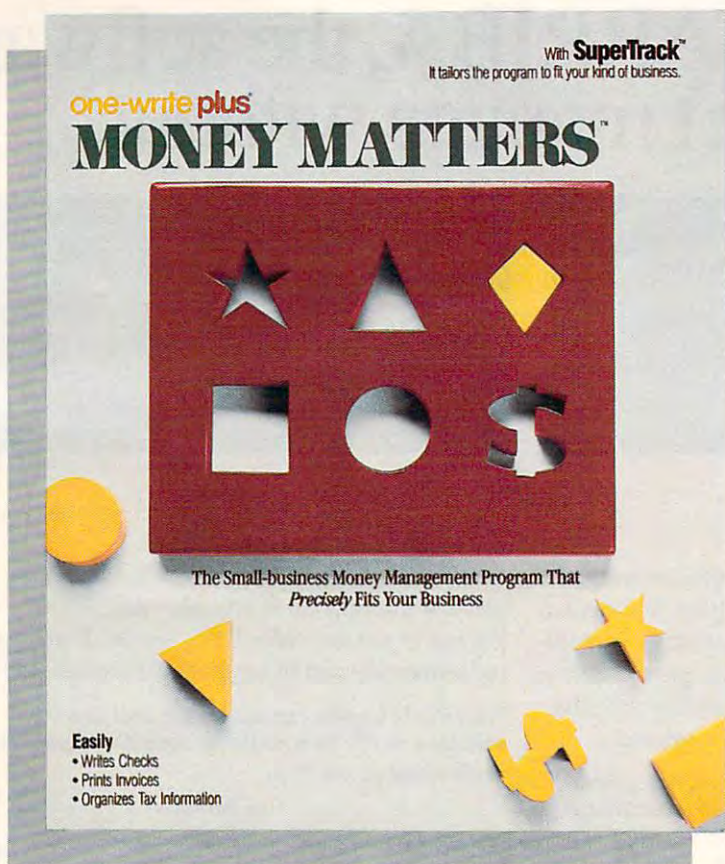
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PRODUCT



One aspect of running a home office that many people may not be prepared for is money management. When you start your own business, you'll often find yourself serving as company accountant. Even if you hire outside help, you'll still want to keep close tabs on your business's bottom line. You could use an expensive professional accounting system, but those are often designed for large businesses and may not suit your company's special needs. Or you could try Great American Software's *Money Matters*, part of its One-Write Plus series. *Money Matters* is a small-business money-management program with features that let you tailor it to your business's exact needs.

Money Matters will track your company's income and expenses; print checks, receipts, and invoices; and produce financial reports. It's a sophisticated double-entry accounting program. However, *Money Matters* automates much of the entry process, saving you from much of the drudgery of old-style debit and credit posting. While the program is easy to use, you may need help learning some unfamiliar accounting concepts and terms. For instance, *good will*, *accrued SUTA*, *accumulated amortization*, *equity*, and *retained earnings* are some of the terms that sent me scurrying for an accounting text.

You can set up and maintain financial records for up to 99 companies with the program. Whatever your business needs, one of *Money Matters*' 14 templates should suit. Templates include Retail, Builders, Medical, Accounting, Farms, Government, Financial, Manufacturing, Services, Legal, Real Estate, Non-Profit, and Religious. You can also create your own.

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GLEND A McCLURE

Mark Waggoner

MONEY

for your business, *Money Matters* automatically sets up the check (expense) and receipt (income) accounts it thinks you'll need. In the Rental template, for example, some of the account names are Rents, Late Fees, Maintenance, Insurance, Inventory, and Accumulated-Original Costs. You can change, add, or delete accounts; however, you cannot change or delete an account in which you have already entered checks or receipts. This keeps you from accidentally eliminating an account you've already used.

Money Matters is menu-driven and requires little typing on your part. Working your way through the menus and submenus is a snap. The name of your company is displayed above the menus, making it easier to keep track of what you're doing when working with data from multiple businesses. A line at the bottom of the screen tells you what your next action should be, such as *Enter the invoice number*. Context-sensitive online help is available with the press of the F1 key.

You can track up to 500 different accounts with this program, which should be sufficient for even the largest home business. You distribute income and expenses for each business by writing checks and receipts. Each entry can be distributed among up to 20 accounts. For instance, a credit-



Mark Waggoner

card expense could be divided between five stores, a gas station, and a restaurant. Then the gas station expense could go into the account called Automobile Expense.

You track your business's expenditures using the Check Register. For complete recordkeeping, you should enter every check, even if you don't want the computer to print it. The check-entry screen is similar to a regular checkbook. You enter the date, payee, check number, amount, and a memo on a check window at the bottom of the screen. The upper half of the screen shows checks you have entered. On the right are two columns, each displaying an account number and name. These are the accounts where you distribute your expenses. You can scroll through all of the accounts using the arrow keys.

A unique feature is Account 9999, Temporary Distribution. This is a holding area for expenses you don't know what to do with at the moment. Just place the expense in 9999, then go back later and redistribute it.

When you enter a check, *Money Matters* subtracts the check amount from your bank account and adds it to the distribution account. Your updated bank or credit-card account balance is then displayed.

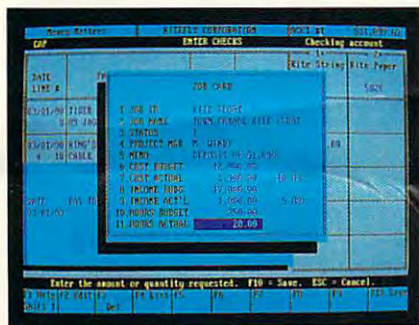
You enter income as receipts. The process is almost identical to

check entry, except that *Money Matters* adds the receipt amount to your bank or credit-card balance and to the income account you selected.

Entering check and receipt information goes quickly. *Money Matters* beeps to reassure you that you have entered the information correctly. I was apprehensive when entering this data, though, because the manual doesn't have a list with the distribution account names spelled out completely. When I wrote a check to my mortgage company, the account name read *Mortgages-Current matur*. I was unsure what that abbreviation stood for. I found out later that it means *current maturities*, but I still wasn't positive I had entered the expense in the correct account.

Customer/Vendor Cards make check and receipt entry even easier. These cards hold name, address, and year-to-date balances on up to 4000 customers or vendors. Pressing F6 pops up the correct customer or vendor information to paste on the form you're working on, saving you from having to retype this information for every check or receipt.

Several other timesavers offer shortcuts for finding and entering data. Speed Search allows you to go directly to an entry on a pop-up list without having to scroll item by item.



You can set up SuperTrack cards to help keep track of individual project costs.

You type the first numbers or letters of the entry, and *Money Matters* finds the first match. If it isn't the record you want, pressing F8 sends *Money Matters* to find the next match. Also, you can record frequently used key-press sequences as macros, automating repetitive processes.

The feature that really sets *Money Matters* apart from other financial-tracking software is SuperTrack. SuperTrack lets you customize *Money Matters* to fit the unique aspects of your business. You can track costs, commissions, labor, inventory, or any number of other business-related records with this feature.

Usually, when you enter an expense, it's added to the expense account and subtracted from your bank account. Most accounting systems don't let you keep track of the details of that expense, such as the number of hours spent on the project you're paying for. SuperTrack lets you keep specific information on transactions, information tailored to your business's needs. Best of all, you can add information to SuperTrack cards with a few simple keystrokes at the same time that you record checks or receipts.

Suppose part of your income comes from rental units. You can create a property-management SuperTrack card that corresponds to the Internal Revenue Service's Schedule E. Create a set of SuperTrack cards for each rental unit, with one card for each expense category you report on Schedule E. For example, create one card for advertising, one for cleaning, and so on. As you record your bank deposit of total rents received, you can pull up the cards for individual units and track how much money is received from each unit. When you write a check for cleaning services, pull up the card for the unit you had cleaned and record the expenditure. The SuperTrack card will keep a running tally for each unit. This allows you to track how much it costs to rent each unit.

SuperTrack can handle many tasks. You can define up to three card types per business. You might create a card definition for inventory, one for job costing, and one for business taxes. You can store up to 2000 individual cards of each type. SuperTrack's data handling is very flexible: You can tally dollar amounts; inventory by weight, size, or color; commissions by salespeople, territories, or sales accounts; or hours spent on a project.

Money Matters has predefined SuperTrack cards for Job Costing and

Inventory. Eight other models are listed in the manual's appendix: Fixed Assets, Property Management (Schedule E), Business Taxes (Schedule C), Merchandise Rental or Leasing, Commissions Paid Out, Commissions Due, Investments, and Professional Cost Tracking. You can use these examples as they're listed, or you can modify them to suit your home business needs.

You can print detailed reports of your transactions to the screen or printer. Check/receipt registers, vendor/customer analyses, balance sheets, and inventory reports are a few examples. These reports can cover the current month, the entire year, or a specified range of dates. I found the vendor analysis, which tells how



Automate home office billing procedures using *Money Matters*' invoice function.

much you paid to each vendor during a certain time period, particularly helpful.

You can enter and print invoices at any time. *Money Matters* provides three types of invoice forms: inventory, service, and professional. The default is inventory. The invoice function automatically calculates sales tax, payment-due dates, and discounts.

Money Matters allows you to set up two different printers for printing checks and receipts. For example, you could use a dot-matrix printer for printing checks and a laser printer for invoices. Print options allow you to choose whether to print return addresses or memo lines on your checks and to print the distribution amount on your check stub. You can print checks and invoices one at a time or in batches. When printing checks, *Money Matters* prints the date, check number, amount, payee, and memo on the check stub.

Where do you get checks? The precheckwriting report screen tells you to phone your local Safeguard forms distributor, who offers a full line of forms guaranteed to be compatible with *Money Matters*. I would

like to have seen a sample check with the stub attached included in the package, to make sure the checks were right for my business.

There are two manuals: one for *Money Matters* and one that covers the SuperTrack feature. These manuals are among the most readable I've seen. The pages are chock-full of carefully worded information, including a detailed index and clear screen pictures. The layout is attractive. Almost all the questions that I had were answered by the manuals.

If you have questions about the program that aren't answered in the manual, technical support doesn't come cheap. After you register the package, your first call for help is free. After that however, you must either buy a service contract called The Works or go for the A la Carte option and pay for individual calls. The Works contract costs \$60.00; it gives 60 minutes or 12 months (whichever comes first) of toll-free phone support. A la Carte is charged on a per-call basis: \$1.50 per minute, with a minimum charge per call of \$15.00. And it's not an 800 number; you pay the long-distance charges as well. Paying for support essentially raises the price of *Money Matters*. And at \$15.00 per call, you shouldn't have to wait two days for an answer. [When *COMPUTE!* tried to call the A la Carte line with a technical question, we reached an answering machine that stated that we would have to wait two days for a return call due to the high volume of tech-support questions. —Editor]

If your home office is taking off and you need to keep track of income and expense transactions, *Money Matters* will do the job for you. It takes a little forethought—you need to decide what aspects of your business you want to keep tabs on before you set up your account and SuperTrack cards. If you take the time to tailor the program to your business's needs, though, you'll find that *Money Matters* is a fine program which performs reliably, efficiently, and takes some of the drudgery out of managing your finances.

Money Matters

IBM PC and compatibles with 512K and hard disk—\$89.95

Package includes manual, SuperTrack guide, and four 5¼-inch disks.

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L H X



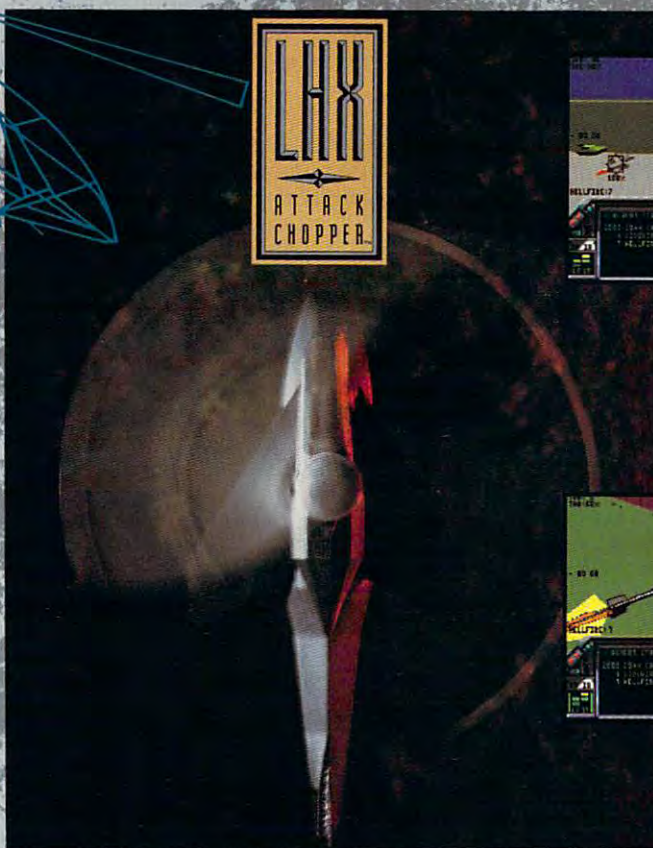
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DAVID D. THORNBURG

Back in the distant dark ages of personal computing (ten years ago), many computer users dabbled with programming. There were many reasons for this, not the least of which was that there were few useful commercial programs at the time. Almost all of the early computers came with one common piece of software: the BASIC programming language. In fact, it took the Macintosh to break the spell; the first Macs were packaged with a word processor and a graphics program! Apparently Apple thought people wanted to use computers as productivity tools, not just as Tinkertoys for the mind. However, even the Mac now comes with its own programming environment, *HyperCard*.

The fact is that personal computer users, for the most part, like to tinker with their machines. Unlike fixed-purpose computers, such as dedicated word processors, the programmable computer has the power to be adapted to do almost anything you want.

It all boils down to the natural desire we have to become masters of our environment. This was made clear in a big way when *VisiCalc*, the first spreadsheet program, originally appeared on the Apple II. The ability to create, modify, and play with sets of numbers became a videogame of sorts—a tremendously addicting game. Unlike a program that just lets you build tables of numbers for financial reports, *VisiCalc* allowed the user to create “intelligent” cells whose values were based on calculations performed on numbers from other parts of the spreadsheet. Within a very short period of time, people who had never seen a financial report before were playing what-if games with corporate and household budgets. Their ability to create their own spreadsheet analyses gave them power.

This power came from a blend of two different skills: skill in financial

analysis and skill in computer programming. Yes, the design and construction of a spreadsheet is computer programming.

Of course, the limitation of the spreadsheet as a programming language is that it's primarily suited for the creation of number-based applications. One would be hard-pressed to find a way to create a spreadsheet that worked like an arcade game, for example.

Over the years, many people have tried to find a universal metaphor that could be used as the basis for a more general programming language. Formal languages like BASIC are built on the metaphor of sequential instructions—computing from the

PROGRAMMING
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machine's perspective. To become an expert in languages like BASIC, C, Forth, or Pascal requires that the user learn a sequential way of thinking about problem solving.

HyperCard breaks away from traditional programming structure. Unlike spreadsheets (whose problem domains are restricted) and unlike traditional languages (whose syntax requires a new way of thinking), *HyperCard* allows the user to think of programming in a fairly natural way—the stimulus/response model.

HyperCard applications present the user with a collection of possible actions that can be taken at any given time. A menu item can be selected, a

button can be pressed, text can be entered in a field, the cursor can be moved with the mouse, and so on. Depending on the action chosen by the user (the stimulus), the computer produces a response, such as a text presentation, an animated sequence, or the printing of a document. Unlike traditional languages whose programs are written in one body of code, *HyperCard* programs are attached to the objects themselves. In other words, a button may contain a script instructing the computer to dial a telephone. Whenever this button is pressed, the computer will dial a number. If the programmer wants to change the script associated with this button, this change can be made in the button's script without affecting any other parts of the program.

What I like about this model is that it can be used to design programs of your own, even if you're using a programming language like BASIC. You would start by making a list of all possible user actions, such as pressing keys on the keyboard or clicking a mouse button. Next to each action, you'd write a description of what you want the computer to do in response to this action. When it was time to write your program, you'd create a main procedure that checked to see if the user had done anything of relevance. If an action was detected, the computer would use a subroutine to perform the desired task and then return control to this master loop that would be constantly on the lookout for new user inputs.

This rough structure for programs works as well for the design of a videogame as it does for the creation of a word processor. If you don't have access to *HyperCard* or similar environments that support the creation of your own powerful scripts, you might want to try your hand at using this model to create a BASIC program. Even if you don't create the program of the century, you should take the time to explore your ability to make your computer do exactly what you want. □

Small Craft Warning.

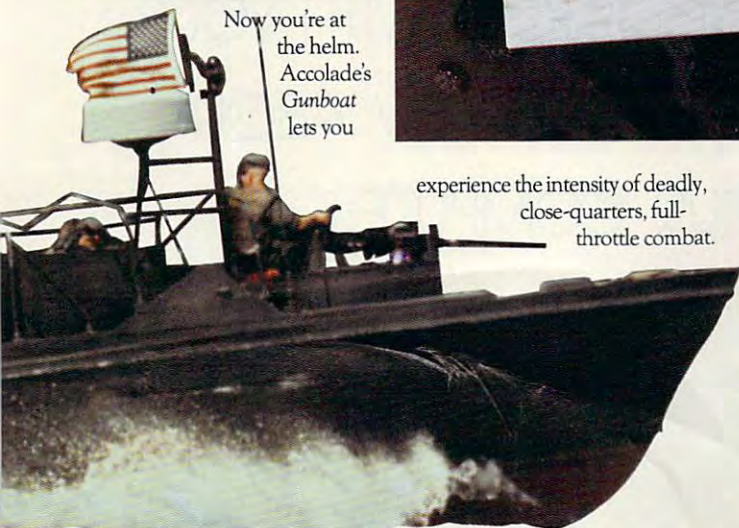
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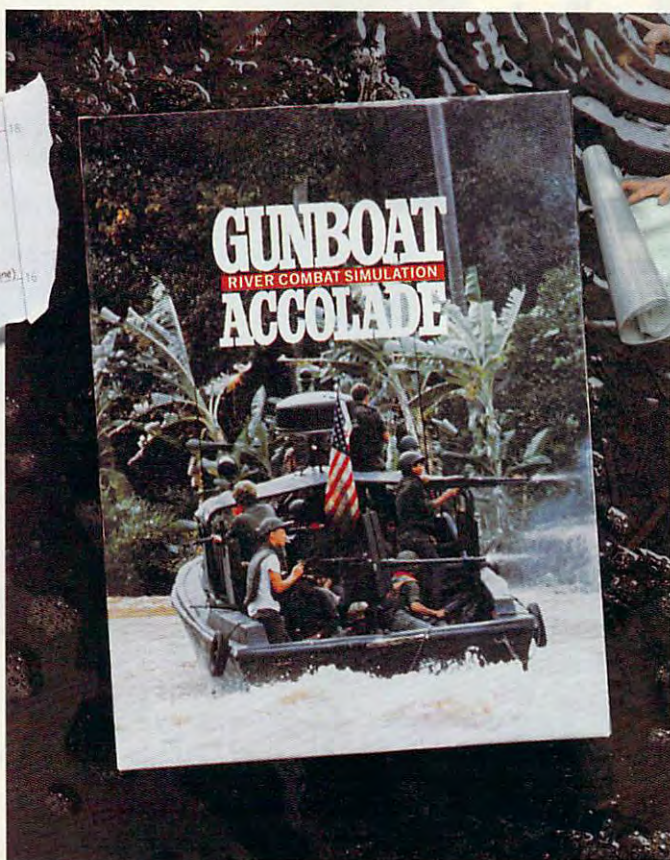
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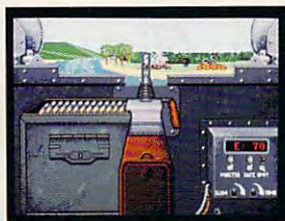


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ON THE ROAD AGAIN

PHILIP CHIEN

Today's laptop computers make it easier than ever to take your computer with you. But whether you use a laptop or simply throw your desktop computer into the back of the car, it pays to plan ahead. When you travel, you have to be sure that you'll have food, shelter, and transportation. It's also important that your computer has what it needs—so it can function properly and return home in one piece.

Before you hit the road, call your insurance company. Ask if you're covered for theft or damage while traveling. Can you immediately recover the cost of a replacement unit if it's needed for a critical presentation? Are missed wages and consequential losses covered if your software is damaged or lost?

If these points aren't included in your existing homeowner's or office policy, you can easily purchase an extra rider for the protection you need. But watch out—the premiums can be extremely high if you want to protect the value of the data or presentation.

The most important rule of traveling with your computer is to keep it with you at all times. Like all valuables, it should be kept on your person. You should *never* put your computer in with the checked baggage or leave it visible in the back of an open car. Even on a winter day, a closed car can become hot enough to melt plastic disks and leave a layer of dew on the inside of your computer's case. The moisture from the dew could cause a short circuit the next time you turn your computer on.

One simple trick has saved more than one computer from being lost forever. Tape a copy of your business card to both the inside and the outside of your computer's case. If you should become separated from your computer, you'll at least have a chance of getting it back. Another

WHO SAYS YOU CAN'T TAKE IT WITH YOU?
HERE'S ALL YOU NEED TO KNOW ABOUT
TRAVELING WITH YOUR COMPUTER.

good trick is to set up your AUTOEXEC file to display your name, address, and phone number, as well as a notice that you'll pay a reward if you're notified about the lost computer.

All the Right Moves

When you pack your system, be sure to use a good heavy-duty carrying case. Most laptop computers are built into their own carrying case, but an additional layer of protection is important in case your computer encounters rough handling.

As a general rule, soft cases are designed for specific computers and have just enough room for your computer and a few accessories. On the other hand, soft cases are relatively easy to carry over your shoulder and will fit under most airline seats.

Hard cases usually have more room than soft cases and are useful for shipping or for trade shows, where your computer will be carried by baggage handlers.

Whichever type you choose, the case should be relatively plain and nondescript—that means no fancy logos or designer name labels. Eye-catching bags attract attention and potential theft. It's better to have a plain bag with a computer that reaches its destination than a fancy designer bag that suddenly grows legs and walks away.

