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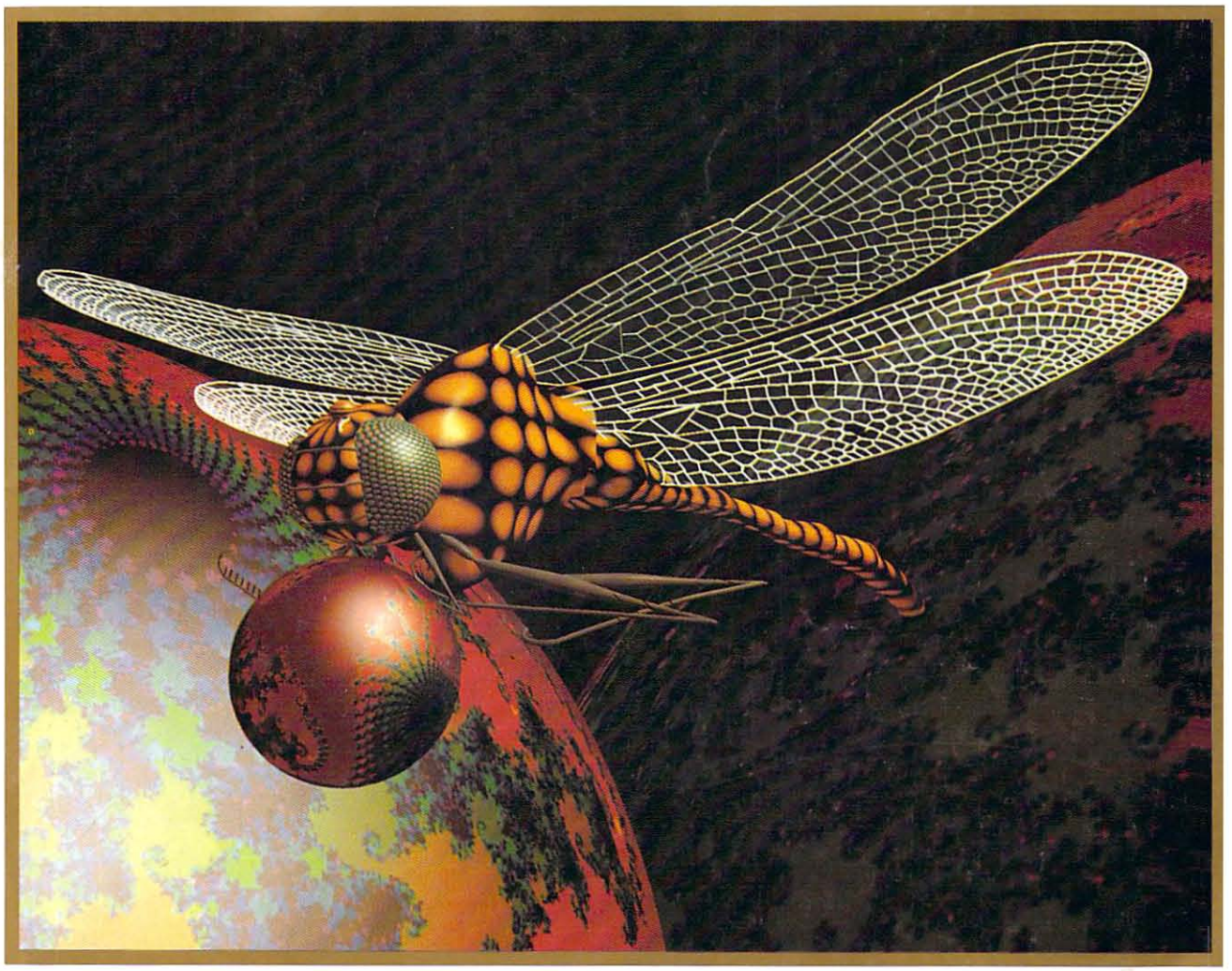