While most laptops are relatively light, there's an important accessory that usually outweighs it—your user manuals. How often you'll need to consult your manuals will depend on your experience with your software. Rather than take along a full set of manuals, you can take along the cheat sheets that came with your software. You might even purchase a set of second-party cheat sheets if none were included with your programs.

Only use backup copies of the software and data you'll need on your trip, and pack a second separate backup set, preferably on your person.▷



When you get to your destination, your computer may be separated from you, and if you don't have a second backup set, you'll be in trouble. Don't forget that the data you plan to use on your trip could be more valuable than your entire computer system. In addition to your critical programs and data disks, you should also bring along a couple of utility programs (including file-maintenance, disk-optimizer, and disk-repair programs), just in case.

World's Longest Printer Cable

Believe it or not, modems are much more versatile than printers, even if you don't normally use one. Small modems are about the same size as your mouse and use very little power and suitcase space. A modem can also double as a substitute printer.

Fax machines have spread across the world even faster than computers, and virtually every hotel and business has a fax machine with a dedicated phone line. In addition, many online services (such as GENie, MCI, and Delphi) can send fax messages. You can create your document, save it on your floppy, and upload it to your online service. Then have the online service send the output—as a fax—to your hotel or office's fax machine, with a note requesting that it be sent to your attention. It may seem complicated and roundabout, but it's relatively simple once you get the hang of it.

Check ahead of time to see which kind of printer will be available at your destination. Most dot-matrix printers are IBM/Epson compatible and will hook up directly to your computer's printer port, but there are exceptions. If you plan to use a laser printer, check to see that your software is compatible. In most cases, you can configure your programs for a generic printer, and you'll be able to print a draft or working copy. Unfortunately, there's no such thing as a portable laser printer—at least not yet.

Instead of disconnecting your printer cable

each time you travel, it's much easier to purchase an inexpensive ribbon cable. Not only will you not have to disconnect your printer cable each time you travel, but a ribbon cable is lighter and smaller than a normal printer cable.

X Marks the Spot

If you travel by plane, allow extra time for the airport security guards to hand-search your computer. *Do not* let your system be x-rayed. Although the x-rays shouldn't harm your computer, they may erase certain types of memory chips. The magnetic coils in the transmitting tube could also erase your floppy disks.

Many people have never had problems passing their computers and disks through airport security systems, and I admit I've let my computer go through x-ray machines when I was too late to take the time for a hand search. But it's better to be safe than sorry. Airport security officers are more aware of computers now and are less likely to be confused by a request for a hand search.

The security people will probably ask you to take your computer out of its carrying case and plug it in to demonstrate that it's an actual working computer, not something disguised as a computer. This may involve crawling on the floor to reach an electrical outlet and extra time if there are a lot of people waiting.

The December 1988 Pan Am 103 flight from London to New York was destroyed by a bomb disguised as a large radio, and security precautions have since become more stringent. For a while, there was a proposal to eliminate all carry-on electronic components, but the FAA backed down because of the large number of laptop computers used by traveling business people.

Running Interference

If you're lucky enough to have a laptop with a battery, there's good news. While airliners don't have a 120-volt AC outlet next to each seat, you can operate a laptop with a battery pack. The fear that interference from a computer might send a plane off course was addressed by American Airlines. It tested dozens of computers, calculators, dictating machines, and even radio-controlled toy cars and determined that none of them interfered with their onboard systems. The FAA made an addendum to Federal Air Regulation 91.19, which allows the use of pocket calculators and pacemakers, to include computers and videogame machines. During the critical takeoff and landing periods, your computer must be put away, along with the rest of your carry-on luggage, for additional safety.

If you're a passenger on a small private plane, I don't recommend that you use your system while in flight. Since you're much closer to the cockpit and the flight instruments, your computer could interfere with them much more than it would in the body of a large jet. It's still unlikely that your computer would harm the plane, but once again it's better to be safe than sorry. It's also possible that your computer could be jostled during turbulence and accidentally hit the pilot in flight.▷

Pack Your Bags

This is a rough list of the items I keep ready for unexpected trips. You should adjust the list to suit your own requirements. In addition, I keep a fully stocked tool kit (with extra sub-DIN-8, DB-9, and DB-25 connectors) in my car—just in case.

- Three-plug AC outlet adapter or small power strip
- Mouse
- Keyboard with its cord (You wouldn't believe how many people forget this one!)
- Extra power cord—leave your original cord at home
- Tool kit or at least a small screwdriver
- 3-to-2 grounding adapter—in case you encounter a two-slot outlet
- Printer cable
- 6–12 foot long phone cord for your modem
- Phone-line adapter kit (see text)
- 3½- and 5¼-inch formatted disks
- Cables to transfer data to other computers
- Extra video cable and television adapter

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Circle Reader Service Number 157

Heartbreak Hotel

When you finally make it to your hotel room, you may find that the phone isn't designed to accommodate a modem. If you look around, you can usually find a modular phone jack or at least a place where you can hook into the phone line.

Sometimes you'll find a small panel with two screws or a small box held on by a screw. If you remove the screws, you should see either a modular jack or a set of four screws with color-coded wires. There are a variety of commercially available modular jack adapter kits for the four-screw terminal block, but I prefer a homemade adapter consisting of two alligator clips attached to a modular phone cord. Just connect the green wire from your modular cord to the green screw and the red wire to the red screw. Fortunately, this isn't something you'll have to do very often. Most hotels, especially the newer ones, have modular phone jacks.

If your terminal program automatically dials, don't forget that you may have to dial a 9 and wait for a second dial tone before you can get an outside line. In addition, if your destination's area code is different from your home area code, you'll have to change your terminal program's dial macros. Local access numbers for timesharing services (such as Telenet and Tymnet) will also be different. If you have to change the phone numbers of your telecommunications

program, be sure to write down your old numbers and put them in a safe place so you can reset them after your trip.

Time Machine

Another travel problem that most users forget about is the effect of time-zone changes on their computers. Your system clock is still accurate—but only for your home location, not your destination. When you save a file to disk, your operating system records the time, but that time could be off an hour or more. And don't forget that when dialing online services the discounted night rates apply from the time zone you're calling from.

One obvious reminder: When you get back home, you should reset your clock for the right time zone and reset your dialing macros for the proper dialing prefixes and phone numbers.

Portable computers have been around since the Commodore KIM-1 and RCA Cosmic VIP, but today's laptops are just as powerful as their desktop counterparts. With a bit of thoughtful planning, you'll find it's as easy to use a computer on the road as it is to use one in your home or office. □

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

Sixteen Under Ten: Laptops Go on a Diet

Each year, laptop computers become smaller and lighter. Here's a sampler of 16 laptops that weigh less than ten pounds.

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20555 FM 149
Houston, TX 77070
(800) 231-0900

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Irvine, CA 92718
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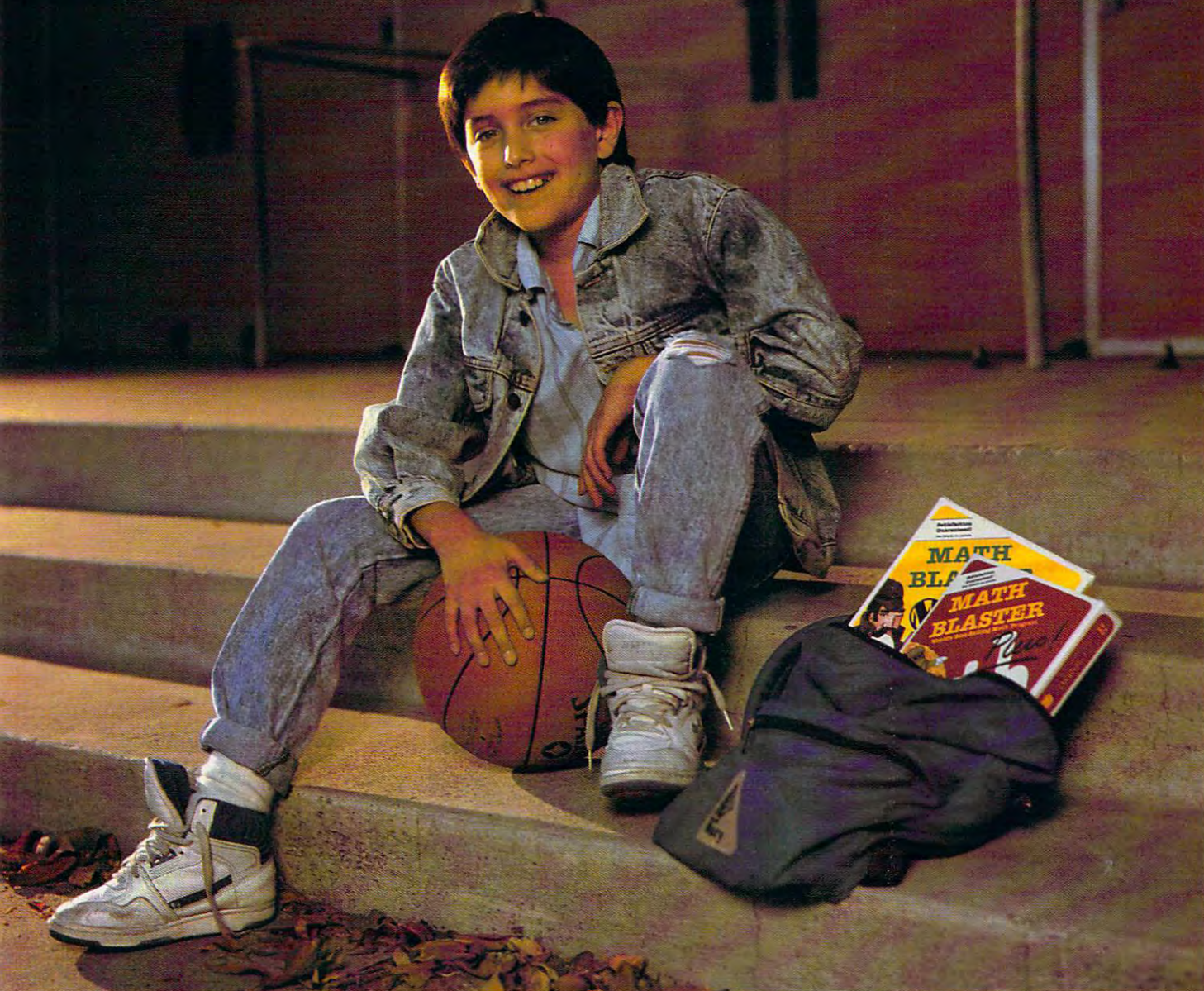
Sanyo MBC-16LT2

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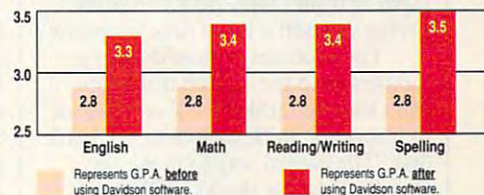
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H I N T S A N D T I P S F R O M O U R R E A D E R S

Almost all programs come with a file called READ.ME or READ-ME.TXT containing last-minute information that couldn't be included in the documentation.

These files can be dumped to the printer, but I prefer reading them onscreen. However, using the TYPE command, the information scrolls by so fast that I often can't stop it quickly enough by hitting Ctrl-S.

I now use the MORE pipe command, which pauses on each screenful of text. For example, suppose you want to display a file called READ.ME that's on a floppy in the A: drive. You'd input TYPE A:READ.ME | MORE and hit Enter. Make sure the MORE command is in your DOS directory.

You can use this trick to read any text file one screen at a time. After you've read the display, hit any key to go to the next screen.

*Don Bradley
Northbrook, IL*

Mega Disks

I have an IBM AT with one 1.2-mega-byte floppy drive and no hard drive. Some programs that come on multiple 360K disks will run much smoother with a hard drive. However, if the files take up fewer than three full 360K floppies, you can often copy them onto a 1.2MB floppy and run them as if they were on a hard disk, saving yourself a lot of disk swapping.

The problem is, how do you get the files onto the 1.2MB disk? You can't use the DISKCOPY command to transfer a 360K disk onto a 1.2MB disk. The easiest way to make the transfer is to use the XCOPY command included with DOS 3.2 or higher. This program reads as much data into the computer's memory as possible before requiring you to swap disks. If you don't have any TSR programs running, copying a 360K disk onto a 1.2MB disk will only require two swaps. Just type XCOPY A: A: and

follow the instructions on the screen. If the floppy you're copying has sub-directories, then type XCOPY A: A: /S. Repeat this for the second and third floppies.

If all of the program disks fit on one floppy, you can generally run the program by following the instructions for hard disk usage. Just substitute any references to drive C: with A:. You can also use this technique to reduce the number of floppies on your desk: Just copy two or three different programs onto one 1.2MB disk.

*Chung Chan
Oakland, CA*

Switching Batch Files

TSR utilities are great. Ranging in function from disk buffers to mini word processors, TSRs can make your day-to-day PC work a lot easier. I know—I load tons of them in my AUTOEXEC.BAT file. The problem is, all of those utilities eat memory. And when you subtract the memory used by device drivers loaded in my CONFIG.SYS file, my 640K PC often ends up with less than 512K free.

Every once in a while I want to run a program that runs best with, or even demands, almost 640K free. My

initial solution was to create boot floppies with different AUTOEXEC.BAT and CONFIG.SYS files. This worked fine, but it seemed silly to be booting my hard disk system with a slower floppy drive.

Then I hit upon a better solution. Why not store a set of minimal startup files on my hard disk and toggle between them with a batch file? It's easy: First, create a file called AUTO2.BAT that contains only the absolutely necessary startup files—perhaps even just a PROMPT \$P\$G command. Then create a second file called CONFIG2.SYS containing only absolutely essential device drivers.

Now load up your favorite text editor and create the following batch file.

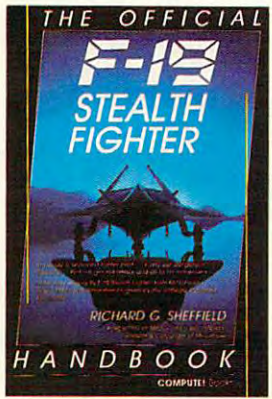
```
ECHO OFF
CD \
REN AUTOEXEC.BAT AUTEMP.BAT
REN AUTO2.BAT AUTOEXEC.BAT
REN AUTEMP.BAT AUTO2.BAT
REN CONFIG.SYS CONTEMP.SYS
REN CONFIG2.SYS CONFIG.SYS
REN CONTEMP.SYS CONFIG2.SYS
ECHO FILES RENAMED, REBOOT
YOUR PC
```

Save the file as SWITCH.BAT. Now, when you need to use a memory-hungry application, just type SWITCH and reboot after the batch file finishes execution. Your PC will use the minimal startup files, and most of your memory will be available for your application. When you've finished, type SWITCH again. When you reboot, you'll have all your handy TSRs and device drivers available.

*Denny Atkin
Greensboro, 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.

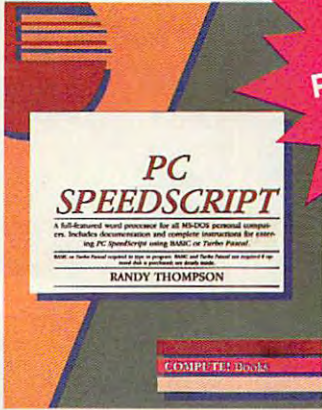
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 by Richard G. Sheffield
 Foreword by Major "Wild Bill" Stealey, president and cofounder of MicroProse
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 Learn the ins and outs of flying MicroProse's new F-19 Stealth Fighter flight simulator. Study the practical hints and tips for flying the simulator and performing ground-attack and air-to-air tactics. Then read all the background information in the book to learn to fly the real F-19. In the final section of the book, you'll find yourself looking over the shoulder of an expert F-19 Stealth Fighter game player as he carries out several dangerous missions.

Easy 1-2-3 for Small Business
 by Sandra Cook Jerome, C.P.A.
\$18.95 320pp
 This hands-on guide is perfect for small-business owners who need financial reports and information quickly. It is more than just another tutorial on Lotus 1-2-3; it's a guide to building practical spreadsheets. You get complete instructions for creating more than a dozen spreadsheets, including income statements, job costing, tax planning, balance sheets, and accounts-receivable aging. You'll even learn to write a business plan. Although written specifically for Lotus 1-2-3 releases 2.2 and 3, the spreadsheets in *Easy 1-2-3 for Small Business* are also compatible with release 2.01.

COMPUTE!'s Guide to Nintendo Games
 by Steven A. Schwartz
\$9.95 272pp
 A valuable buyer's guide, this book is packed with tips for better play and reviews of available game cartridges for the Nintendo Entertainment System. Each game description includes a screen shot; basic information such as type of game, number of players, and controller type; and ratings for the essential elements such as sound and graphics quality, violence, difficulty, and overall play value.



PC SpeedScript
 by Randy Thompson, associate editor at COMPUTE! Publications
\$24.95 224pp
SpeedScript, a full-featured word processor and the most popular program ever published by COMPUTE!, is now available for IBM, Tandy, and compatible personal computers. From letters and reports to novels and term papers, *PC SpeedScript* handles all your word processing needs. This 5 1/4-inch disk contains the ready-to-run *PC SpeedScript* program and the *Turbo Pascal* source code. You do not need BASIC or *Turbo Pascal* to run the programs. The package includes a 224-page book with complete documentation and source code listings.



Quick & Easy Guide to Using MS-DOS, Second Edition
 by Bonnie Derman and Strawberry Software
\$14.95 224pp
 The second edition of this easy-to-use guidebook covers all versions of MS-DOS through version 4. Commands and directions are logically arranged for quick reference. Topics include directories, files, disk commands, screen and printer output, and more. It's the only MS-DOS book that employs a truly task-oriented approach.

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BATTEN DOWN THE HATCHES AND TAKE TO THE HIGH SEAS WITH THIS AMBITIOUS NAVAL WARFARE SIMULATION



As ambitious as any war game since *Universal Military Simulator*, *Harpoon* finally arrived in late 1989, full of promise and of flaws.

The promise was immediately evident: Here were the warships, aircraft, and weapons systems used in modern naval warfare in the North Atlantic Theater. Based upon Larry Bond's much admired board game, *Harpoon* combines a menu-driven interface, a huge database of information, and a geographically proscribed but environmentally rich universe. The combination is powerful and delivers an intense and sophisticated gaming experience. The quality of that experience, however, depends on how generous you're willing to be toward the game's developers.

For all of its wonders, *Harpoon* may have disappointed its initial purchasers. Some problems emerged upon loading the game. Even on a 386SX machine, *Harpoon* takes time to start up. Cycling through the various setup screens is likewise time-consuming, not so much because of the choices that you must make, but because *Harpoon* processes slowly. Admittedly, the game contains a great deal of information, and the code required to manipulate the game's many elements is huge.

Put simply, the early version of the game that I examined (and this was not a beta copy, this was ready-to-sell software) was buggy. Multiple bugs. Big ones.

Saving and restoring games was difficult, if not impossible; crashes were frequent; the manual contained

COMPUTE! CHOICE

KEITH FERRELL

This game has been a long time coming.

I first saw *Harpoon* in 1987. Even in its early stages, the game stood out. This one would go farther and do more than any other war game on the market. Everyone who saw this simulation two and a half years ago

wanted it immediately.

Then the wait began. Three-Sixty, the game's publisher, poured more and more resources into development, but the game didn't appear. *Harpoon* seemed to be one of those great almost products: a swell idea that never got completed. Last fall, though, rumors of the game's impending arrival began to flow once more.

MINIMENTS

some large holes; and some victory conditions were not recognized. This was what I'd waited more than two years for?

To its credit, Three-Sixty began addressing the problems almost immediately. I received update disks that corrected some of the more fatal errors; subsequent disks eliminated even the small bugs. The company has put a plan in place to update customers and provide replacement disks containing some bonus features to make up for the inconvenience.

I write this six weeks after the game's release. I'm on my third, and with luck final, update.

This is the game I've waited two years for.

Harpoon puts you in the role of director of theater operations for NATO or the U.S.S.R. At your disposal, depending on which of the 12 scenarios you're playing, are forces ranging from small groups of ships to armadas consisting of dozens of vessels and subs, as well as hundreds of aircraft. You can play the simpler scenarios in a few hours. Larger scenarios, representing the sorts of battles on which wars can turn, can take ten or more hours.

Time, in fact, becomes a third player in the game, affecting your decisions and altering their consequences. Even in the age of silicon and missiles, naval warfare remains a



Mark Wagoner

lot of waiting for a few minutes of furious activity. The Falklands War—a scenario I'd love to see in *Harpoon*—offers a good example. The whole world watched anxiously as Great Britain assembled and dispatched a fleet, but the fighting didn't begin until days later. *Harpoon's* designers added time-compression options to minimize the frustration that accompanies such waits. Time-compression utilities give you several options, from 1:1 realtime to 30 seconds of game time equaling 30 minutes of realtime.

I couldn't find any consistency in the game's internal clock. A time-remaining bar adds a sense of urgency to each scenario, yet its hours and minutes tick by at irregular, unpredictable intervals. The manual attributes this to the complexity of providing situation updates, especially in larger scenarios, but it's still a bit disconcerting.

When you first start issuing orders, you'll want to use the 1:1 time option. Although your basic job is managing theater operations—assembling and positioning the fleets, setting strategy—you're also responsible for establishing orders for individual craft.

You must set courses, order electronic sensors to be turned on and off, post airborne pickets, establish vessel speed and depth for submarines—any one of which can be crucial when the shooting starts.

Issuing these orders is simple, but learning how the various ships and systems work best together is much more complex. That learning experience is one of *Harpoon's* most intense challenges, as well as being among its most attractive features.

Harpoon will repay your efforts with a serious look at state-of-the-art superpower weaponry. The information you need to do your job is contained in the game's database. The data is for the most part clearly written, with enough detail to make your command more effective.

The database interface makes study simpler. It's easy to point and click through screen after screen filled with valuable information. I've lost track of time among these screens, as a matter of fact. The material makes fascinating reading.

Harpoon demands a mouse. It's not required, but I wouldn't approach the game without one. Drop-down



A NATO missile group prepares to attack Soviet warships with *Harpoon* sea-to-sea cruise missiles.

menus, point-and-click selection of craft elements, and shuttling among windows are all made much simpler with a mouse.

Keyboard commands are included, but I found them to be inconsistent in practice and poorly explained in the game's manual.

You're going to want to bring plenty of memory to the table, at least 550K of free RAM. I put together a special boot disk, stripping out everything except system files and a mouse driver. *Harpoon* wants a lot of memory and can get finicky if it doesn't have it.

Gameplay itself is stately: Using time compression to shrink long voyages, I found myself captivated by the progress of my ships toward their assigned destinations. The voyages take place in interesting, dangerous waters. The scenarios included are set in the Norwegian Sea. Bounded by the pole to the north and the Greenland/Iceland/United Kingdom gap to the south, the sea offers offensive and defensive problems and possibilities. Much of NATO's war planning focuses on these crucial waters, vital to the success of either side.

Harpoon's scenarios take full advantage of the region's topographical complexity and its effect on both surface and submarine vessels. Small forces can hide among the fjords, darting out to wreak damage on unsuspecting enemy vessels. Submarines can play hide-and-seek with surface fleets. There's plenty of room to deploy and maneuver aircraft. Some of the scenarios involve amphibious, as well as naval and air, forces.

The scenarios themselves are ranked in order of complexity, although the least complicated are not necessarily the easiest. The simplest scenarios pit small groups of vessels against each other. These are good tests of individual systems and offer the chance to learn the game's navigation, surveillance, and confrontation rhythms and rules.

The most complex involve dozens of craft and require you to make hundreds of decisions. It's nerve-racking work, and quite convincing.

Additional *Battlesets*, as *Harpoon's* designers refer to their scenarios, are expected to be released, each focusing on a different area of the world.

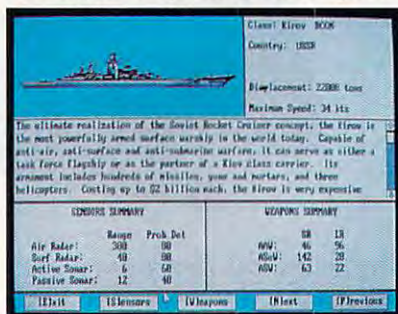
Harpoon uses several windows. The Group Map is the largest item on-screen. This is the strategic map, where you position your forces and issue orders. The Unit Map is useful for

tactical planning and closeup views of your forces.

Forces can be depicted on the screen in graphic representations or by actual NATO icons. Either way, the game looks good in EGA. I wouldn't want to play it in CGA, though. If you simulate CGA on monochrome monitors, you should know that this approach slows *Harpoon's* already slow execution. Similarly, the game all but requires a 286 and a hard disk. You can get by without them, but it's neither fun nor fast.

Cycling through your combat forces, examining and changing orders, regrouping or retreating is, up to a point, as simple as clicking a mouse button and entering the appropriate commands. The game can be won by sticking to the simplest levels of command, but it's not easy, nor is it completely satisfying. (Nor, to be honest, are you likely to win often.)

Taking your time, though, and learning the deeper levels of the game



Access *Harpoon's* information database to get vital statistics on enemy vessels, such as this Soviet *Kirov*-class cruiser.

is especially rewarding. Screens can be reconfigured to show latitude and longitude. You can configure and alter combined air and sea formations. Strategy can be changed quickly, although, since this is a realistic game, the results of your new orders will not immediately become evident.

The stately progression of your strategy is subject to any number of external factors. Weather can change, mechanical breakdowns can occur. And the enemy can find you.

Combat itself takes several forms. Air-to-air combat, for example, is not shown in closeup, as are confrontations involving ships. Rather, small explosions, accompanied by messages reporting the results, tell the aerial war story.

When committing a force to battle, you're given a choice of weapons from the ship's or plane's arsenal. Allocating and deallocating firepower is easily accomplished: Clear, well-

designed ordnance screens give you your choice of weapon and your choice of target if more than one is available. Make your decision and launch the weapons. You're returned to the main screen for the results.

For example, having committed four torpedoes in an attack on a submarine, you can track the progress of the fish toward their target. When they reach their destination, cutaway animation takes over, showing the target ship and its deadly pursuers. You may find yourself gripping the edge of the table during the final seconds before the torps make contact—or miss their target.

Harpoon's documentation is good, up to a point. Several of the game's features are not mentioned in the manual, nor is the documentation complete enough. I'd like to see much more information on specific types of orders, particularly those involving groups of elements working and fighting in concert. An updated manual has been promised.

There is some good reading included with *Harpoon*. Larry Bond contributes a thorough essay on naval tactics, with special emphasis on how those tactics are recreated in *Harpoon*. Tom Clancy offers a brief, fascinating glimpse into the workings of an actual Soviet warship.

For the effort and imagination that went into the contents of the game, *Three-Sixty* deserves credit. Those aspects make *Harpoon* deservedly a COMPUTE! Choice.

But the problems with the game's original release and manual temper that judgment. In some ways, the public functioned as *Harpoon's* beta tester—identifying bugs that should've been caught before the product was out the door. While I'm hopeful that by the time this review sees print all of the bugs will be corrected, I also feel obliged to add a caveat. If you like war games, you'll love *Harpoon*. But you may have to spend some time with *Three-Sixty's* personable customer service staff to get hold of a finished version.

Harpoon

IBM PC and compatibles with 640K; 360K floppy systems require a hard drive—\$59.95

Package includes an operations manual, a tactical guide, a Soviet submarine guide by Tom Clancy, and three 5¼-inch disks.

THREE-SIXTY

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GAMEPLAY

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

Translating can drive you crazy. I've been doing some of that lately, from Portuguese to English. Portuguese is a clear, graceful language, just as English is. But, when you try to translate a really terrific sentence from Portuguese into English, you begin to realize that there are ideas and nuances in Portuguese that *don't exist in English*—or if they do, it takes ten times as many words to express them.

That happens in computer translations, too—you know, when a program that was a hit on the Mac gets translated to the IBM format, or an arcade game gets implemented for the Apple II. Sometimes there's just no way to get the same effect.

Last month I got my hands on translations of five games that I had first learned to play on a different computer. These were all great games before, and they're still great on the new machines. So don't think for a minute that I'm giving them anything less than rave reviews. I just want to point out some of the woes—and advantages—of translation.

Moving *Populous* (Electronic Arts), a graphically brilliant game, from the Amiga to IBM hurt it visually, even with EGA graphics. But that's to be expected; the Amiga was designed to have brilliant graphics, while IBM graphics have been kludges and dumb mistakes from the start. The game developers made up for that by offering the IBM version with several new landscapes—the Wild West, an alien planet, a computer world, and a totally indescribable landscape—that made it feel like a whole new game.

Going from one computer to another can also affect a game's interface. On the Amiga, *Solitaire Royale* (Spectrum HoloByte) allows you to pick up a card and drag it to its new location; on the IBM, you can only mouse your way to the card, click on it, then mouse the cursor to the new location, and click again. It still works

fine—it was an alternate interface on the Amiga, too—but just a bit of the spark is gone.

Why the change? Perhaps because the Amiga was designed to be used with a mouse while the IBM was designed to be used with a keyboard; also, animation is fast on the Amiga because it's part of the hardware.

But if programmers translating from Amiga to IBM have to grit their teeth as they watch their game degrade a bit, games moving the other way can improve—if anyone cares to make the effort.

Romance of the Three Kingdoms (Koei) certainly got enhanced sound, and it looks and plays beautifully on the Amiga. In fact, it seems completely unchanged from the IBM version—and yet I wish it *had* been changed.

Romance is a menu-driven game—every possible command leads

to several choices, each of which requires you to type in one or more numbers. A typical sequence might require you to type 3, 56, 1, 2000, 0 and then, quite possibly, *N*; and then you might have to start the whole command all over from the top—again and again.

quency over and over. All of this typing could easily have been eliminated because *Romance of the Three Kingdoms* absolutely cries out to be a mouse-driven game. There's no reason *ever* to touch the keyboard. The same thing is true of Koei's sequel, *Bandit Kings of Ancient China*. But that all-keyboard IBM interface remains unchanged.

It was probably a sound business decision—the cost of such improvements probably wouldn't be covered by the increase in sales—but I can wish, can't I?

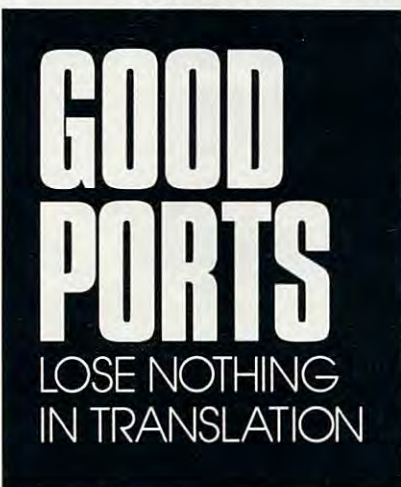
One translation that came through with flying colors was *Qix* (Taito) on the Amiga. Instead of the solid colors I knew from the Atari 800 and the original arcade versions, the captured areas fill with an interesting pattern and the title screens and background music are gorgeous, as Amiga users have come to expect.

But even here, the interface goes a bit weird. When you move without the joystick button pressed on the Atari version, you do quick draws; when you press the button, you do a slow draw. On the Amiga, moving without the button doesn't draw at all, and pressing the button does a slow draw. To do a *fast* draw, you have to learn the strange technique of pressing the button and then releasing it after you've begun to draw your line. It's very hard (for me at least), and it takes away just a little bit of the fun. There just had to be a better solution; I wish they had used it.

And then there's *SimCity* (Maxis), which seems to have survived completely intact during its passage from Amiga to IBM—at least if you have a mouse and an EGA-or-better graphics board.

Translators don't get much credit—game porting is generally regarded as slug work. But my hat is off to the translators—and their publishers—who make the effort and pay the bucks to make a game play the best way it can on each different machine.

I just hope I can do as well in translating Portuguese to English. □

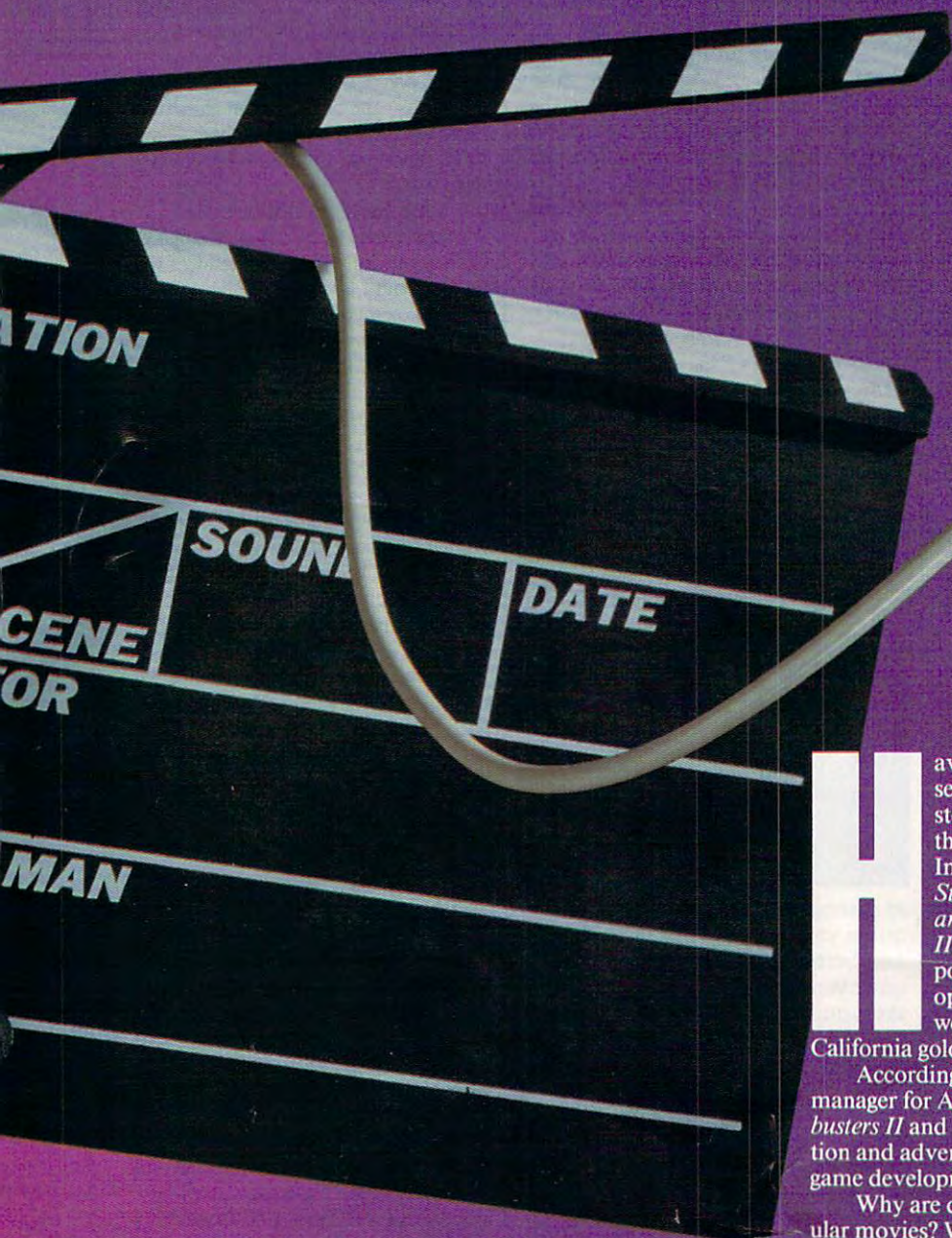


LOSE NOTHING IN TRANSLATION

After you play long enough, some of these typing sequences become second nature—as if you had become a macro generator yourself, programmed to type the same number se-

LIGHTS, CAMERA,

HOW HIT MOVIES TURN INTO
TOP-SELLING COMPUTER GAMES



RICHARD O. MANN

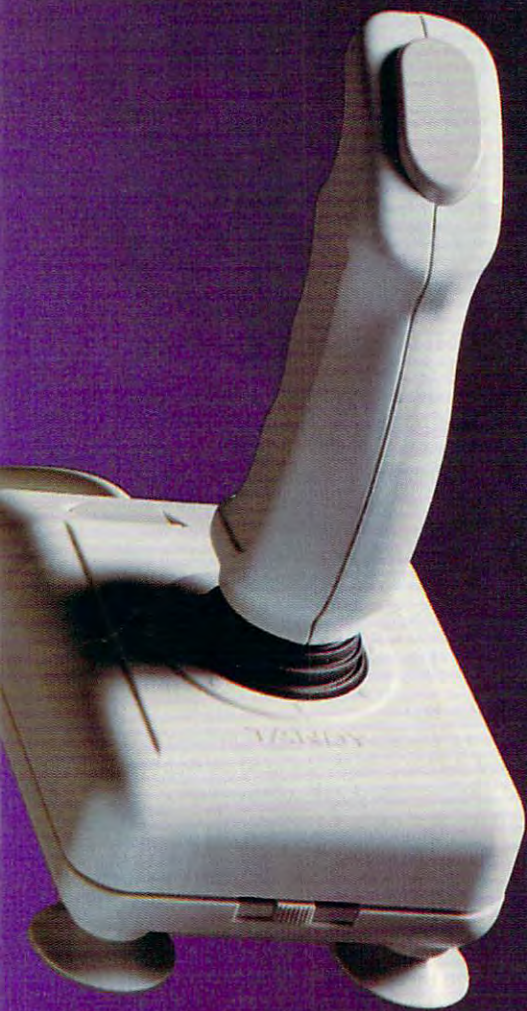
Have you noticed that the software section in your favorite computer store is looking more and more like the shelves of your local video store? In both stores, you're likely to find *Star Wars*, *Star Trek*, *Indiana Jones and the Last Crusade*, *Ghostbusters II*, *Superman*, and dozens of other popular movie titles. Software developers have discovered the Hollywood connection, and they've struck

California gold.

According to Kelly Flock, group product manager for Activision, the developer of *Ghostbusters II* and *Die Hard*, virtually all major action and adventure movies are now licensed for game development.

Why are developers so eager to tie into popular movies? What special problems do they

JOYSTICK!



have in dealing with Hollywood people? How well do these games sell? To answer these questions, we'll follow the creative process from a nearly complete motion picture to a ready-for-release computer game.

Let's Do Lunch

As a studio plans a major motion picture with game potential, its licensing department contacts game developers to offer the property, sometimes as much as 18 to 24 months before the movie's projected release date.

The studios treat their movies—especially their series properties—as holy artifacts, so they're extremely particular about who gets to work with them. Game developers exercise their own special brand of creativity to fashion a game from a written movie script, and the result can affect the movie's reputation.

Because of this, if a studio has successfully dealt with a game developer, it's likely to offer a deal to that developer first. Game developers consider their relationship with a movie studio to be a priceless business asset.

Since Paramount liked its work on *Star Trek V—the Final Frontier*, Mindscape had the inside track on Paramount's new blockbuster, *Days of Thunder*. Mindscape spokeswoman Lisa Petrisson says the competition was especially intense for this title, a stock-car-racing movie starring Tom Cruise.

It's a Deal

Developing a movie game involves a substantial financial risk, so developers consider the scripts carefully. "The cost of the licenses can vary tremendously," says Petrisson. "Licenses for computer games generally are much less than licenses for Nintendo games. We will pay anywhere from \$50,000 or \$100,000 all the way up to a million dollars for a license to use a certain film title on our products."

Mark Beaumont, vice president of marketing and product development at Data East, has successfully developed games from *Platoon*, *Batman—the Movie*, and *Robocop*. "We evaluate the script first to see if there's a game in there," he says. "Then we look to see if the property can be run across all the different formats we support. The ideal property for us is one that can start as an arcade game, then translate to Nintendo, then computer software, and maybe even to pinball. Then we look at the suitability of the property for the audience we'll be addressing."

"We're almost film producers, in that we're trying to guess from the story, the director, and the stars—which sometimes aren't even known yet—if the movie is going to be a huge success. It usually takes a Top Ten or Top Five movie to be a successful computer game," adds Flock.

More Coffee!

As soon as the deal is made, the developer is behind schedule. It's crucial to release the game as soon as possible after the movie is released. ▶

LIGHTS, CAMERA, JOYSTICK!



The first photo shows the movie's Indiana Jones caught on board a dirigible. The second shows the same scene transformed for the action game, *Indiana Jones and the Last Crusade*.

Though developers would love to release their games at the same time as the movies, the closest any have come recently was Lucasfilm Games, which released the Indiana Jones game only six weeks after the movie last summer. The best anyone else has done is a delay of about three months, which often puts the game out just as the videocassette is being released.

Shooting for the movie's release date means the game must be developed at least twice as fast as a non-Hollywood game. "Instead of having three people work on it for ten months, you put ten people on it for three months," Flock explains. "It works out, but you have a big spike where you have a real management challenge. You have to do everything simultaneously and then worry about continuity. Doing film-based products is really similar to the way they do the films themselves. It's different from the way we normally build computer games."

You Changed What?

Initially, all game developers have to work from is the script. Studio relationships vary, but most developers eventually see stills from the early shooting. Although they attend any prescreenings, they have little contact with the actual movie production. This presents a unique challenge for the artists who draw the backgrounds for the game scenes. All too often they don't even see the movie sets.

Most of the movie games have been arcade-action games, where the plot details aren't critical. Beaumont says the best way to avoid having to alter a game because of last-minute script changes is to stick to the script's basic elements, which are less likely to be cut. *Robocop*, for example, involves only Robocop, Ed-209 (the principal villain), and generic enemies.

Unlike an arcade-action game, an adventure game has to closely follow the movie script. Noah Falstein of Lucasfilm Games, the project leader on the *Indiana Jones and the Last Crusade* adventure game, experienced a lot of anxiety over script changes. "There were some exciting moments when we heard that Spielberg had completely recut the movie," he says. "We thought, 'Oh great, all these changes we've made,



all the stuff we put in will be obsolete when we see what he's done.' "

But after seeing a special screening of the recut movie, Falstein was relieved to find that the changes were mostly stylistic, things that added to the tension but didn't change the story.

Concerning some earlier script changes, Falstein says, "There were a number of things we put into the game that ended up not being in the movie. We view that as an advantage. People who play the game get to see stuff that George Lucas intended to put into the movie that was cut for various reasons. That adds to the fun of it."

We Don't Like It

Then there's the problem of studio approval. At every stage of development, the studios want to review and approve the details of the game.

Describing Paramount's review of *Star Trek V*, Petrison says, "They weren't really happy with our original concept for the game, so we changed it into a completely different game. At certain stages along the way, they said, 'We don't really want you to do that.' For example, we had a segment where there's a battle between Kirk and K'laa, the Klingon. It was to be an actual fight between the two of them from their ships. The Paramount people would never let us say they were actually fighting each other. So the way we got around it was to use a battle simulator inside the Enterprise, which was acceptable. It was a clever way to have a fight sequence without going against the persona of *Star Trek* and peace and all those good things they try so hard to build up."

The need to have studio approval every step of the way severely limits the creative people who design the games. In their non-Hollywood games, they have a free hand to design the games to match their own creative vision. With movie properties, it takes a different kind of creativity to design a boffo game while staying within the confines of the script. "In general, I prefer to work on games from our own original ideas, just because it gives us more freedom," says Falstein. "In specifics, though, it really depends on the movie. The *Indiana Jones* movie was very good for doing a game." >

It's a Hit

"Recently, by and large, it seems that most of what we're doing is based on movies," Petrison says. "There's a lot of competition out there. You try to get a game based on something people already know about, so the appeal of the movie or character will transfer over to the game you're creating," she explains. "For example, when people see a Star Trek game, they already know what Star Trek is about; that helps them want to pick it up."

"The arcade segment of the computer software business is starting to slide," says Beaumont of Data East. "The only area that seems to be surviving the slide is Hollywood properties. *Robocop* and *Batman* have done very well for us over the last year. That indicates that the only arcade games people are looking for may be ones associated with movies. People who used to buy computer arcade games now tend to go to Nintendo for that."

There's a danger in movie tie-ins, however. Several developers mentioned the failure of games developed from *Willow* and *Labyrinth* as examples of good games that didn't sell because the movies didn't take off.

On the other hand, a really good game can succeed despite the movie's lackluster performance. *Tron* was an arcade megahit; the movie was an also-ran.

A movie doesn't have to be Top Ten to be a hit with computer game buyers. "There's a correlation between who went to see the movie and [who buys] the computer game," according to Kelly Flock. "If you've got a property that appeals strongly to the typical Commodore audience, which has been young boys, then a property like *Predator* for the Commodore does extraordinarily well, although I don't think anybody's talking about that movie being even a Top



Ten—although it did pretty well. But in the target audience of people that play computer games, it did extraordinarily well. So it becomes an extremely good computer game."

All of the developers agree that a movie game will significantly outsell a comparable non-Hollywood title—as long as the movie doesn't bomb.

But not everyone believes that the path to the computer game Hall of Fame goes through Hollywood. Sierra spokesman Kirk Green says that his company has no immediate plans to produce a movie tie-in. Sierra did *Dark Crystal* for the Apple II five or six years ago and achieved some success with it—in spite of the movie's mediocre performance. The company prefers to work with its own ideas and predicts that it won't be long before movie producers approach Sierra to make movies from its games. *Leisure Suit Larry* on the big screen—what an idea!

Just as one of the characters die in the movie, you can steer the Statue of Liberty through the streets of New York City in *Ghostbusters II*.

Was That Really Bill Murray?

Movie studios are very sensitive about how the game developers portray the actors. A license gives the game developer the right to use the movie but not to use the actors' likenesses. Discussing *Batman—the Movie*, Data East's Mark Beaumont says, "Generally, if you use the actors as they were depicted in the movie, you're OK. If you use them in situations that you create, such as if we used a picture of Michael Keaton that didn't exist in the movie, using his image in a different situation, then you'll run into a lot of trouble, because then you're using Michael Keaton, not using the *Batman* movie property."

The actual terms of the licenses vary. "In many cases, you can use the likenesses of the characters, but you can't animate them," says Kelly Flock of Activision. "In *Ghostbusters II*, we use the likenesses of all the characters. In fact, we have Bill Murray telling you when you have a disk error. But we don't animate them in any circumstances."

Fan Mail

If you love these games, you're in good company. "It's a real pleasure for us on a personal level that one of the fans of [*Indiana Jones and the Last Crusade*] is Steven Spielberg," Falstein says. Spielberg would come by Lucasfilm Games during the program's development. Later, when the game was out, he would call Falstein. "He started calling us quite frequently for hints. In fact, he played through the game over the course of several weeks, most of the time with his son, giving us calls going through the various phases. He even missed some editing sessions because he was caught up in the game. That was very exciting for us."

So as you work your way through Indy's latest computer adventure, take solace. Even Spielberg needed hints to figure it out.

And as you leave the movie theater after seeing Hollywood's latest blockbuster, you can look forward to seeing the same story and characters on a computer screen near you—in about three months. □

Richard O. Mann contributes frequently to several national computer magazines from his home in Roy, Utah.

GAMESCOPE

H I N T S A N D T I P S F R O M O U R R E A D E R S

Here are some tips on how to get the keys in Sierra's *King's Quest II: Romancing the Throne*.

Finding the first key is actually quite simple. The only objects you'll need are the trident and the bouquet of flowers (which you get when you give Little Red Riding Hood the basket of goodies). To get the first key, read the inscription on the magic door and go directly back to the rectangular rock found near the ocean. There you'll meet a mermaid lying on the rock. Give the mermaid the flowers and a giant sea horse will pop out of the water. The sea horse is the ticket to finding King Neptune. From there you'll probably know what to do with the trident. When you get the first key, get back on land.

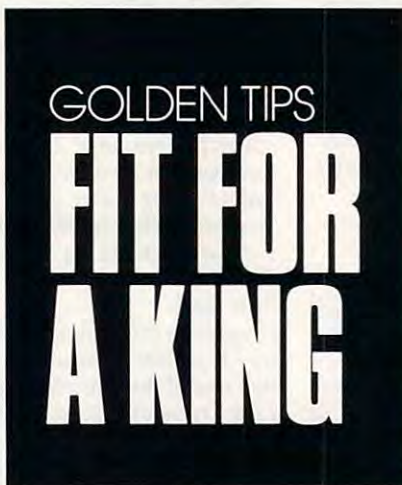
On your way back to open the second door, you'll need to capture the nightingale. There are two ways to get the bird. If the blind witch is in the cave, walk straight to the nightingale. Cover the bird cage with the cloth Neptune gave you, take it, and leave. If she's not in the cave, just go in, grab the cage, and leave before she returns.

Once you have the bird, go straight to the magic door and unlock it. After reading the inscription on the second door, go to the magic shop. You'll need to trade something for the magic lamp there—it will be obvious what when you get there. Once you've been rushed out of the shop, rub the lamp three times. You'll get a bridle, a sword, and a magic carpet. Ride the carpet and you'll find yourself in the mountains. Throw the bridle at the snake and it'll turn into Pegasus. Once you get the key in the cave, you'll be halfway home.

Go back and unlock the second door. You've probably suspected that the third key lies within Dracula's castle. Read the inscription and go directly to the castle scene. There you'll find a ferryman. You'll need some items before you board his boat, though: the cross, the stake, the mallet, the sugar

cube, the cloak, and the ring. You'll find the cloak and ring under Grandma's bed once you give her the soup you found in the dwarf's home. Be sure to put on the cloak and ring before you climb onto the boat. Once you've crossed the poisonous lake, eat the sugar cube. It will protect you from the brambles. Walk straight past the ghosts and enter the castle. Upstairs in the bedroom you'll find a candle; light it with the torch.

Before you go downstairs, be sure you're wearing the cross. If Dracula is in the chamber, kill him with the stake before he gets up. If he's gone or dead, don't forget to search his coffin. It isn't necessary to kill Dracula to



win the game, but it's worth points. Once you have the key, grab the ham and leave.

*Colin Chow
Vancouver, B.C., Canada*

Them Thar Hills

Here are some tips to help you strike it rich in Sierra's *Gold Rush*.

- If you need some quick money, sell your house.
- Look in the cracks in the gazebo. You'll find a gold coin.
- Can't get your money from the bank? Ask to see the president and get your account number from him.
- Quit your job at the newspaper office

before you leave Brooklyn.

- Want to take the boat? Make sure you read the instructions on the poster.
- You'll need to purchase oxen in Independence. Buy mature oxen.
- To get down the steep hill, unhitch your oxen and tie the chain from the wagon to the wheels.
- If you get caught in the desert, drink the water from the barrel and eat the meat in the broken wagon.
- To escape from the flesh-eating insects in Panama, climb the vine overhead.
- Read your father's tombstone in Sutter's Fort, and then read Psalm 23 to get extra points.
- Look under the stamp on the envelope and you'll get a surprise.
- Use the gold coin to buy a pan from the trading post in Sutter's Fort.
- You'll find gold by panning in the American River.
- When you stop at Green Pastures or the Trading Post, be sure to tie your mule to the posts. Otherwise, he'll run away.

*Travis Lee
Arnold's Cove, Newf., Canada*

Finest Hours

Are you spending most of your time in Lucasfilm Games' *Their Finest Hour: The Battle of Britain* hanging from a parachute? Use the Mission Builder to create a scenario that has you flying an He-111 bomber against 15 Spitfire Mark IIs. Set their skill level at Ace, and make your plane invincible with unlimited ammo. Fly this mission a few times and you'll be an expert defensive gunner.

*Denny Atkin
Greensboro, NC*

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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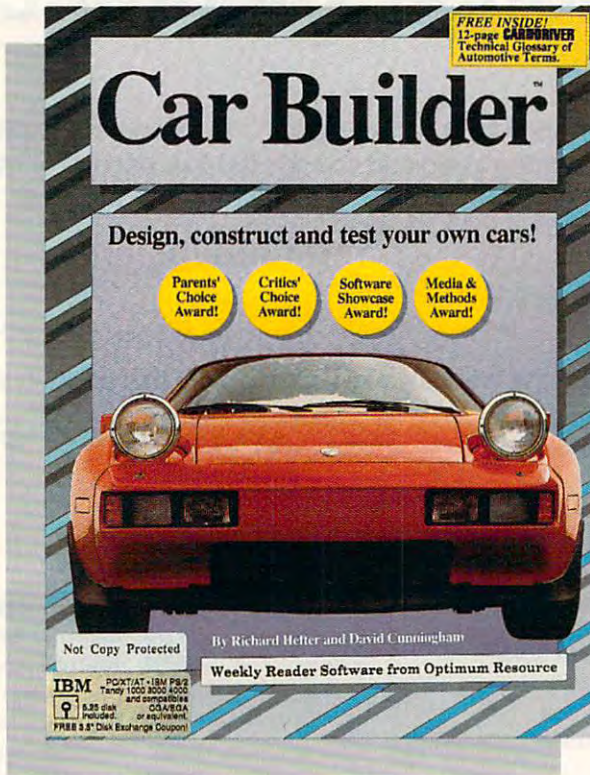
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LEARNIN

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CREATING THE
CAR OF YOUR
DREAMS



nity to drive our father's Oldsmobile, but few can afford to get behind the wheel of a new Ferrari.

Henry Ford once quipped that Ford customers could have their Model T's in any color, as long as it was black. Today, cars come in all shapes and sizes and offer a bewildering array of options and features. Accordingly, *Car Builder* lets you design your car by picking from a wide variety of parts. Best of all, you don't have to worry about the cost.

You begin by selecting a chassis. A long chassis allows your car to seat more people and accommodate a larger engine. However, a bigger chassis will increase the car's weight. The balance of performance, versatility, and function you achieve at the chassis level must translate to the rest of your design if you want to be a successful auto maker.

After choosing your chassis, pick your engine from several models—anything from an L4 DOHC (a four-cylinder engine with a dual overhead cam) to a wicked V8 OHV (an eight-cylinder overhead valve engine with immense horsepower).

Horsepower makes a difference during acceleration and in gaining top speed, but you must consider the weight of the engine and where you're planning to mount it.

The program provides your car with a standard suspension including McPherson struts, springs, and shocks. You can add antiroll bars, gas shocks, and ride adjusts. Also, there are a number of automatic and manual transmissions available, with varying gear ratios. Give your thirsty engine a high-octane drink by mount-

COMPUTE! CHOICE

WAYNE KAWAMOTO

Chrysler Chairman Lee Iacocca once said, "If you can find a better car, buy it." Weekly Reader Software, with its *Car Builder* program, says, "If you can design a better car, prove it." This educational computer-aided design package gives you all the tools you need to draft

your own car from the tires up. Recommended for ages 8 and up, *Car Builder* lets you create your dream machine, whether that's a spacious family station wagon with room for three kids and five dogs or a gas-guzzling road warrior. High-performance cars are the most fun to design: Most of us have the opportu-



ing a fuel tank in one of several available positions.

Of course, any safe automobile should handle well and be able to stop quickly. Select a rack-and-pinion or power-assisted steering system. Add a set of brakes—drum brakes or regular or vented disks. Because so much is riding on your tires, a large selection of radials, slicks, and belted tires of different widths, compositions, and weights are at your disposal.

The program considers the final weight distribution of your parts on the chassis, and how that affects the performance and handling of your car.

Now that you've got your power train, chassis, suspension, brakes, and tires, you can work on developing the styling that will make your car stand out. Along with good looks, you'll also have to consider performance.

Aerodynamic styling not only makes cars look sleek, but it also helps them slice through the wind. Drag, a force that acts against the movement of a car, is influenced by a car's front surface area, its speed, and the sleekness of the car's surface. The profile that you design will determine the car's aerodynamic drag and affect its performance.

When it's time to create the body, select a hood, roof, and tail section



After you've finished your design, take it out to the test track and check its performance and handling characteristics.



Mark Wagoner

from a stock assortment. Look for the proper shape, but also consider the weight of each part.

Once you have a basic design, you can modify the car's profile. Using a tool much like the zoom function in many paint programs, you can reshape the car's contour with the arrow keys. An onscreen arrow shows a location along the car's profile, while a box in the lower left corner of the screen displays a magnified version of the indicated area.

Press a key to superimpose an outline of your selected engine, seats, and gas tank so you can design the body around them. You can even shape your car so that your sporty eight-cylinder engine sticks out of the

hood for a cool street-rod look.

Finally, customize your creation by adding windows and decals. The decal is a bold stripe along the side of the body where you can brazenly state your creation's name.

With the design completed, you're now ready to test your car's performance. A wind tunnel allows you to study how air flows over the contours of your design in a controlled environment. These tests determine a car's drag coefficient, which shows how sleek a car's surface is.

After you've finished with the wind tunnel, an experienced test driver puts your car through its paces on a test track and then comments on its performance. Performance categories

tested include acceleration, handling characteristics on curves, braking distance, and wind shudder at high speeds. After the test, the screen shows the test results and specifications of your car. You can print a hardcopy of the specs for later reference.

If you don't like the performance, it's back to the drawing board. The program provides the tools you need to find design flaws, fix them, and then test the changes.

Car Builder shines in its ability to spark the imagination and creativity of kids and adults alike. Given tools like this program, kids can have fun learning about design and function.

When I was a youngster, my friends and I would draw racecars and compare our creations. This would provoke intelligent discussions about the relative merits of our designs (*My car is better than your car! No it's not!*).

Car Builder's performance tester ends such arguments by providing a scientifically based analysis. Kids will love competing to design the fastest car or the car with the longest range or best gas mileage.

The program provides two sample designs: a very plain midsize family sedan, appropriately named the Basic, and a high-powered sports car called the Spyder. I recommend that you remove the Spyder design before using the program; it's an almost perfect design that gives away too many design secrets. It's more fun to figure out the concepts and to learn on your own what makes a good design.

The program has some deficiencies, but they don't detract much from the software's overall excellence. For example, you can only design and view the car from one side. This limitation means that cars produced by the program all have the same width. You cannot change the aerodynamic or handling characteristics of a car by



The wind tunnel lets you test whether your sleek new body design is really a drag or a modern wind-cheating sport machine.

changing its width or by changing the angles that aren't part of its side profile. It would be more fun, not to mention more realistic, to design a car in three dimensions and to be able to rotate the final design to see it from all angles.

Car Builder's biggest deficiency is in the graphics department. The program displays only CGA graphics, and even those lack inspiration. When you design something, particularly something with the appeal of a car, you'd like to see an artistic graphic representation of your creation. Don't expect graphics even close to what you'd see in a driving game like *Pole Position*.

Changing the profile of an existing design is rather clumsy. You must tediously push the arrow keys up or down on every pixel to alter a contour. *Car Builder* should provide tools to draw lines between two points and then manipulate the lines into curves with one movement, as you'd find in



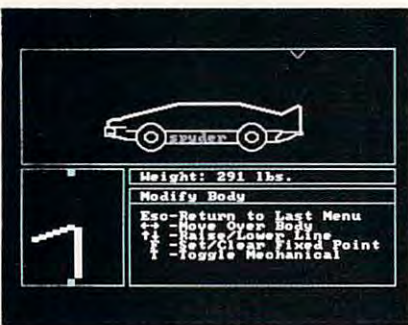
The first step in creating your dream machine is selecting a chassis.

a paint program. Mouse support would simplify drawing, too.

Improving the interface would also protect users from inadvertently exiting back to DOS. You press the Escape key to leave submenus and return to the main menu. From the main menu, pressing Esc exits the program. It's too easy to press it one time too many—I lost all of my work a few times. The program should ask you if you really want to quit before exiting.

After going through the challenge of designing a new car, it would be nice if the test drive could be more exciting. As a practical measure of performance, it accomplishes its purpose. However, I would have liked to have seen some of the tests performed graphically. For example, instead of just giving the figures it computed for the braking distance, it would have been more enjoyable to see the car drive and brake and then measure how long it took to stop.

When you print your car's specifications and road-test results, the program doesn't print a picture of your car. I found that when I wanted to



You can modify the body to give your passengers more headroom.

compare designs or consider modifications, I wanted a hardcopy of my car's visual design. Although I couldn't print it through the program, I was able to use the Print Screen key in conjunction with DOS's GRAPHICS command to get a hardcopy of my car's design.

These shortcomings aside, the program is easy to use, and the documentation is straightforward. The package includes a helpful technical glossary of automotive terms excerpted from *Car & Driver* magazine. It isn't copy-protected and can be easily installed on a hard drive.

The basic premise behind *Car Builder* is one of the best that I've seen in an educational program. It encourages creativity, analytical thinking, and deduction. It's also one of the finest examples of using technology in a basic educational program.

Although the program greatly simplifies the car-design process with a computer, it's conceptually similar to professional computer-aided-design programs. It does a good job of showing the engineering process in which you create a design, test it, evaluate it, and then redesign it according to scientific principles. The program really promotes experimentation. Most of all, it's a lot of fun.

Car Builder

Apple II—\$49.95
IBM PC and compatibles—\$49.95
Package includes User's Guide, *Car & Driver* Technical Glossary, one 5¼-inch disk, and a 3½-inch-disk exchange coupon.

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DISCOVERIES

D A V I D S T A N T O N

Everything looks better in color. Black-and-white just doesn't cut it anymore. Have you seen any new black-and-white movies lately? How about the TV in your living room—is it color or black-and-white? If you still use black-and-white film to take photos of the family on vacation, maybe I could interest you in a cheap, used black-and-white video camera?

Home computer users have always preferred color monitors. Even businesspeople who once held color in contempt now embrace IBM's new, more colorful VGA standard. The old four-color CGA graphics pale by comparison. So why do so many of us who insist on color elsewhere still settle for drab black-and-white printouts?

Imagine what a little color could do for a third-grader's *Print Shop*-generated Mother's Day card, a sixth grader's book report, or a senior's spreadsheet for accounting class! At home, color could do wonders for a family newsletter. But most of us think we can't create color documents because we have inexpensive dot-matrix printers that only print black on white.

That's not true, though. There are several ways to experiment with color on the printer you already own, and most of them require nothing more than a few dollars' worth of multihued paper and colored ribbons.

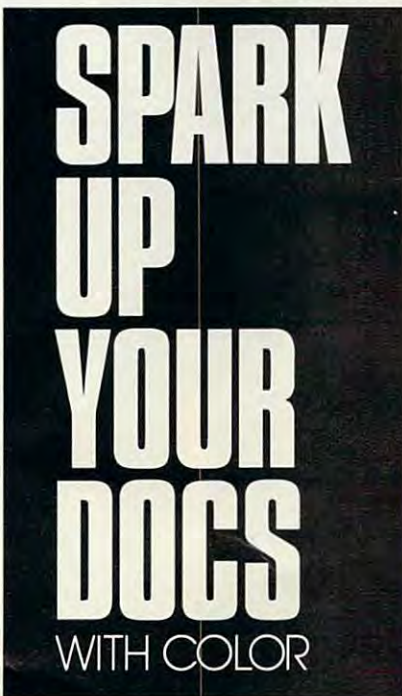
The simplest approach, of course, is to use a colored ribbon to print on colored paper. Green print on red makes a great Christmas card. Dark brown on beige looks dignified—perfect for a certificate of accomplishment. For a professional-looking letterhead, try dark blue on light blue or white bond.

But what if you want more—two, three, or even four print colors on one page? Your printer can do that, too. We'll call the process *stenciling*. Here's how it works.

Suppose you want to create a

word processing document that prints selected words in red. First write the entire document and save it under the name COLOR. Next, turn insert mode off in your word processor and replace all of the letters that you want to appear in red with spaces. The resulting document will have the same spacing as your original, but only the letters to be printed in black will remain. Blank areas will appear in place of red words. This is your black stencil. Save it as COLOR.BLK.

To make a red stencil, reload the original COLOR document. This time, replace all of the black letters with spaces. Be sure to maintain the same positioning of all the words. Save this stencil as COLOR.RED.



Load a black ribbon into your printer. Load COLOR.BLK into your word processor. Position your pin-feed paper carefully, and place a light pencil mark on the paper directly above the printhead. (This mark will allow you to reload your paper in the same exact position later.) Print COLOR.BLK.

To add the missing red words, first replace your black ribbon with a red one. Load COLOR.RED into your word processor. Reposition your paper by properly aligning the pencil mark and the printhead. Then print your red stencil.

The result? A colorful document produced by a standard dot-matrix printer and a standard word processor. To add more colors, simply create more stencils.

This stenciling process isn't confined to word-processing applications. The same concept works just as well with graphics software. Stenciling can also work with spreadsheets (be sure to use manual recalculation mode when making your stencils) and virtually any other program that supports printouts.

But what about situations that require many copies, maybe a hundred or more? No problem! Single-color copiers, especially those that use replaceable toner cartridges, can do stenciling, too. The procedure differs only slightly from the one explained above. You'll need two or three extra toner cartridges, one for each additional color.

Start by creating separate stencils exactly as before. Save them on disk using appropriate filenames. This time, though, print each stencil in black on a separate sheet of pin-feed paper. Don't readjust the paper between stencils; just let the printer print and scroll the paper on its own.

Now load 100 blank pages into your copier's tray. Insert a black cartridge, and make 100 copies of your COLOR.BLK printout. Put those same pages back into the tray for another run. Replace the black cartridge with a blue one and photocopy your COLOR.BLU stencil. As before, each color requires a separate copy run.

Color can add new life to your computer output. Stenciling is cheaper than buying a new printer or a color copier, and it's great fun. Try it and see. And if you produce something that you're proud of, why not send a copy along to us? □



AMERICAN NEWS SERVICE

MEMORY

Before this past spring, if you wanted to play a classic videogame, you had to scout convenience stores on the fringes of town. Or prowl around the darker back corners of the local arcade parlor. Or check out the bars near the college campus.

That was before the Museum of the Moving Image in Astoria, New York, artfully arranged dozens of the most famous coin-operated games of all time in an electronic exhibition called *Hot Circuits: A Video Arcade*. It's quite an impressive collection.

After its stay in Astoria, which finishes at the end of May, the exhibition goes on tour to ten cities across the country.

Featuring dozens of key games, *Hot Circuits* isn't just artful, it's also interactive. Upon admission, you're given a bag of tokens. Most of the games on display are live. You're welcome to play them and purchase additional tokens.

Not only is it entertaining to spend an hour or two browsing among the games, it's also edifying. There's more history behind the video arcades than you might expect.

In the Beginning

The coin-operated videogame industry was created in the early seventies, with 1971's *Computer Space* leading the way. Developed by Nutting Associates, *Computer Space* challenged players to manipulate a spacecraft through gravity warps, around suns, and in and out of hyperspace—all in glorious black-and-white. It was a hit, although perhaps too complex to attract a large following.

Creating a large following—not to mention a large

industry—fell to inventor Nolan Bushnell, who started a small company to produce coin-operated videogames. The company's name would become a part of the culture of the 1970s: Atari.

With \$500, Bushnell founded Atari in 1972, taking the company's name from a score in go, the Japanese strategy game. The company soon released the first true videogame hit, Bushnell's *Pong*. Deceptively simple, *Pong*'s paddles and back-and-forth cursor touched a deep desire: This was television *you* could control. The future of electronic entertainment could be heard in the click and clack of that cursor striking *Pong*'s paddles.

How successful was *Pong*? After its first two days in a bar in Sunnyvale, California, one of the early *Pong* machines stopped working. Repair was called for but not needed; the machine's coin box was full.

For all its success, *Pong* was fairly static. The nascent videogame industry was not.

For the next few years, game manufacturers focused on improving technology. They added color to their games and developed forms of entertainment that were more sophisticated and more compelling—and thus more profitable. *Pong*'s offspring flourished in several directions.

By the midseventies, other players had entered the field, bringing their own approaches and innovations to coin-operated entertainment. Bally/Midway's *Sea Wolf*, released in 1977, was a fairly routine submarine adventure. The following year, though, the company made history with the introduction of *Space Invaders*.

Remember *Space Invaders*? Those inexorable legions of aliens descending from the top of the screen were easy to kill as individuals but together were as unstoppable

RELIVE
THE EXCITEMENT
OF THE CLASSIC
ARCADE MACHINES

KEITH FERRELL

ARCADE

Released in 1971, *Computer Space* lets you move through gravity warps, around suns, and in and out of hyperspace.



A Museum Where Images Move

The American Museum of the Moving Image was born in September 1988. The idea for the Hot Circuits exhibition came to life at the same time.

"The idea for a videogame exhibition certainly fit in with our mission as a museum devoted to film and video," recalls David Draigh, publications director for the museum and one of the co-curators of Hot Circuits.

A good idea, though, is the easiest part of putting together a museum exhibition, as the Moving Image staff quickly discovered.

"We started gathering machines in earnest in January of 1989," Draigh says. He credits game developer Williams Electronics and game distributor Larry Wilner with helping to gather the bulk of the game machines. "We had put together a wish list of about 40 or 50 games. At a certain point, we turned to additional sources for games that were particularly hard to find," Draigh says.

Surprisingly, some of the most popular games were the hardest to locate. "*Breakout* was a game we tried to find and couldn't," Draigh says, a note of wistfulness still evident in his voice. "But the hardest games to find were *Pong* and *Pac-Man*."

Why were these two megahits so hard to find? "*Pong* really looked disposable," Draigh says. "It's a cheap cabinet, and a little Hitachi television set, and one little board. *Pong* got thrown away." It took weeks to find a game that was intact. "We found a lot of people who thought they had *Pong* but really had one of the *Pong* ripoffs." An actual Atari *Pong* finally turned up in a Long Island basement, from which it was rescued for the exhibition.

And *Pac-Man*? Surely there are thousands of *Pac-Man* machines out there. "No," says Draigh. "What happened was that *Pac-Man* got gutted to create *Ms. Pac-Man*, which is still a popular arcade game."

Eventually, Hot Circuits came together and opened in June 1989 under the guidance of Rochelle Slovin, the museum's director; Sharon Blume, the museum's deputy director; and Draigh.

"The response was incredible," Draigh recalls. The museum's attendance went through the roof. People came back again and again.

It's easy to understand why. The games are well displayed, with literate text panels by John Berton. The museum itself is handsome and easily accessible by car or subway.

And, as many visitors have discovered, there's much more to the American Museum of the Moving Image than just Hot Circuits. In addition to a permanent exhibit that looks at the industries behind motion pictures and television, the museum shows films, offers special programs, and mounts ambitious galleries that have looked at topics as varied as screen couture and moving-image technology.

ble as an advancing swarm of killer bees. The game not only established a standard arcade category, it also lent its name to a medical phenomenon, Space Invaders Wrist, which was described as "a minor ligamenture strain of the joint from repeated or prolonged playing."

The Foes Get Smarter

Galaxian, released by Bally/Midway in 1979, brought another feature to the electronic arena: intelligent enemies. Displaying more than a bit of strategy, *Galaxian*'s aliens kept players on their toes, dodging and weaving in vain attempts to anticipate enemy moves.

While Bally/Midway attracted arcade addicts with aliens, Atari turned to rocks. Orbiting rocks, to be exact. Big hunks of space matter—*Asteroids*.

Released in 1979, *Asteroids* created a national craze. A reinvention in some ways of *Computer Space*, this black-and-white game struck a nerve. People played for hours, positioning their spacecraft, blasting big rocks into little rocks, and groaning when collision was unavoidable. (A little-known bug in the game offered some solace: There was a spot on the screen where you could hide and shoot to your heart's content.)

As the eighties dawned, games grew more ambitious, more complex, more hypnotic. Williams released *Defender* in 1980. With enemies even more intelligent than those in *Galaxian*, *Defender* was for a time the hot game. Playing it became a sort of ritual, your body angling in response to the screen, hands slapping the controls in a stylized semaphore as you whipped your spacecraft in different directions, through hyperspace gates, into confrontation with multiple and multiplying aliens. (The effort was worth it; if you could make it to 900,000 points, a bug in the game let you play forever.)

Another 1980 Williams hit, *Berzerk*, was one of the first games to move from home video machines to arcades.

Flush with profits from *Asteroids* and other hits, Atari pressed for innovations. For 1980's *Missile Command*, the company used a trackball as the game's controller and offered players a separate siting area in which to target nuclear warheads as they fell earthward. The trackball and targeting screen didn't help—the game ended with a vivid reminder of the natural consequence of nuclear war: nuclear devastation.

In the same year, Atari introduced *Battlezone*, a tank game featuring 3-D graphics. These were semisolid shapes your tank could maneuver around—or hide behind.

But it was with 1981's *Centipede* that Atari achieved perhaps its greatest innovation—or at least the one players had waited longest for. *Centipede* allowed you to shoot constantly, just hold down the button and blast away. Ligamenture strain became a thing of the past.

Evolving Interfaces

The player interface continued to evolve. Released by Williams in 1982, *Robotron* used twin joysticks, one to control movement, the other to

aim and fire. The same year, Sega's *Sub-ROC 3-D* created an environment for the player, presaging a whole category of arcade games built around such devices as enclosed seats, cockpits, and control panels.

The other great arcade trend of the early 1980s was personification. Most videogame hits had machinery as their central focus: starships, robots, tanks, fighter planes, missiles, and so on. But the biggest hit of all bucked that tradition.

Pac-Man, introduced by Bally/Midway in 1980, took its name from the Japanese word *puka*, meaning *to eat*. The public certainly ate it up. *Pac-Mania*, as it was known, knew no bounds. Books were written, sermons were preached, and analyses were offered as to the meaning behind *Pac-Man's* success and the effect of the game on our young. (The young—and a fair number of older players as well—knew the effect: *Pac-Man was fun*.)

Pac-Man begat other characters who enjoyed a moment's glory in the arcade's artificial sun: *Donkey Kong*, *Dig Dug*, *Q-Bert*, and *Frogger*. There was *Ms. Pac-Man*, as well, who distinguished herself by facing random monsters, rather than encountering *Pac-Man's* more programmed foes.

Perhaps the most unusual of *Pac-Man's* offspring was 1982's *Baby Pac-Man*, which combined a videogame with traditional pinball. When *Baby Pac-Man* made its exit from the maze, a pinball machine was activated; when the pinball passed out of play, the videogame came back to life. A similar approach was taken the same year by Gottlieb's *Caveman*.

At the Movies

Arcade games offered tie-in and promotional potential that Hollywood was quick to sense.

In fact, the videogame phenomenon flowed both ways. *Tron*, a 1982 Disney film, blasted Jeff Bridges into the heart of a videogame. Bally/Midway's *Tron* was released the same year as the movie and recreated several of the film's games in coin-op form. The game did better at the arcade hall than the film did at the box office.

Atari brought *Star Wars* to the coin-operated screen in 1983. For 50 cents you could be Luke Skywalker, with a digitized Ben Kenobi urging you to "trust the force."

But for many, it was Sega's 1983 interpretation of *Star Trek* that most perfectly translated a cinematic experience into an arcade game. Mr. Spock welcomed you to the Enterprise, and Scotty warned you when the ship had taken too much damage. Vector graphics and aggressive Klingons made this one of the longer-lived movie tie-in games.

Technological Imperatives

As fast as one videogame technology took hold, another came along to supersede it. *Time Pilot*, a 1983 release, used layers of 2-D graphics, as well as a screen that scrolled horizontally and vertically, to provide a huge and flexible combat universe.

Dragon's Lair, released by Cinematronic in

Next Stop for Hot Circuits

The Hot Circuits exhibition moves to the Science Museum of Connecticut in June 1990. Located at 950 Trout Brook Drive in West Hartford, Connecticut, the museum will host the video exhibit from June 1 to September 24, 1990. Hours for the museum and exhibit are 10:00 a.m. to 5:00 p.m. on Mondays through Saturdays and 1:00 p.m. to 5:00 p.m. on Sundays.

In addition to the Hot Circuits exhibition, you'll also want to visit the Science Museum's planetarium, the science and technology displays, the mini zoo featuring animals of Connecticut, and the hands-on computer lab.

Admission to the museum is \$5.00 for adults, \$4.00 for children ages 3-12, and \$.75 for children under 3 years. The planetarium costs an extra \$.75 per person. Group rates are available. For more information, call the museum at (203) 236-2961.



These are just a few of the many video-arcade games that are displayed at the Hot Circuits exhibition

1983, put videodisc technology to work in a game that came close to offering television-quality animation. The animation itself was created by Don Bluth, of *All Dogs Go to Heaven* fame.

In 1986, Sega used NASA simulation technology to create *Out Run*, one of the year's biggest hits.

Videogames, so effective with robots, spacecraft, and cartoonlike characters, fared less well with the human form. In 1988 *NARC*—the most recent of the games on exhibit—solved that dilemma with scanned images of real humans. The characters are animated frame by frame to good, if exceptionally violent, effect.

The Hot Circuits exhibition offers little by way of speculation on the games of tomorrow, although there are hints to be found among the notes. Atari's 1986 success, *Gauntlet*, proved that rudimentary role-playing was possible with groups of arcade gamers. The videodisc game pioneered with *Dragon's Lair* appears to be making a comeback. Total-environment games, ones in which the player is surrounded by the game, loom larger and larger on tomorrow's arcade horizon.

There's little doubt that the coin-operated videogame will continue to evolve. Thanks to Hot Circuits, we have a better idea of the foundations on which those future games will be built. □

Keith Ferrell is the features editor for COMPUTE! Publications and the author of several books.

HOMework

H I N T S A N D T I P S F R O M O U R R E A D E R S

After teaching high school geometry for seven years, I realized there was often a cognitive gap between learned concepts and subjects with similar underlying principles. It seems some students have difficulty adapting what they know to fit new situations. In today's fast-changing world, adaptive behavior separates those who take advantage of change from those who become disoriented and fall behind.

One way to foster your children's adaptive thinking is to improve their ability to sequence—to find and predict patterns.

Logo, a computer language designed for young children, is one of the best tools for building pattern-recognition and sequencing skills. Using its graphic capabilities, you can give kids immediate feedback and visual cues that help tie things together.

If you have a Logo interpreter, you can use these exercises to help your kids learn to recognize change. The idea is to present something with a missing component. The first one draws half of a geometric shape on the screen. Kids will naturally try to finish such a drawing. When they do, they're supplying missing information and filling in the gaps. They're bridging the gap between a previously learned concept and the problem that you've presented on the screen. First, have them try the following example.

```
cg
repeat 45 [fd 50 rt 178]
```

With some guidance, it won't be long before your kids have figured out that changing 45 to 90 closes the figure. They also might discover that adding another `repeat 45 [fd 50 rt 178]` without the `cg` (clear graphics) will do the trick, too.

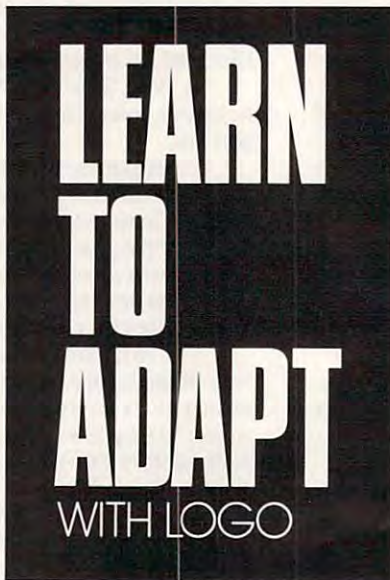
The next example comes in two sections. The first part sets up the second, which is missing certain elements. The first section draws ten

similar isosceles triangles that radiate from the center of the screen. The second draws ten half-rectangles.

```
cg
name 20 "x
repeat 10 [seth 0 setpos[0 0] rt 25 fd :x rt 50
fd :x name :x + 4 "x]
```

```
cg
name 20 "x
name 10 "y
repeat 10 [seth 0 setpos[0 0] pd fd :y rt 90
fd :x name :x + 10 "x name :y + 5 "y
pu]
```

The intent of this exercise is to encourage your children to figure out that they need to change the fourth line to `repeat 10 [seth 0 setpos[0 0] fd :y rt 90 fd :x rt 90 fd :y rt 90 fd :x name :x + 10 "x name :y + 5 "y]`. Such a change will create a set of ten similar rectangles.



You might coach your kids into changing the values that are added to `x` and `y` inside the repeat brackets. Do that by changing `name :x + 10 "x` to `:x + 12 "x` (or use any other value except 10 or 12). If the figure you're drawing is a triangle and one of the incremental values is changed and the

other isn't, or if the ratio of change is altered, the figures aren't similar anymore. (Similar figures have congruent corresponding angles and corresponding sides that are in proportion.) This leads nicely into an exploration of the values necessary to add to both `x` and `y` to keep the figure similar.

Standardized tests always include a section that asks what the next element in a series is. That kind of question addresses the same skill we've covered in the previous two Logo examples. With Logo, you can turn these problems into a game, as in the next example.

```
cg
ht
show [What is the next element in the
series:]
name 1 "x repeat 4 [show :x name :x*2 "x]
show [Now press a key . . . ]
readchar
show [The answer is]
show :x
```

This program will display the sequence 1, 2, 4, 8 on the screen and prompt for the correct answer (16). By changing the fifth line, you can create an infinite number of variations. Here are some suggestions:

```
name 1 "x repeat 4 [show :x name :x*3 "x]
name 1 "x repeat 4 [show :x name :x+2 "x]
name 10 "x repeat 4 [show :x name :x-2 "x]
name 1 "x repeat 4 [show :x name :x+1 "x]
```

These ideas are by no means the limit to what you can do with Logo. Show the beginning of a pattern or an idea, and the discovery process should take over and open new doors.

*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. □

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▪ Play Stellar Emperor	0:30	3.00
Total hrs. non-prime/ 1200 baud	2:00	

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REVIEWS

POCKET A COMPUTER, BE A HERO, SOLVE PUZZLES, MANAGE YOUR DESKTOP, CATCH A MOUSE, BE MORE PRODUCTIVE, MAKE A TOUCHDOWN, AND MORE

ATARI PORTFOLIO

The introduction of palm-size computers last year not only offered the promise of computing on the road, but also put computing in your pocket. Machines like the Sharp Wizard and the Casio B.O.S.S., two of the more popular hand-held computers, rely on specific software applications built within the framework of their particular hardware design. With its Portfolio, Atari breaks from this mold by offering a miniature personal computer that is MS-DOS-compatible (well, almost).

Atari bills the Portfolio as a coat-pocket computer. It measures 8 × 4 × 1½ inches and weighs, with batteries, just over one pound. That puts a strain on any suit-jacket pocket; unless you want to put your tailor's kids through college, you'll be better off carrying the Portfolio in your briefcase. Still, you get the idea: This is one *small* computer.

It's powered by three AA-size batteries, which provide many hours of performance. Those batteries power an 80C88 processor at 4.92 MHz. The standard system comes with 128K of RAM, which can be raised to 640K by means of IC cards, which Atari sells in 32K, 64K, and 128K increments. You treat the IC cards as you would floppy disks, by formatting them and then storing data files on them. Take note, however, that unlike a magnetic disk, an IC ramdisk is battery-powered and therefore volatile—if its battery dies, you lose your data.

The Portfolio's nonbacklit LCD screen offers very good readability,

but its eight-column × 40-row format is a good bit smaller than the standard display found on other miniature systems, such as the Poquet PC. (The Portfolio's price tag is a lot smaller, too, so the trade-off may not be so hard to take.) File transfer to and from a desktop computer, or to your printer, is handled through the system's bus connector, located on the right side of the machine. (You can order parallel and serial interfaces from Atari.)



Enjoy full-featured productivity with Atari's lightweight, palm-size Portfolio.

The keyboard takes some getting used to. The good news is that unlike the Wizard and some of the other hand-held computers, the Portfolio boasts a QWERTY layout. You won't have to hunt and peck to enter your data. The downside is the keyboard's size. Because of the chicletlike key design, typing is more a matter of sliding your fingers over the keys and pressing.

It's not an impossible arrangement, however, and I found that after a couple of weeks I was able to enter data pretty effectively. What I sacrificed in speed I gained in accuracy, so I was able to type pretty clear notes and entries.

The heart of the Portfolio's soft-

ware system is its MS-DOS-clone operating system, DIP OS. Under this system, you can use many of the DOS commands you're used to. For instance, you can use the MD command to create directories and the FDISK command to define the size of the internal ramdisk. Batch files are supported with the GOTO, IF, ECHO, and REM commands, among others.

Beyond the basic operating system, which is carried in ROM, the Portfolio sports five internal applications: Address Book, Calculator, Diary, Text Editor, and Worksheet. There is a Setup program as well, which allows you to configure the computer's hardware to your preferences (keyboard click on or off, for example).

The Address Book is a full-function application that you can use to store the names, telephone numbers, and addresses of clients, friends, and contacts. Each address book can be stored under a separate directory name (CONTACT.ADR and PERSNL.ADR, for example). When you open the application, you'll be in Page Mode. The screen is divided by a single horizontal line near the top.

Above that line you type a name and phone number. Names are automatically sorted alphabetically, with numbers following the alphabetical listing. By listing the phone number and the name on the same line, you can see both when you open the application in Line mode. After typing the name and number, press the Enter key to move below the line. Here is where you would type the address and any other notes. There is no line limit to the amount of data you can enter. Once you've finished making one entry, press the Fn-Pg Dn key combination to bring up a blank page, ready for the next address.

To view your files in Line Mode, press Esc while you're in Page mode. From here you can use the Portfolio's acoustic autodialer, which you access by pressing the Fn-1 key combination and selecting Dial from the menu after positioning the cursor over the correct entry. I have never cared much for acoustic dialers, and the Portfolio didn't change my mind. I tried to dial several numbers but had no success.

The Calculator applications can handle four types of calculations that you can set up from the application's Format menu: General, Fixed, Scientific, and Engineering. Instead of a separate numeric keypad, the Portfolio doubles up on some of its letter keys, which are transformed to numeric keys when you start the Calculator.

The Portfolio's Diary is a well-designed time-management system that operates much like the Address Book. When you start the Diary, the computer will display a five-week calendar, with the current week on the second line, preceded by the previous week and followed by three more weeks. (With the week of February 18, 1990, on line 2, for example, the screen display would span February 11 through March 17.) If you have entered any reminders for that month, an asterisk will appear next to the particular date. You can call up any day's schedule by moving the cursor over the date in question and pressing the Return key.

Like the Address Book, the main Diary screen is divided by a horizontal line. Above the line is where you would enter your appointments. Begin with the time, followed by a note about the appointment. My only problem with the Diary is that it required that I use a 24-hour clock. I thought that my using Setup to request an English display would give me a 12-hour clock, but it didn't. I circumvented this annoyance by putting a 12-hour time in the notes field for those appointments that fell after noon. For example, a 2:00 p.m. appointment would read 14:00 *Staff Meeting 2 pm*. It's clumsy, but it keeps me from having to translate my time schedule all the time.

You can move around in the database quite easily with the arrow and Pg Up and Pg Dn keys. Setting alarms and recurring appointments is also quite simple, using mnemonics (*d* for *daily*, *m* for *monthly*, and so on).

The Portfolio's Text Editor allows for basic text entry and offers several tools for editing, such as search and replace, cutting, copying, and pasting (from a clipboard). With

the machine's small screen and unconventional keyboard, you won't want to enter much text—but it's there if you want to write short notes. I was much more comfortable taking notes in longhand and writing them up later at my computer or at my full-size laptop.

For those times when you need to crunch some numbers, the Portfolio's Worksheet offers basic spreadsheet functions, but at a cost. I found the manual confusing in explaining the application's command structure, and I found manipulating cell contents quite difficult. The computer's small display again is a hindrance, because it forces you into a virtual window that you must use to move around the entire spreadsheet area. For those times when a spreadsheet is absolutely essential, learning how to work this application might be worth the trouble, but I found the Calculator to be much more useful.

The success of this computer will depend largely on the software base it's able to generate. Because the DIP OS is an MS-DOS-like operating system, and not a direct derivative, developers will have to rewrite their programs to work under the restrictions of DIP OS. I would like to see some dedicated applications like an expense report and a travel log come out for the Portfolio. Programs like those would serve much better than the system's own Worksheet application. Also on my wish list is a terminal program: I can imagine using the Portfolio to download mail from my online service mailbox while I'm working on my laptop at the table in my hotel room.

Downloading information into the Portfolio presents its own special problems. You'll need to shell out the extra bucks for an additional IC card. Depending on the size of your personal database, you may fill the standard 128K sooner than you think.

This small computer is interesting and well timed. If Atari can successfully bring software developers to the platform, the Portfolio may surprise a lot of people with its solid design, sensible functionality, and low cost. It certainly surprised me.

PETER SCISCO

Portfolio—\$399.95
IC RAM cards—\$79.95 (32K); \$129.95 (64K); \$199.95 (128K)
Parallel interface—\$49.95
Serial interface—\$79.95

ATARI COMPUTER
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HERO'S QUEST I

Brigands are terrorizing the town of Spielburg, and the evil sorceress Baba Yaga has awakened all manner of creatures to roam the countryside. The baron's son and daughter have been kidnapped, and the town is blocked off from help by an avalanche. What this town needs is a hero!

But whom do they get, swaggering into town just ahead of the avalanche? You, a fresh graduate of the Famous Adventurers' Correspondence School of Heroes. Looking for a little action to beef up your résumé, you unwittingly stumble into a hornet's nest—you're the only hope for a town destined for eternal gloom.

Hero's Quest I: So You Want to Be a Hero, Sierra's first in a planned line of *Hero's Quest* titles, is something of a breakthrough in adventure-game design. A unique synthesis of adventure gaming and role-playing, this game may become the prototype for a new category of computer games.

Like all adventure games, *Hero's Quest* has specific situations to overcome and puzzles to solve. Yet its nonlinear approach is evident even before the game begins. You start by selecting one of three character identities: a brawny fighter, a magician, or a crafty thief. Each character has special abilities that the other two don't have. The fighter relies on strength, vitality, and weapon skill; the thief can pick locks, sneak past people, and throw daggers; the magician can cast a variety of useful spells.

After selecting your basic character type, you proceed to a screen that allows you to name and customize your character by allotting 50 extra points to enhance various skills. As a fighter, for instance, you might want to pump up your strength and increase your skill with weapons.

As you play the game and gain experience, your attributes gradually improve on their own. The fighter can practice sword fighting with the local sword-fighting champ. The thief can practice picking locks throughout town at night. The magic user should seek the advice of the wizened Wizard and concoct more potent spells.

The first order of business is to explore the town and talk to the friendly, but saddened, residents. As with all of Sierra's games, *Hero's Quest* understands player input in the form of simple sentences. You can

walk up to the sheriff and ask about the brigands, or you might ask the local healer about some ingredients needed for potions.

After exploring the town, you'll need to visit the Guild Hall and choose one of six quests posted on the bulletin board. Start with a simple quest, or face certain failure! To complete your quests, you'll traverse vast woodlands, a waterfall, a guarded castle, secret passages, caves, streams, graveyards—even a snow-capped mountain.



Use magic, cunning, and strength as you battle hostile forces in *Hero's Quest I*.

As you roam the vast forest surrounding Spielberg, you'll inevitably encounter something hostile. Fighters can pad their skills for these encounters, but thieves and magicians are wise to use the escape option, which shows your character hightailing it to safer ground! When you engage in battle, a special combat screen provides a large, detailed closeup of both you and your opponent. You can thrust, dodge, parry, and block, or cast spells if you have that ability. Status bars show your health and stamina during combat, as well as the opponent's health.

The tremendous graphics are up to Sierra's usual standards, with over two megabytes of disk space devoted to background pictures, animation, and numerous sound drivers, which explains why the game comes on ten floppy disks. (A hard drive is highly recommended.) The game is loaded with unique animated sequences, giving it the appearance of a cartoon in some spots. The reflection of your character walking past a pool of water really shows off the talents of the game's programmers and artists.

Finished with the game? Select a new character type and play again. Different character types must solve most of the puzzles by different means, making *Hero's Quest* three games in one.

A few hints: The Frost Giant has a sweet tooth. Fight goblins at the beginning to build up your experience. If you address someone who doesn't hear you the first time, just repeat

yourself. And remember to read all signs, or you might miss important warnings, like "Trespassers will be toad!"

SCOTT MILLER

IBM and compatibles with 512K—\$59.95
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VGA, and MCGA; mouse/joystick optional;
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LIVING JIGSAWS

How do you go about solving jigsaw puzzles? Do you put the corners in first and then do the edges? Or do you start matching patterns and work from the inside out? Regardless of your personal style, doing jigsaw puzzles is fun. And solving the animated puzzles in *Living Jigsaws* is even more fun.

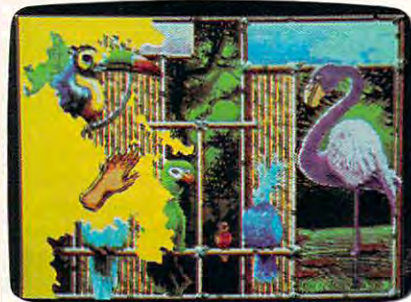
Start by choosing dinosaurs, racecars, an underwater scene, or any of 12 other graphic images. Here, as with dime-store puzzles, you try to assemble the image with pieces of various shapes and sizes; however, this computerized puzzle is more flexible, allowing you to choose the size and shape of the cutout pieces according to your abilities. Young users may be satisfied solving a 9-piece interlocking puzzle at the Super Easy level. More experienced users may be up to the challenge of a 250-piece monster made up of small rectangles. Still doesn't sound hard enough? Imagine trying to solve a white puzzle with uniform pieces on a white background!

Solving the puzzles involves selecting cutouts from one of several Piece Screens and assembling the image on the Puzzle Screen. At the beginning of each game, all the pieces are laid out on the Piece Screens in random order and orientation. Some cutouts may simply be rotated; others have been flipped end to end. Use the graphic hand to pick up a piece, switch to the Puzzle Screen, and then move the piece into position. Rotate and flip until you think the piece is right side up. When you place it successfully, you'll be rewarded with a loud click as the piece snaps into place.

Not sure exactly where a piece goes? Never mind. Put matching

pieces together and they'll stay grouped, even if they are in the wrong spot on the puzzle screen. You can flip back to the Piece Screens to get more cutouts or to store pieces that don't seem to fit. The computer is keeping track of the time you've spent working on the puzzle, so do your best. You can even challenge yourself to finish faster next time.

Have you ever got involved in a jigsaw puzzle only to discover that it was a bit too difficult for you? Well, unlike a regular puzzle, *Living Jigsaws* doesn't just provide the pieces and leave the rest up to you. It offers a lot of help options and even a Help Elf to place individual pieces if you get really desperate. By pressing one function key after another, you can have the computer finish the border for you, flip every cutout to the appropriate orientation, or just get rid of stray pieces. You can even get a peek at the finished picture.



Piece together dazzlingly animated puzzles on your PC with *Living Jigsaws*.

Although the reward of any jigsaw puzzle is the satisfaction of piecing the whole thing together, *Living Jigsaws* offers an even greater reward: gorgeous animated images. Butterflies flit through a garden, the driver of a car waves, and a purple-caped wizard blows bubbles at you while water flows up and down the screen. These are impressive pictures in any of the supported modes, but only in the VGA mode do you enjoy images so vibrant and colorful that they seem to grow on the screen. If you have been hesitant about buying a game but wanted a program that would make onlookers envy that VGA system you paid so much for, this one may do the trick.

Not every feature of *Living Jigsaws* is as well implemented as the graphics are. The overall interface, a curious blend of key commands and cursor controls, is a bit tricky for younger users to learn. And while the computer does keep score, you'll have to take notes or remember to save each solution if you want to know whether you're getting better. On a

too-much-of-a-good-thing note, the animations continue to work even while the puzzles are in little pieces. Parts of the Help Elf appear as he walks across a piece; you'll spot corners of butterflies or get to watch pieces of balloons drift across the sky. Unfortunately, these animations slow down the play considerably, even on a speedy 386 machine. After the novelty wears thin, you might want to turn off the animations in order to get on with solving the puzzles.

With four levels of difficulty, eight different puzzle-piece shapes on each level, and 15 pictures for a total of 480 different puzzles to solve, there is enough challenge in *Living Jigsaws* to keep even the most dedicated puzzle fan happy for hours.

LESLIE EISER

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METZ DESKTOP MANAGER

The popular view of *Microsoft Windows* is that it's a nice place to visit, but you wouldn't want to live there. That attitude may change with the commercial release of *METZ Desktop Manager*. It's a well-designed add-on program that greatly increases the usefulness of *Windows* as a point-and-click menu system.

Desktop Manager lets you create your own menus. Collect the names of programs from any directory or disk and assemble them into logical groups. Load data files and applications together with the click of a mouse and use descriptions as long as 38 characters. You can have as many menus as you like, with as many as 1000 items in each menu.

The program's automatic menu generator can search your drive and install all your *Windows* applications, DOS applications, and data files (or any combination of the three). The

program also includes a screen blanker, a windows arranger, a directory display, and a file finder. And it does all of this using only 20K of your computer's memory.

As good as this program is, many of its features may soon be obsolete. The next upgrade to *Windows* is expected to use icons to display files, allow programs to use more than 640K, and work better with ill-behaved programs (programs that write their graphics routines directly to the screen often won't run under *Windows* 2.0+). With this in mind, you may prefer to upgrade your current version of *Windows* to version 3.0. On the other hand, METZ Software will probably upgrade *Desktop Manager* to accommodate *Windows* 3.0 and add features Microsoft has once again forgotten to include.

DAVID ENGLISH

IBM PC and compatibles with 512K (640K recommended), DOS 2.0 or higher (DOS 3.3 or higher recommended), *Windows* 2.03 or higher, graphics display required, mouse recommended—\$49.95

METZ SOFTWARE
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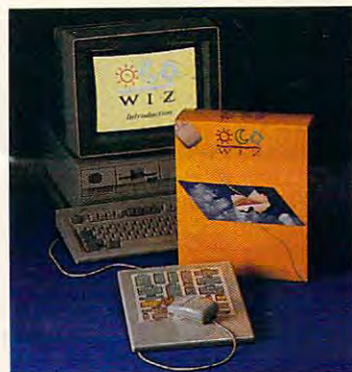
WIZ G

raphics tablets have for some time held a secure place on the desks of illustrators, designers, and engineers. But for the most part, they have remained out of reach of the home computer user. Starting at \$600 and working their way up from there, these alternative input devices aren't exactly cheap. CalComp is working to change that with the WIZ. The company calls its latest input device "an intelligent mouse pad," but it's really a cross between a mouse pad and a graphics tablet.

The WIZ consists of three parts: a three-button mouse (each button has two positions, so you can think of it as a six-button mouse), a 9½ × 11¼ inch tablet, and specially-designed driver software for the WIZ templates. All three components work in harmony in the WIZ system; I'll start with the mouse.

The WIZ mouse distinguishes itself from other PC mice by its use of a crosshairs pointer. Unless you've seen high-end engineering workstations,

you may not be familiar with this kind of pointer. It allows pinpoint accuracy when drawing or designing on the screen, and it permits specific selections to be made electronically from the tablet.



The WIZ graphics tablet and mouse bring high-resolution input to the PC.

CalComp draws on its experience in the engineering world to bring such accuracy to the PC. The WIZ boasts a 1000-dots-per-inch resolution, a much higher resolution than you'll find on most ordinary mice. Another distinguishing characteristic is the lack of a roller ball; the WIZ mouse and pad operate much like an optical mouse—no moving parts to clean.

You can program each of the mouse's six button positions to perform a specific task. The default settings are the traditional left and right mouse clicks, a Template Pick, and the WIZ Manager (more on WIZ templates and the Manager later). If, like me, you have little or no use for a right double-click, you can assign a macro to that position. In fact, you can assign a macro to all but two of the positions: left mouse click and Template Pick.

The WIZ Manager simplifies creation of mouse-button macros by means of a menu series that takes you through the process step by step. In only a few minutes I was able to program button position 5 to load *Microsoft Works* and to open three spreadsheet files that I use for scheduling.

Macros aren't limited to the mouse buttons, however, and this is where the second and third components of the WIZ system come into play. The electronic pad makes use of pre-designed template cards that fit beneath a clear plastic sheet covering the pad's surface. The WIZ I reviewed included templates for several popular programs, such as *Works*, *Word* 5.0, *AutoCAD*, *dBase IV*, *WordPerfect* 5.0, *PageMaker* 3.0, and others. Each template sheet comes with a software

driver, which you load through the WIZ Manager. After you've loaded the driver, you can use the mouse to select commands that are printed on the template sheets.

Using the templates takes some getting used to. I found the only one really worth the bother was the DOS template. Although they're useful for accessing nested menus in programs like *PageMaker*, I found the templates less useful for an integrated program like *Works* because each *Works* module has a separate template. The value of an integrated program is the ease with which you can switch between applications. I don't want to have to stop and load a template sheet.

I also experienced some problems writing macros to the template. CalComp has left an empty grid on each of the templates, to which you can assign macros—one macro to a box. The grid on the DOS template measures 10 blocks across and 5 blocks down, but the WIZ manager would create macros only in the top 30 blocks.

Some users may object to the templates because they take your eyes away from the screen while you're working, which defeats the intuitive use of the mouse. That's a trade-off you'll have to consider: Is the convenience of templates and multiple one-button macros worth the effort of learning your way around the templates?

It's not necessary to use the templates to take advantage of the WIZ, and you may want to experiment with the DOS (or the *Windows*) template before buying one for any of your favorite programs. You can still use the mouse as a high-resolution input device. It's more costly than other mice but, if you're an illustrator or designer, it may be worth it.

To augment its use by designers, CalComp offers an optional pen that you can use in place of the mouse. The pen was not available for review at press time, so I can't speak for its effectiveness. But the idea of a low-cost graphics tablet coupled with high resolution and a drawing pen is sure to attract a number of computer users who feel that drawing with a mouse is like tracing with a brick.

CalComp has an interesting idea in the WIZ, even if it carries a few annoying wrinkles. I would like to see drivers for *DeluxePaint* and other paint packages. I also discovered some strange discrepancies in cursor movement within *Works* and other programs. Additionally, some of my programs would not accept input from the WIZ mouse; however, Cal-

Comp reported that it's upgrading the driver to be 100-percent compatible with the Microsoft mouse. With just a few improvements and corrections, the WIZ could turn out to be the proverbial better mousetrap.

PETER SCISCO

IBM PC and compatibles—\$249
Macintosh—\$249
Electronic Pen—\$75
Software Application Templates—\$49

CALCOMP
2411 W. La Palma Ave.
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ABC MONDAY NIGHT FOOTBALL

Two decades ago ABC broadcast the first "Monday Night Football" game. Since then, "Monday Night Football" has become an American institution. Now Data East has released the first official *ABC Monday Night Football* simulation for the PC. It includes cheerleaders, Frank Gifford, a blimp, and all 28 NFL teams. But does it have what it takes to satisfy real diehard football fans?

Graphically, *Monday Night Football* is as impressive as any other football game I've seen for the PC, and more impressive than most. The players are large and detailed. Through most of the game your view of the action is from above, and just behind, the offensive team. For field goals and extra-point attempts, you get a great view of the kick from the box seats behind the goalposts. In addition, various colorful screens—such as those showing Frank Gifford, the Data East blimp, or the cheerleaders at half-time—contribute to the simulation's televised look.

Monday Night Football really shines, however, in its use of digitized sound. From the beginning of the game, when you hear the familiar "Monday Night Football" theme music and the easily recognizable voice of Frank Gifford introducing the game, to the postgame celebration in the winning team's locker room, the game is generously punctuated with digitized voice samples. You actually get to hear the quarterback calling his audibles. During a play, the grunts and

crashing helmets of the offensive and defensive lines come through clearly. When there's a penalty, the referee appears in a window at the bottom of the screen and announces, "Personal foul, defense. Fifteen yards," while making the appropriate hand signals.

Monday Night Football offers 30 offensive and 12 defensive plays to choose from. The play-selection screen displays only 3 offensive and 3 defensive plays simultaneously, but you can scroll through the other available plays with the joystick or appropriate keys. Each set of 3 onscreen plays includes a short-, a medium-, and a long-yardage play. One of the nice features of this system is its flexibility. Choosing a particular play determines the team's formation and governs the actions of your linebackers, but until you actually release a pass, you always have the option of scrambling for as many yards as you can on the ground.



Joystick jocks will enjoy the sights and sounds of *ABC Monday Night Football*.

While you're on offense, a set of helmets at the bottom of the screen represents your teammates: tight end, halfback, fullback, and left and right wide receivers. Once the ball is snapped, you hold down the joystick button to cycle through your eligible receivers and running backs. When the desired helmet is highlighted, you let up on the button to make your selection and then tap the button once to deliver your pass or hand-off. If you decide that you want to run the ball yourself, you simply cycle back to the QB helmet and go for it.

While this system may offer the flexibility to change your mind as a play is unfolding, it's difficult to master. It takes time to cycle through all available receivers—when a blitz is coming down your throat you don't have that luxury. Also, it's too easy to cycle past the desired receiver—leaving you buried under a pile of defensive players. Fortunately, the game features a practice mode that lets you try out each play until you master the

timing required for perfect execution.

Other helpful features include an option to diagram your own plays and a team-modification utility that allows you to adjust ability ratings for your offensive and defensive starting lineups, as well as your reserves. For each modification you make, however, there's a trade-off. If you increase your quarterback's passing ability, his running game will suffer. Similarly, when you increase a defensive player's pass-coverage ability, he becomes a less effective tackler.

Joystick jocks will feel right at home with *Monday Night Football*. You can play either against the computer, head-to-head against another player, or in a cooperative effort with another player to beat the computer. If you enjoy the statistical side of sports, you'll find *Monday Night Football's* action-oriented gameplay and lack of stats somewhat disappointing. But if you want a game that brings to your PC the sights and sounds of a televised football game, *Monday Night Football* scores a big TD.

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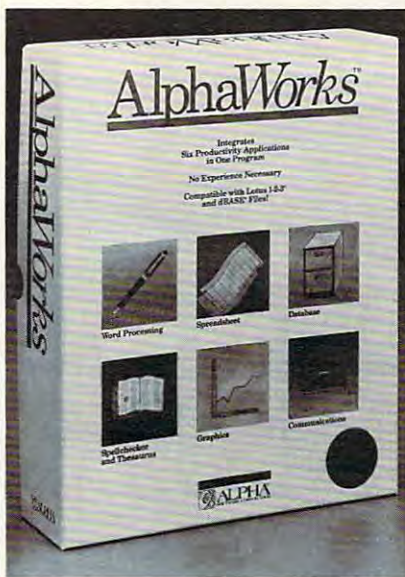
ALPHAWORKS

A little of this; a little of that. Many integrated packages offer pinch-sized versions of stand-alone word processors, databases, and spreadsheets. *AlphaWorks* is a tablespoon and a half by comparison. In its first version, the program was already stuffed full of features. *AlphaWorks 2.0* is even more robust. And those of you with home offices will particularly savor the varied features of this package.

Each module of Alpha Software's integrated package is full-flavored. Unless you're head chef at a major corporation or a gourmet statistician, you'll never exhaust this program's possibilities.

When it's time to write business letters and financial reports, the word processor will serve you well. It features all the editing tools you need: copy, delete, and insert. You can even

save deleted blocks in scrap files, recalling them if you need them later. For formatting in the word processor, you use a series of rulers with tab stops and margin controls. You can save as many as eight rulers, applying them to the text with a few easy keystrokes. You can deactivate a ruler by deleting its symbol from the text. Character formatting includes italics, underlining, bold, and two self-defined styles which you base on what your printer can do. Because the program isn't graphics-based, you can't see the character formats onscreen. However, color monitors show a different color for each style, and a status bar also keeps you on top of which style is active.



The advanced features of *AlphaWorks* could be just right for your home office.

No word processor would be caught in the dining room without a good search-and-replace feature, and *AlphaWorks* measures up in this category. A special collection of wildcard characters makes this feature shine. Rich macros and a 100,000-word spelling checker/thesaurus garnish the word processor module.

Some of us never get much beyond word processing, even in an integrated package. But it's worth the venture in *AlphaWorks*. This program has the most detailed database module that you can find in an integrated package. You can sort by complex indexes, extract reports, merge data with form letters, and calculate columns.

In this new version of *AlphaWorks*, the added features help distinguish the program from the ordinary fare. When you design a form for entering data, you can draw lines and boxes to make it look more profes-

sional. Graphics aren't enough? Try SOUNDEX searching. If you know what a client's name sounds like but you can't quite remember the spelling, index the database by using SOUNDEX (LASTNAME) and then search for an equivalent spelling. This module is so rich, I couldn't find my way through all the features.

Likewise, the spreadsheet is a tasty dish, particularly because of all the functions you can use in formulas. Even more impressive, the graphing feature gives you control of almost all the elements of each chart you create. I couldn't control the y-axis, but, with all the other options for creating titles and labeling points, I hardly missed that feature. In the upgraded version, try exploding a pie chart for convincing presentations. Another new feature lets you search for strings in your spreadsheets.

A communications module rounds out *AlphaWorks'* menu. Along with basic features, it records log-on procedures so you can connect with your favorite service with a single keystroke. For people who use COM 1 for a serial printer or some other peripheral, the program offers a second communications service that addresses the second serial port, COM 2.

To move through the program, you use menus and control-key combinations. *AlphaWorks'* new version supports a mouse, but function keys work just as well. You select a command by hitting the first letter of that option on the keyboard. The slash key also activates menus, and you can use the arrow keys to make selections. Some key combinations cycle you through open windows. You can enter a few more figures in the spreadsheet that calculates projected sales for December, and then move to the window that displays your letter to your prospective customers just by hitting Alt-F8.

What if you don't know which files you want to open? After you've issued the Retrieve command, hit the up arrow. You'll get a list of files. A nice touch in this upgraded version is its ability to let you examine the beginning contents of a file as you move through a list of filenames, simply by pressing the F8 key, which creates a window to the highlighted file.

The mechanics of the interface are simple, but the underlying pattern is hard to recognize. Nothing is intuitive about the menu system, *AlphaWorks'* only weakness. You pay for complexity and power by putting up with a byzantine interface. Some formatting commands require several levels of choices. Even working with

the program for a month, you might never learn all of the everyday commands you'll need. Count on always having to look up which codes stand for which character formats in the status line. Keep the manual by your side at all times.

Luckily, the program is documented extensively. First, the tutorial demonstrates many of *AlphaWorks'* features by taking you on an in-depth tour. Get a glimpse of the tutorial's length and you'll have a good idea of the steep learning curve you'll have to climb. Once you've completed the tutorial, use the reference manual for more detailed information. Keep the tutorial around, however, for quick questions. It does a good job of explaining concepts by example.

As a final testimony to the intricate twists and turns of *AlphaWorks'* interface, the quick reference "card" is 20 pages long. It's useful but not exactly what I'd call a *quick* reference card.

If you plan to use your PC for occasional letters, a list of addresses, or a household budget, get an integrated package that's easier to learn. However, new and established home business owners will appreciate the power that comes with *AlphaWorks*. With this well-seasoned package, you can go to the small-business-of-the-year banquet and sit at the head table.

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PANZER BATTLE

On television's "Hogan's Heroes," the words *Russian Front* made Colonel Klink and Sergeant Schultz tremble with fear. But in the comfort of your computer room, those same words mean hours of entertainment and challenging strategy as you play *Panzer Battle*, the latest addition to the Battlefront Game System from Strategic Studies Group.

Panzer Battle contains six scenarios that simulate World War II tank battles between the Soviets and the

Germans. SSG has taken great pains to make the scenarios—Moscow, Minsk, Korsun, Prokhorovka, Kharkov, and Kanev—as accurate and realistic as possible. The manual provides a short historical briefing, a situation map, and hints to help you win the game.

You may play against the computer or another person. Either side can be given a handicap, if necessary, and each battle can last up to 99 turns. Prior to taking a turn, you must use the game menus to review your troops, casualties, and objectives. You must also study the position and strength of the enemy, the weather forecast, and the terrain on which you'll be fighting. Finally, you must position your troops and give them their orders.



Become a tank strategist as Germans and Russians fight it out in *Panzer Battle*.

Once you've made your plans and your forces have their orders, you can sit back and watch as the computer moves the opponents around the onscreen battle map. As each of your orders is executed, you're given feedback.

For those of you new to war games, Battlefront Game System is SSG's format for simulating land battles. While each new game introduces different battles, it uses the same menus and features found in other SSG releases. This means that once you learn how to play *Panzer Battle*, it's easy to move on to other SSG games.

What's not easy is mastering the process the first time. *Panzer Battle* is tough to learn, but the effort is worth it. By their very nature, strategy games are not as easy to learn as other computer games. Having to constantly move back and forth through SSG's complex system of menus (12 start menus and 20 game menus) complicates things. Pull-down menus probably would have made the game easier to handle.

It took me several hours to learn how to play the game; even after that, my leadership abilities resembled

those of bumbling Colonel Klink. I recommend using the tutorial, which does make the game easier to learn.

Don't let the initial difficulty stop you from learning the game, especially if you have an interest in military history and/or you enjoy other strategy games. Once you've learned how to play, *Panzer Battle* will provide you with many hours of entertainment.

If you master the six scenarios that come with *Panzer Battle*, you can edit them to make them more challenging. It is also possible to create new battles using a separate program, *Warplan*, which comes with *Panzer Battle*. The manual suggests several variations for each scenario, and they aren't difficult to produce. However, creating an entire new scenario is much more demanding and requires an extensive knowledge of the game.

The game also comes with an icon editor called Warpaint. Forts, cities, woods, rivers, and various army groups, for example, are represented on the computer display by icons. Warpaint allows you to change the design and color of these icons to suit your own taste.

I found it helpful to use Warpaint to obtain a better understanding of the game's 81 different icons. SSG does not provide a hardcopy list of these icons and what each represents, and when I first started playing the game, I was baffled by some of them.

Panzer Battle supports EGA, CGA, MCGA, VGA, Hercules, and Tandy 16-color graphics. I don't recommend using a monochrome monitor with *Panzer Battle*, because it's very difficult to distinguish between the various types of terrains and the enemy forces on a green or amber screen. A hard drive is not a necessity, as the game fits nicely on two 5¼-inch disks or one 3½-inch disk.

Many men dream of being famous generals, but few have the skill or opportunity. If you have a comfortable recliner in your computer room, however, and a long enough cable on your keyboard, you can become an arm-chair general with *Panzer Battle*. The best part is that you don't have to worry about the Russian mud and snow slowing down your microprocessor as you advance on the enemy.

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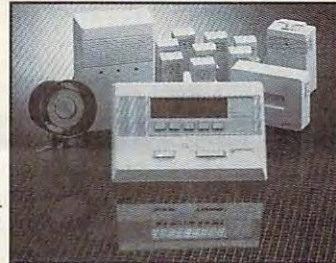


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DIE HARD

Fans of the 20th Century Fox movie *Die Hard*, get ready for more action! You'll love the suspense-packed computerized version from Activision.

The adventure begins on the 32nd floor of the Nakatomi Building in Los Angeles. The company's Christmas festivities have languished because a gang of international terrorists holds 30 employees, including your wife, at gunpoint. But the terrorists don't know that you're hiding in a bathroom.

You're not an employee. You're John McClane, a diehard New York cop who will stop at nothing to foil their plans for the biggest heist of the century—\$600 million in bearer bonds. When Hans Gruber, mastermind of the plot, realizes you're out to scuttle his plan for cracking the company vault, he sends out his henchmen to terminate you.

Die Hard is an incredible 3-D action/adventure game. It encompasses the same logic for survival portrayed in the movie. You must think quickly and use your intuition if you want to get out of this one alive.

The maze of halls and rooms you travel through is realistic, providing a single-point perspective. You watch your character from behind as he walks down corridors and past plants, bulletin boards, and furnishings. You must search each room for terrorists. The 3-D effect can be truly dizzying if you twirl around a room quickly to scout the entrances.

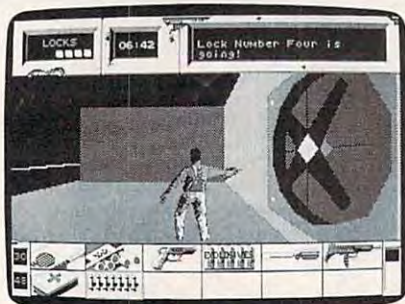
Using wall maps to find the quickest route to the next stairwell is a necessity, but you must first crack a security code in order to use the stairs to reach the upper levels.

The suspense is heightened because you never know when you'll be confronted by one of Gruber's men. Sometimes one will appear in the hall and you can sneak cautiously by without incident. Other times you're fired at from a room as you pass a doorway. But beware—one of Gruber's cohorts is out to get you with a vengeance. You killed his brother; now he's determined to kill you.

You want to save some bullets for a personal confrontation with Gruber himself, so conserve your ammunition. Hand-to-hand combat works well as you take out some of the thugs, but you must position the character to kick or punch at just the right angle to defeat an opponent. Even if you use a

gun, accurate aim is essential.

When you defeat an opponent, remember your desperate situation and search him for items that may be valuable to you. A digitized image from the actual movie appears on the screen during the search, and a menu allows you to select from these items as comments about the objects appear in a dialog box. Look for handguns, machine guns, food, and a two-way radio. You must use your intuition to determine what will be useful and what will only weigh you down.



Match wits with ruthless terrorists and save hostages in Activision's *Die Hard*.

McClane can drop objects he's carrying or pick up others from the floor. These items are added to his inventory, which is displayed across the bottom of the screen. Use the keyboard to select an item for McClane.

Either the keyboard's numeric keypad or your joystick will serve you well in confrontations with Gruber's men. Whether fighting hand-to-hand or with a gun, you control McClane's actions. Have him duck, jump, kick forward, roll forward, punch, block, and roundhouse kick. If things get too tough during a conflict, switch between hand-to-hand fighting and armed combat.

During these encounters with Gruber's henchmen, keep an eye on McClane's health, which is monitored in a bar in the lower right corner of the screen. Each blow or bullet weakens him, and certain items recovered from your victims strengthen him. The bar is green at the beginning of the game, but as McClane weakens, the bar turns red. When the bar disappears, McClane expires.

You must also watch the time displayed at the top of the screen. The terrorists are breaking into the vaults, and you have a mere 20 minutes to reach the roof of the 40-story building, stop them, and save your wife, Holly.

For the status of the vaults, check the red blinking bars in the upper left corner of the screen. A bar disappears as Gruber's men break through each of the seven vault doors. When the

last vault is cracked, a countdown begins for blowing up the roof.

Die Hard definitely calls for strategy, but it's a very rousing game. It's also addictive. Should you be killed, a digitized image of Hans appears with a taunting, "So soon? Not much challenge." This is enough to make anyone try and try again, and you're determined to make Hans eat his words. After all, you're a diehard.

LISA WROBLE

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Mindscape uses this mega-rally as the backdrop for *The Road to Sturgis*, in which you ride your Harley from Eastport, Maine, to the Dakota hills. Not quite a simulation, but more complex than an arcade, *Sturgis* puts your hobnail boots against the clutch pedal and your fingers around the throttle as you steer your scooter down a twisting ribbon of road.

Begin by choosing your skill level, which is directly related to your hair length—are you a peach-fuzzed wimp or a hirsute hog rider? From there, the game adopts a page from the adventure-game genre and asks that you rank specific characteristics such as wealth, charisma, mechanical ability, riding ability, and brawling ability. Allocate a total of 30 points among these categories and then hit the road.

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bike shop to customize your hog and enter the biker event being staged (there are five different events, from Drag Racing to Weenie Runs). Competing successfully adds to your reputation as a biker so that when you reach Sturgis you'll be treated warmly.

For all its fun, *The Road to Sturgis* presents one annoying problem. Running the EGA version of the game requires a full 640K of RAM, making this program a real hog. Most of us use a little RAM for TSRs, for a mouse driver, or for caching. I've seen simulations much more complex than this game run in 512K.

If you're looking for a place where you can act out your secret wish to ride a Harley, grow your hair, and thumb your nose at the establishment, *The Road to Sturgis* is as close as your computer.

PETER SCISCO

IBM PC and compatibles with 640K and CGA, EGA, VGA, or Tandy 16-color—\$39.95
Amiga and Atari ST versions scheduled for May release—\$49.95

MINDSCAPE
3444 Dundee Rd.
Northbrook, IL 60062
(312) 480-7667

TV SPORTS: FOOTBALL

By the time you read this review, America will be basking in the afterglow of this year's Super Bore—er, Bowl. Yet the country's appetite for more gridiron action remains. Cinemaware's *TV Sports: Football* stands ready to satisfy that seemingly insatiable hunger with remarkable realism. This package combines arcade action and statistical analysis into a top-of-the-line sports simulation. Foremost among those elements, at least for the gamer who likes hands-on play and top arcade action, is the presentation of the game itself.

TV Sports: Football provides the most realistic overhead view of football action ever seen on a computer screen. The graphics are superb. No matter which of the 24 offensive and defensive plays you choose, players block, run, pass, and tackle with startling sharpness and seamless animation.

The graphic excellence in the game's representation of the players contributes much to your ability to execute various plays. While the mechanics of running, passing, kicking, and defending are simple to learn, they require quite a bit of practice to master.

For example, passing consists of a few keystrokes or intuitive joystick maneuvers followed by depressing, holding, and releasing either the joystick button or the designated fire key on the keyboard. After having your quarterback fade into the pocket and set up, an *X* will move downfield in the direction you desire. The longer you hold down the key or button, the farther downfield the *X* will travel. Releasing the key or button fires the pass.

The mechanics of passing are easy enough, but you'll soon discover that actually getting the ball to your receiver is a different story. Just as in real football, timing is everything. *TV Sports: Football* requires would-be Joe Montanas to lead their receivers. If you throw the pass to the receiver and he's still running his pattern, the ball will end up behind him, incomplete or intercepted.

Running presents similar chal-

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lenges. When you see holes open up in the defensive line, you need only guide your runner through the gap to gain yardage. But seeing the hole and hitting it cleanly are two different matters; once again, as in the real game, holes close quickly.

Fortunately, *TV Sports: Football* offers practice modes in all phases of the game, and unless you want to be on the losing end of a 75-0 score, you would be well advised to spend a considerable amount of time on the practice field. The repetition in these practice sessions is actually enjoyable.



Combine statistical analysis and realistic arcade action in *TV Sports: Football*.

Incidentally, the well-drawn play diagrams deserve careful study in both the practice and the game modes. The players run their routes precisely, and knowing when and where runners are to go or receivers are to be is a definite plus on offense and defense alike.

TV Sports: Football is more than just an elaborate arcade game. Although it does not use the names of real players, Cinemaware patterns the 28 available teams after their true-life counterparts, and the teams perform accordingly. Even the individual players will do so, and by editing the names on the existing rosters, you can recreate actual NFL teams. You can even create your own teams with your favorite players or recreate NFL teams from the past. However, to maintain realism, a system of checks and balances prevents you from creating an entire roster of superplayers.

In addition to creating teams, gamers can set up leagues and play entire schedules, complete with playoffs and a championship. A statistical-report program tracks the games, providing team and individual stats during and after the game. The program also compiles stats throughout the season and produces league-leader reports in over 30 categories.

There's more. *TV Sports: Football* features ReelTalk, a sound-effects system producing quality output through the software, from the "Hut,

hut" of the quarterback to the grunts made by a tackled player to the cheers from the crowd.

Making good use of its outstanding graphics, *TV Sports: Football* includes full-screen shots of Dallas Cowboy-like cheerleaders; crowd closeups; zoom-ins on players who look at the "camera" and say hello to their moms; and pregame, halftime, and postgame screens of sportscasters in their newsrooms, announcing the game and giving other game results.

With all this going for it, *TV Sports: Football* would seem a shoo-in for game of the year. Unfortunately, several flaws hurt the game, though none of the problems are terminal.

To begin with, the documentation is sketchy in some parts and less than clear in others. For example, the keyboard instructions for selecting plays tell you to use the arrow keys, but I found it necessary to use the numeric pad keys that double as arrows (that is, the 4 and 8 keys to select the play in the upper left corner, the 6 and 8 keys to select the play in the upper right corner, and so on). A call to the manufacturer revealed that you can actually define keys to use when playing.

Another nuisance is that, after entering one of the practice modules, you must do a complete reboot before being allowed to play the game or enter a different practice routine.

Finally, and this one Cinemaware warns you about, unless you're playing on a machine running at 10 MHz or better, you need the patience of Job to play *TV Sports: Football*. The tremendous graphics and play procedure come at a price, actually two prices: You need a fast machine and you must have EGA/VGA graphics.

TV Sports: Football can be played against the computer or a human opponent, or, as the sideline coach, you can let the machine run all the plays after you call them. Few games offer the number of options found in *TV Sports: Football*; none of them offer you the realistic arcade graphics. Sports fans in general and football fans in particular should take a look at this game. The view is great from this perspective.

JAMES V. TRUNZO

IBM PC and compatibles (will not run on PS/2); 512K; EGA/VGA only—\$49.95

CINEMWARE
Distributed by Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
(415) 571-7171

PC PROOF

Oh, the embarrassment of having someone find fault with your writing! Don't get defensive. Get *PC Proof*, a software editor that overly sensitive writers will surely welcome. It identifies your mistakes without Mrs. Grundy's reproving looks and without seeing your embarrassment.

PC Proof reads text for errors and suggests corrections. It flags problems with mechanics, usage, and style, and it checks the overall organization to determine whether sentences and paragraphs are organized effectively.

To use *PC Proof*, first exit your word processor. Then access the program by typing *PROOF input file output file*. PCP creates two copies of the text; one shows the corrections you make; the other doesn't. The text is displayed, and you decide whether to change the words or passages that PCP suggests might be errors. After you've corrected the errors, go back to your word processor and call up the .out file, which contains the corrected copy.

Nine function keys control the program. You can highlight all the errors in the text or spotlight one error at a time, moving from one error to another with the function keys. F3 takes you to the previous error; F5, to the next.

Regrettably, PCP is fully compatible with only two word processors: *Microsoft Word* 3.0 and 4.0 and *WordPerfect* 4.2 and 5.0. You must convert documents from other word processors to ASCII before proofreading and editing them with PCP. After proofing these ASCII documents, you'll have to format the final copy because ASCII doesn't support bold, underlining, or page breaks.

PC Proof's check on writing mechanics includes spelling. In addition to the words in PCP's 120,000-word spelling dictionary, the program checks words that you have added to the dictionary, such as proper names or technical terms. However, you can delete from the dictionary only the words you have added; the 120,000-word core cannot be modified. Another limitation: When matching words in a document to words in its dictionary, PCP requires identical capitalization. Such lack of flexibility could lead to problems.

The punctuation check also has limitations, catching only incorrect spacing of punctuation marks, incom-

plete pairing of quotation marks, and the use of the wrong mark. Most of the guidance comes from the manual, which contains six pages of punctuation rules. Pressing F2 pops up an on-line reference manual.

The capitalization check highlights all sentences not beginning with a capital letter and flags words if their capitalization differs from the capitalization in the spelling dictionary.



Let *PC Proof* help you analyze style, usage, mechanics, and organization.

Using the usage check, you can identify offensive words that are racial, sexual, or vulgar. I typed all the offensive four-letter words I could think of; *PCP* flagged all of them except *work*. Also it flags oft-confused words such as *stationary* and *stationery* and catches vague and overused words such as *stuff*, *situation*, *fantastic*, and *really*.

PC Proof points to wordy phrases such as *in the event that* and suggests more concise phrasing such as *if*. I was disappointed, however, when *PCP* did not catch my intentional error: *Theirs a lot of money in the bank*.

I like the style check. *PCP* flags all eight forms of the verb *to be* so that you'll be aware of passive voice and constructions such as *There is* or *It is*. These forms weaken your writing.

PCP's check for nominalizations is its most useful feature, one I have not seen in other editors. These words would be verbs were it not for such suffixes as *ment*, *ion*, *ance*, and *ence*; thus, instead of the generally more effective verb forms, you have nouns. In the sentence *A decision must be made by our office*, for instance, *decide* has become *decision*, making the sentence wordier and less direct. *PCP* would flag the problem, and you could then write, *Our office must decide*.

Press F6 to get a word count for an entire document or for individual paragraphs, as well as a tally of sentences and paragraphs. Another list indicates the average number of words per sentence and per paragraph. But one important count is left out:

the actual number of words for each sentence. This count is very important when writing to a specific reading level.

The manual, though attractive, lacks detail about how to use the software. Only three screens are printed, and a list of errors that *PCP* can find is not included. Also, I was unclear about how the output file was created, and at times I was unsure how to use the editor. If I had never used a software editor before, I wouldn't have known which step to take first.

Fortunately, *PCP* does offer telephone support, both voice and fax. There's even a help number in Switzerland for European users.

PC Proof promises to correct your writing and improve your writing skills. Other software editors may be more sophisticated and find more errors than *PCP* finds; however, if you need a spelling checker, tend to use offensive words, or turn your verbs into nouns, *PC Proof* may be just the right editor for you.

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CARTOONERS

How can you keep your kids from watching too many cartoons on TV? Give them the opportunity to create their own on your PC. That's what *Cartooners*, by Electronic Arts, promises and delivers. Children make cartoons from start to finish—creating the plot, writing the lines, choosing the scenes and actors.

As you begin the program, a main menu provides three choices: Look, Play, and Create. The last one allows you to create new cartoons from scratch. When you select Create, a menu bar with pull-down menus appears. One option on the menu, Scenes, lets you choose a background for your cartoon from ten available scenes, including a park, a farm, and a country road.

Next, you select from the Actors

menu, which includes more than just rabbits, dogs, cats, and similar characters. Actors are also things that can be animated, such as an explosion, a baseball, or a balloon.

After you've chosen at least one actor and scene, the real fun begins. Now it's time to add some movements for your actors: walking, turning, waving, or hopping (for the rabbit). Actors can walk or move behind or in front of each other because each image exists on one of eight levels, chosen through a front/back selection on the Edit menu.



Children can enjoy creating and animating their own cartoons with *Cartooners*.

You save scenes and each step of the action by using your mouse, which the program requires, to "push" the record button in the control panel at the bottom of the screen. Other "buttons" allow you to rewind, go forward, and start playing your cartoon from any scene to the end.

Cartooners doesn't attempt to provide audible voices for its characters as some programs do. Instead, creative cartoonists provide words for their actors inside comic-book-style balloons. Nearly all kids know the format.

Finally, you go into postproduction—fine-tuning the editing, adding a title and credits, and choosing theme music for your masterpiece. Nine themes and sound effects are provided. With my Creative Music Systems' Game Blaster board, the lively music added an important dimension to each cartoon. Other supported music boards include the Ad Lib and the MT-32.

Scenes from your cartoons can be printed out. Kids can use them for advertisements and movie posters, or they can collate key scenes into a book.

While older children can create new cartoons from scratch, younger children (or those less ready to plunge into artistic realms) can start by modifying the finished cartoons provided. At the main menu, this option, appropriately, is called Play.

The third option on the main menu is called Look. Here, a marquee lists cartoon titles. The program comes with several finished cartoons, which you can click on to watch. An "all" choice strings them together in one big show. Even the youngest child can watch these play, although it helps to have someone there to read the dialogue in the balloons. A click of the mouse gives you the choice at any time to stop or continue with a cartoon.

The concept of *Cartooners* at first seemed intimidating—would this be as complex as editing a videotape? But the manual is very well written and understandable, taking you step by step through the process, which turns out to be fun and easy. School-age children should have no difficulty creating their very own productions. Even my three-year-old can choose scenes, add actors, and record the results.

A thoughtful touch is a separate illustrated manual for young kids; written in verse, it describes how to use the Look and Play features.

This is the sort of program that grows with a child's ability. Creating and fine-tuning a cartoon can be as easy or as complex as a child's ability or interest allows. Even the first efforts of the youngest child produce satisfactory animation.

Another concern for parents might be the quality of the drawings. Unlike the chunky, stilted people cartoons that are so common on Saturday morning TV, they're actually very cute animal characters.

The best part about *Cartooners* is the opportunity it provides for a child (or adult) to be creative. You can't play with *Cartooners* without creating something no one's ever made before. As an added bonus, *Cartooners* provides insight into how animated sequences so common in computer games are put together.

After a while, familiarity with the available choices breeds boredom, if not contempt, and any director will be driven to scout out new locations and audition new actors. Electronic Arts thought of this eventuality and has provided a disk called *Cartooners in Space*, which has additional scenes and actors just right for space adventures. Among the scenes are Mars, the Moon, and a laboratory control room. Additional actors include bug-eyed aliens, spaceships, and space computers.

While the multitude of options here can take up hours of studio time, even these may not be enough to satisfy the most ardent director. Those hard-to-please *auteurs* can paint their

own scenes and actors with EA's DeluxePaint series of programs. Imagine the creativity these programs can foster. Who knows what stories kids might create? I can almost envision a contest, something like the Academy Awards for kids. The envelope please. . . .

TRACY COZZENS

IBM, Tandy, or compatible PC; 512K of RAM; DOS 2.0 or higher; mouse; CGA, EGA, MCGA, VGA, or Tandy 16-color; hard drive recommended—\$49.95

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

DEJA VU II: LOST IN LAS VEGAS



Hold the phone. I think I've seen this game before. At least it looks familiar. Fleeting images of dark Chicago streets and cheap gin joints lurch into my brain like a drunken punk looking for a toilet. Only one memory stands clear: the stench from Tony Malone's cigar when he breathed into my face with his ultimatum. I had to find his missing 100 G's in the next seven days or I'd be history. And I never even made the book.

All the *film noir* feel is back in ICOM Simulations' *Deja Vu II: Lost in Las Vegas*. Available for some time on other platforms, the IBM version hit the streets with a whole new cast of seedy characters and seedier locales. The black-and-white classic styling and ambience of the Mac version is faithfully rendered in fantastic VGA color (EGA is also supported).

Flatfoot fans once again play the role of Ace Harding, a private investigator in the tradition of Sam Spade and Philip Marlowe. The game's lethal mix of a transparent, interactive interface with a hardboiled, well-conceived adventure makes for hours of great fun.

ICOM's interface avoids type-in commands by creating an entirely graphical environment. Using a mouse (recommended, but not absolutely necessary), you can manipulate and examine any object in the game's many scenes. The freedom to choose

your own path through the adventure is the hallmark of the *Deja Vu* series, and it's put to good use in this sequel.

Computer gamers new to the adventure genre will appreciate the slick interface. More experienced gamers can count on a strong story that's a change from the usual space-fight/dragonslayer scenarios. A worthy successor to the popular *A Nightmare Comes True!*, *Lost in Las Vegas* signals what I hope will be a continuing effort in the *Deja Vu* line.

PETER SCISCO

Amiga—\$49.95
Apple IIgs—\$49.95
Atari ST—\$49.95
IBM PC and compatibles with 512K and EGA or VGA—\$49.95
Macintosh—\$49.95

ICOM SIMULATIONS
Distributed by Mindscape
3444 Dundee Rd.
Northbrook, IL 60062
(312) 480-7667

FLOPPYDRIVER



According to its developer, *FloppyDRIVER* can make your floppy drives run as much as five times faster—but how? It might help to understand how your PC accesses data. When DOS needs to read information from your floppy disk, it usually requests that information one sector at a time—even though your computer's BIOS can read an entire track in one revolution. In the time it takes your disk drive to read 1 sector, it could have read 9–18 sectors (the exact number depends on the type of floppy disk).

With *FloppyDRIVER*, your disk drive works at full speed because it looks ahead and anticipates DOS's next request. It's all done in the background, so once you set up the program, you can forget it's there.

On my floppy-based laptop, I measured improvements on the order of 30–60 percent. The best results came from loading an application and a large data file together. With *XyWrite* 3.52 and a 54K document, *FloppyDRIVER* loaded the two files 59 percent faster. With *XyWrite* alone, the improvement was just 36 percent.

FloppyDRIVER can also automatically format disks without your having to exit an application. If you accidentally try to copy to an unfor-

matted disk, the program can begin a format, make the copy, and finish the format—all without your intervention. During the formatting, you can access any drive—including the one that's being formatted.

On the downside, *Floppy-DRIVER* doesn't work with my cache program, *PC-Kwik Power Pak*, and it makes my drives sound a bit louder when it first kicks in. Despite these minor problems, and the fact that I wasn't able to achieve anywhere near the 500-percent gains in speed that DTG claims, *FloppyDRIVER* has found a permanent home on my laptop.

DAVID ENGLISH

IBM PC and compatibles—\$89.95

DTG
23704-5 El Toro Rd.
Suite 348
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(213) 987-2000

SOFTBREEZE VERSION 3.0

Are you looking for ways to enhance your PC's productivity? Let *SoftBreeze* come to the rescue. This user interface copies its programs to your hard disk and adapts itself to your computer's environment. Because it can reside in your computer's internal memory, *SoftBreeze* allows you to assign hot keys for easy task switching, giving you access to multiple files on your desktop. With it, you can zoom from one application to another, organize your files, and perform disk-management functions.

SoftBreeze recognizes 11 categories of applications—including word processors and databases—and is compatible with over 100 programs. You can put up to ten programs at a time on the desktop. The package includes a user's guide and a Nautilus programmer's reference manual. *SoftBreeze*, written in the company's proprietary Nautilus language, comes with the programmer's guide so that you can adapt or enhance the utility.

Although the layout of the manual is fairly clear, I found the careless typos distracting and annoying, and I hope they are eliminated by the next revision. [SoftShell now is shipping

version 3.05 with new documentation that reportedly has corrected the typo problem. —Editor]

The software, however, is friendly and apparently error-free. The installation procedure is user-friendly, visually attractive, and quick. Installation requires little user input beyond inserting the correct disks when prompted, and it shows you what's going on every step of the way. On-screen instructions are amazingly clear, and operations are fast and efficient. One advantage of *SoftBreeze* over other shells is the remarkable way it scans your directories, finds programs, and categorizes them in its convenient system of menus. Once *SoftBreeze* has installed your other programs on the menu, it's possible to pull down the applications menu, look for word processors, and execute *XyWrite* or *WordStar* with the touch of a button. If you prefer the command line, you can access it from the main menu simply by pressing the Esc key; pressing Esc again returns you to the menu.



Become more productive and switch between tasks more easily with *SoftBreeze*.

You can start *SoftBreeze* any of four different ways, depending on what goes into your AUTOEXEC.BAT file. Starting the program could be as simple as booting the computer or typing *NT* (for Nautilus). This flexibility allows you complete freedom to manage your files and access applications. To help you avoid conflicts with other TSR programs, *SoftBreeze* prompts you during installation when it finds programs that might conflict and advises you on how to handle them.

SoftBreeze can handle file-management functions, including disk copying and formatting, memory mapping, and screen customizing. The average computer user may end up accessing only a few of the features included in *SoftBreeze*. It's designed to free you from having to learn many computer concepts and DOS commands, and if you're a relatively new

computer user, you'll probably appreciate this. But in order to make full use of its capabilities, you should be prepared to spend time with both the *SoftBreeze* and the DOS manuals. Many of the functions, such as setting up your files for task switching, require a somewhat sophisticated user.

The program and its presentation are effective. All screens are graphically clear and distinct from one another to eliminate confusion. A great range of options is available in the way you can access the functions. Arrow keys, function keys, hot keys, and mnemonic keystrokes all produce results. The program ran amazingly fast on my 30-meg hard drive setup. Best of all, for every option that the menu offers, there is a help screen available. And SoftShell Systems offers a customer-support line in case you need additional assistance.

I consider the main strengths of *SoftBreeze* to be task-switching, cutting and pasting among multiple documents, and personalizing screens and/or function keys to your taste. My only objection to the program—besides the typos in the manual—is that you'd probably have to be a heavy user to really appreciate *SoftBreeze*.

All in all, while *SoftBreeze* is a noteworthy utility, you should perhaps stop to consider just how much time you want to spend learning it and configuring it to your needs. You'd want to use it fairly extensively to justify learning the many features of this program.

KRISTEN STERNBERG

IBM PC and compatibles; 512K; DOS 3.0 or higher—\$99

SOFTSHELL SYSTEMS
1163 Triton Dr.
Foster City, CA 94044
(415) 571-9000

POWERMUSE 100



Now that the mouse has finally caught on with PC users, companies are starting to tinker with its basic design. One of the most unusual of the new designs is Prohance's PowerMouse 100. Larger than your garden-variety PC mouse, it has 40 keys on top and looks, in fact, like a VCR remote control with a wire hanging out of the back. ▸

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Each of the 40 keys can be used in several ways—by itself; with the Shift, Ctrl, and Alt keys on your computer's keyboard; and with the Fn and User keys on the PowerMouse. That's six combinations for each key, which means it can handle as many as 240 different commands.

The PowerMouse normally functions as a Microsoft-compatible mouse. In this mode, you can press the Fn key and a number key on the PowerMouse to simulate the function keys on your computer's keyboard.

In the advanced mode, you can load in different key-definition tables and change the meaning of each of the key combinations. You can also create your own key-definition tables (Prohance calls them *PowerMacros*) or use the ready-made ones provided on the program disk. These currently include *Excel*, *Lotus 1-2-3*, *Lucid 2.0*, *Microsoft Word*, *MS-DOS*, *Quattro*, *Symphony*, *Volkswriter*, *Windows*, *WordPerfect 5.0*, and *WordStar 5.5*.

Within *1-2-3*, for example, you can use the PowerMouse to retrieve a file, copy a range of cells, or print a spreadsheet. Because you can input numbers as well as formulas, you can do anything you would normally do from the computer's keyboard.

As an ordinary mouse, the PowerMouse seems too large and its two regular mouse buttons too narrow. But if you spend most of your time in one or two programs and you're itching to automate your daily work routines, this mouse can give you that power.

DAVID ENGLISH

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SUCCESS INC.

No business plans to fail—but too many businesses fail to plan. It's a cliché, but clichés generally contain a kernel of truth. This one holds more than a kernel. *Success Inc.* turns the development of a business plan into a step-by-step program whose result, after some effort, is a thorough, professional, presentable business plan. To achieve that result takes some effort, but I

have to admit that I found the business plan I generated to be professional, thorough, and convincing.

As the program's authors point out, the purpose of a plan is not only to codify your own thinking, but also to serve as written justification to banks and potential investors. Ideally, your business plan is a rough draft of your first few years in business. In short, it's speculation. More accurately, a business plan extrapolates. In preparing the plan, your job is to anticipate and respond to every conceivable factor that could affect your business.



Build a business by filling a need; *Success Inc.* helps you define one.

On this level, *Success Inc.* is exemplary: thorough, well organized, offering advice as well as instruction. The program's question-and-answer format is helpful and thought provoking. Its step-by-step nature keeps you from rushing through important sections. A sample plan is included in the program for reference, yet the instruction is relaxed enough to keep you from getting too bound up in a single role model.

Success Inc. walks you through the various sections of a typical business plan, discussing the section's content and suggested length. Where appropriate, the program screen reminds you to be lively in your prose or that a certain section is of critical importance.

The program insists that you be thorough, addressing everything from the name of your business to its officers and products/services, market studies, geographical factors affecting success, physical plant and facilities, sales forecasts, and dozens of other categories.

There are plenty of support materials in the program's thick manual. In addition to a glossary, there's a good bibliography containing other titles on business planning, as well as books on raising venture capital and a few general small-business handbooks. There is a thorough index, and there are informative appendices.

The manual itself is clearly written, although its layout can be confusing. The confusion is tied both to the program's difficult interface and to the manual's typography, which attempts to reproduce the screen display, including several layers of nested commands. *Success Inc.*'s command interface runs across the bottom of the screen, telling you which function key serves what purpose. There are several levels of commands through which you can cycle. Pull-down menus would have been more effective and efficient.

The program itself is hampered by some shortcomings and eccentricities. The program's *WordStar*-like key-combination commands will mean little to contemporary computer users. Others may disagree. I'd like to see better mouse support; a mouse can be used with the program, but it's not the smoothest of fits.

Installation is complex and involves invoking a key program named SUCCOPY. This program is required to install *Success Inc.* on a hard disk, to back up floppies, and to remove *Success Inc.* from your hard disk when the occasion arises.

Success Inc. is a large program; it occupies nearly half a megabyte of disk space. When I examined the program's directory using DOS's DIR command, I saw only three files, whose combined size was less than 140K.

I booted *Tree 86* to examine *Success Inc.* a little closer and found dozens of hidden files, which the program writes to the hard disk during installation. I don't like that: I think I have a right to know what files are being put on my hard disk and, furthermore, a right to erase them easily. Requiring the use of a master disk to delete the files is an unnecessary complication.

A successful business runs by the numbers, but *Success Inc.* is unable to handle most of the mathematics that are required for preparing a thorough business plan. There are screens throughout the program where columns of figures must be entered, yet there are not even rudimentary spreadsheet functions. To be truly useful, later editions of the program should include more sophisticated math functions and must be set up so that commonly used figures and calculations—and changes in them—are reflected throughout the business plan. Exporting data to an external spreadsheet would also be a welcome upgrade.

Having advised people on the construction of business plans in the past, I was pleased with *Success Inc.*'s

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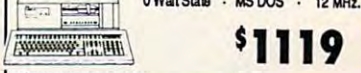
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thoroughness of approach and pleasantly surprised by some planning areas to which I had previously given short shrift. As a business planner, the program ranks among the best I've seen. Once accustomed to its quirks, I was able to bring together a large amount of work in a short time. As software, it needs improvement. I hope the package is successful enough to earn the extra attention and revision it deserves.

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AMÍ PROFESSIONAL

Only a handful of PC programs are both powerful and easy to use. *Amí Professional* is the first PC word processor to combine these two, often contradictory, qualities.

Amí Professional begins with the usual list of features we've come to expect in a top word processor—style sheets, a 130,000-word spelling checker, a thesaurus, indexing, outlining, hidden notes, bookmarks, the ability to generate a table of contents, and an extensive macro language. Then it adds some remarkable features that make the program a pleasure to use, including a full WYSIWYG (What You See Is What You Get) display, automatic charting with seven types of charts and 12 styles for each type, and a complete built-in drawing program.

But where *Amí Professional* really shines is in its intuitive features and the degree to which they can be customized. For example, when you adjust the alignment, margins, or columns, a small representation of the full page shows how the new settings will affect the document. You can also install 12 of your favorite commands as icons on the left side of the screen. Then when you want to undo a command, import a file, or switch to a full-page view, all you have to do is click on an icon.

Because *Amí Professional* runs under *Microsoft Windows*, it needs a

speedy 80286 or 80386 computer. Compared to other *Windows* programs, it performs fast enough, but if you do have problems, you can switch to the program's draft mode. The draft mode runs considerably faster because it doesn't show the document's text formatting, graphics, or positioning.

If you're looking for a top-of-the-line word processor with a WYSIWYG display and plenty of desktop publishing features, *Amí Professional* may be the friendly professional for you.

DAVID ENGLISH

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HYPER-WORD

Computer users often find themselves limited by the way a particular program works, but a recent trend in hypertechnology appears to be changing all that. Now you have greater flexibility, not only in the way you use your data, but also in the way you use your software; in effect, you can customize the program. In the MS-DOS world, Zaron Software's *Hyper-Word* exhibits much of the promise of this new technology.

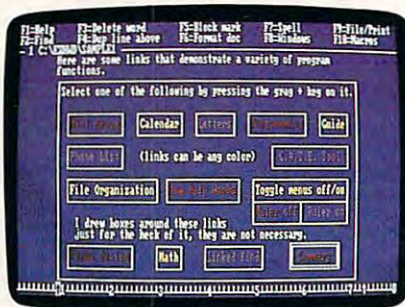
At the core of *Hyper-Word* is a word processor that can display and edit text in up to nine windows. It has an integrated spelling checker and supports headers, footers, and page and chapter numbering; also, it prints form letters, mailing labels, and multiple columns. Other notable features include pop-up, overlapping menus; a hyperlinked help index; and a readability index. The program has an adequate word processor for most uses, but word processing is only the beginning.

You can use *Hyper-Word* as an integrated system to automate your office or home business and meet your personal needs. By using hypertext word links to quickly traverse different files or different portions of the same file, the program lets you pull together seemingly unrelated data. The resulting free-form structure reflects

how people think rather than how computers often require us to think.

Here's how the program works. You create hyperlinks between words, connecting words in one file to words in the same or other files with a single keystroke. A simple example would be linking a document to a name in a client file and the entries in the daily log to facilitate billing. This linking also makes possible the creation of expert systems, operation guides, and instructional online documentation.

I appreciate the automatic logging of daily activity. The start-and-stop date and time are entered into a file every time you use *Hyper-Word*, and you can add notes and comments to the file. The program also includes a daily appointment calendar. These two features are easy to implement and require no additional work or expertise.



Link different pieces of information with *Hyper-Word*, a hypertext word processor.

Besides its role as a free-form hypertext environment, *Hyper-Word* also advertises itself as a Personal Information Manager (PIM). The program can be used as a PIM, but it lacks the automatic association builders PIMs so often employ. Instead, you must design and implement PIM features by using the program's word processor and hyperlink features. The customer billing described previously is one example. Links between the calendar and a file of business expenses could help you keep track of business deductions for tax purposes. The potential is almost limitless.

Most of the problems I encountered with *Hyper-Word* can be attributed to the lack of documentation. I tried to change the program to automatically load my file rather than the introductory sample provided. I entered and saved this review. The next time I tried to run the program, I was repeatedly faced with an error box telling me that I had specified an illegal pathname, even though the directory in the path was one that *Hyper-*

Word created during installation and the file was present. Closer inspection of the File menu revealed that I should have followed the program's own special procedure for loading a file.

In many similar cases, the commands required by the program are not intuitive. Many keystrokes are either undocumented or nonstandard. I could not find a command that would move the cursor to the next or previous word.

Also, when you use the backspace key to correct an error, a sentence appears to wrap correctly and then suddenly reformats so that the first word of the current line jumps to the previous line. It's disconcerting to have the lines jumping and reformatting as you type.

Overall, I'm impressed with the effort that went into *Hyper-Word*. It's a potentially great program, but I wish the documentation were more comprehensive. Hypertext is still a new area for most computer users; a more thorough grounding in its principles would certainly be welcomed. Though the program comes with an online help system, this should supplement, not replace, written documentation.

I would also like to see mouse support in the next upgrade. Using a mouse would greatly facilitate the hyperlink jumps. These changes could take *Hyper-Word* from its unpretentious beginnings to a major software product.

JAMES W. MAKI

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Everything about the Sportster

1200 has been designed with the novice in mind. The concise 28-page manual (including index) covers every facet of telecommunicating. You get, in clear English, installation instructions (including directions for setting the modem's eight DIP switches, easily accessed from the back of the unit), a description of the software required, testing procedures, and even a short course on how modems work.

You can set up your Sportster 1200 as an autoanswer modem for receiving electronic messages. Dual phone jacks on the back of the unit allow you to connect the modem to your phone line at the same time that you maintain a voice line. Switching from one to another is as simple as setting a switch and issuing a command from the AT command set. (Don't be confused; it's all explained in the manual.)

Compatibility with most personal computers is assured, as the Sportster uses not only the Hayes command-set standard but also Bell standards at 1200 bits per second (bps) and 0-300 bps. An RS-232C interface hooks the Sportster to your serial port.

Hardly bigger than your hand, the Sportster 1200 can be easily transported for communications on the road (provided you bring along the power supply). That's great news for laptop owners, because they won't have to buy separate units for their portable and their desktop system.

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CONVERSATIONS

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

The director of the National Center for Computer Crime Data, Buck BloomBecker, describes the organization as "an activist research institute that focuses on computer crime, computer security, and computer ethics." As a researcher, writer, and speaker, BloomBecker seeks to increase public awareness of the legal and ethical questions underlying the computer revolution.

In the course of his work, BloomBecker has encountered all manner of computer crimes. Many of these have been distilled into his latest book, *Spectacular Computer Crimes*, just published by Dow Jones-Irwin.

The Center has been in existence for just over a decade. "In 1986, we published our first statistical report, and we noted the 'democratization' of computer crime," BloomBecker says, explaining the PC's influence on computer crime. "In order to make computers user-friendly, they had to be made abuser-friendly."

As an example, BloomBecker cites a man who, although computer illiterate, found out how to outsmart the ticket machine in the Bay Area Rapid Transit district. "The fact that this kind of person could commit a computer crime is good evidence of the democratization of computer crime," he says.

"A lot of people have an even better opportunity to learn about computer crime, through on-the-job training. The biggest computer-crime problem is employees. You can't really learn how a system works, and use it for very long, before you start to see loopholes."

Do computer crimes typically occur in financial-service businesses?

No, BloomBecker says. "Wherever there are computers, there's the potential for computer crime. Many of the criminals are people who work at their jobs, find a vulnerability, and either plunge right in or tuck it away until need, or greed, or some other

motivation convinces them to take advantage of the knowledge they've acquired."

Retail establishments are especially at risk. "A traditional problem of retail sales is employees who steal a little bit," BloomBecker says. "Now some of those thefts are based on weaknesses in computer systems."

Electronic bulletin boards are another good example of the democratization of computer crime. "In 1986 we called John Maxfield, a leading hacker tracker," BloomBecker says. "He said around 10,000 bulletin boards were in use—and around 1,000 of those were used for illegitimate purposes." When BloomBecker recently called Maxfield for an update, Maxfield said he could no longer estimate how many BBSs served illegitimate purposes.

What type of person is more likely to be a computer abuser?

"There are several types,"

BloomBecker says. "But if you want to see the typical computer criminal, just look in the mirror. That which distinguishes computer enthusiasts from computer criminals has very little to do with personality."

A variety of motivations underlie computer crimes.

"There's the 'hacker' mentality—I call it the *sandbox*. They see computers as a place to play and can't understand why anyone would want to interfere with their playing," BloomBecker says.

"[Another] category is the 'land of opportunity.' This person is motivated by the fact that something is relatively simple to do.

"Then there's the 'cookie jar,' where someone is motivated by intense need, whether it's gambling debts, blackmail, or whatever."

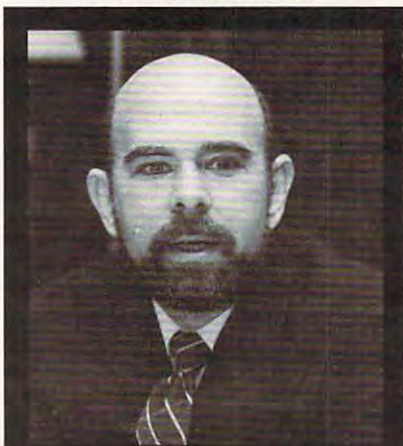
Another category is the soapbox. "This person commits computer crime for political motivations," BloomBecker says. One woman who destroyed a U.S. Air Force computer justified her crime on the philosophy of beating swords into plowshares.

Another area of computer security that bears scrutiny is the field of information gathering. "We're users of the IRS, and Social Security, and various credit agencies," BloomBecker points out. "How do you and I have some input to make sure that TRW, for example, adequately secures information about us?"

"Ultimately, no system can be invulnerable," BloomBecker says. "The real goal should be cost-effective control."

A new parent, BloomBecker sees computer security in light of fatherhood. "I have two obligations to my daughter. One is to keep her from harm; the other is to allow her to grow to her potential.

"I think anyone who's responsible for securing a computer system is faced by the same dilemma. Security ultimately means limits. But we don't want to so severely limit computer systems that their current and future potential is hampered." □



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