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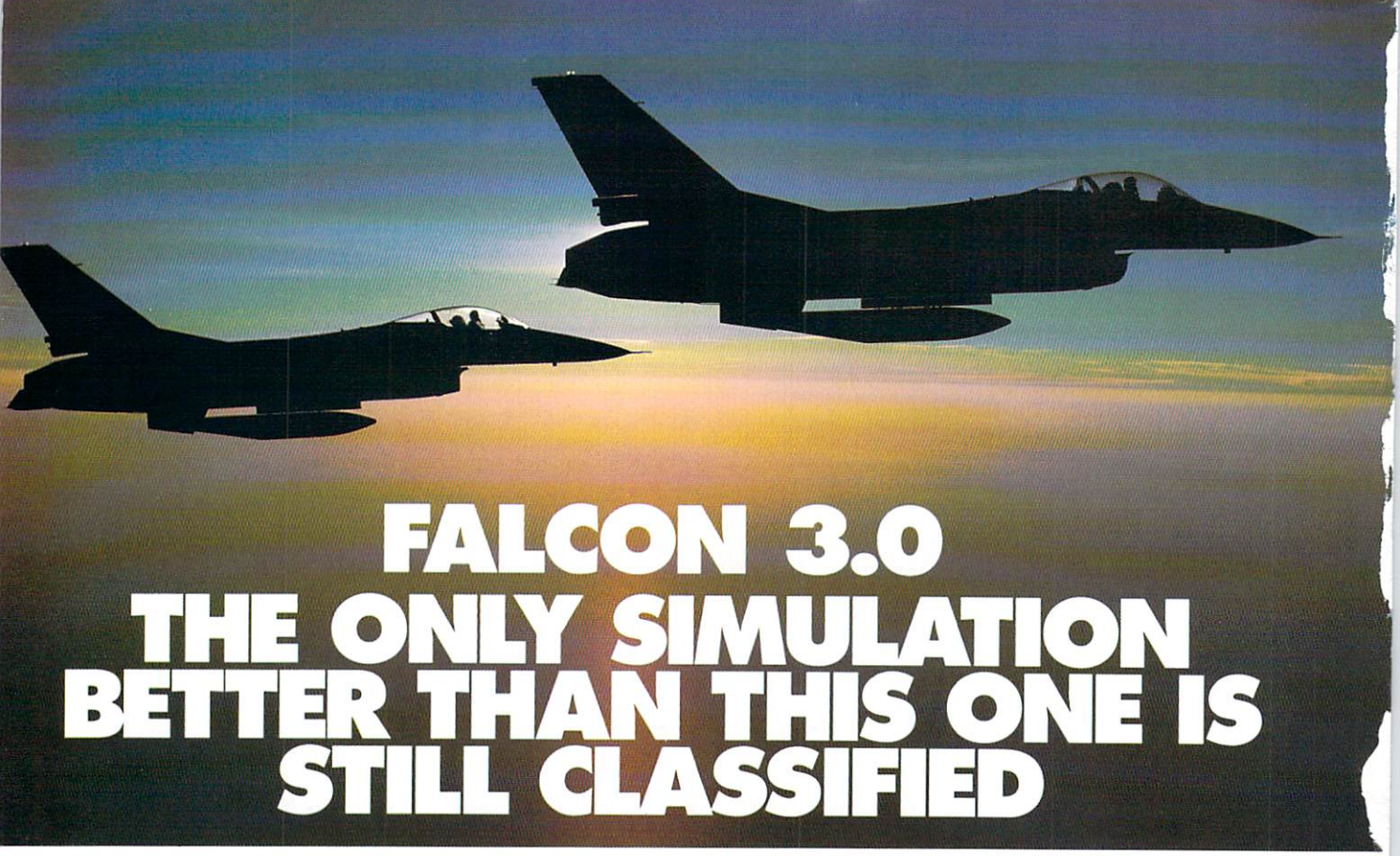

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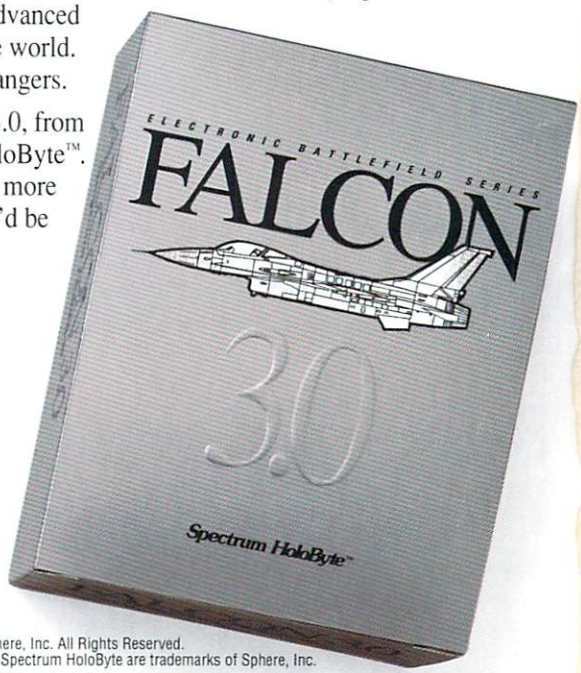

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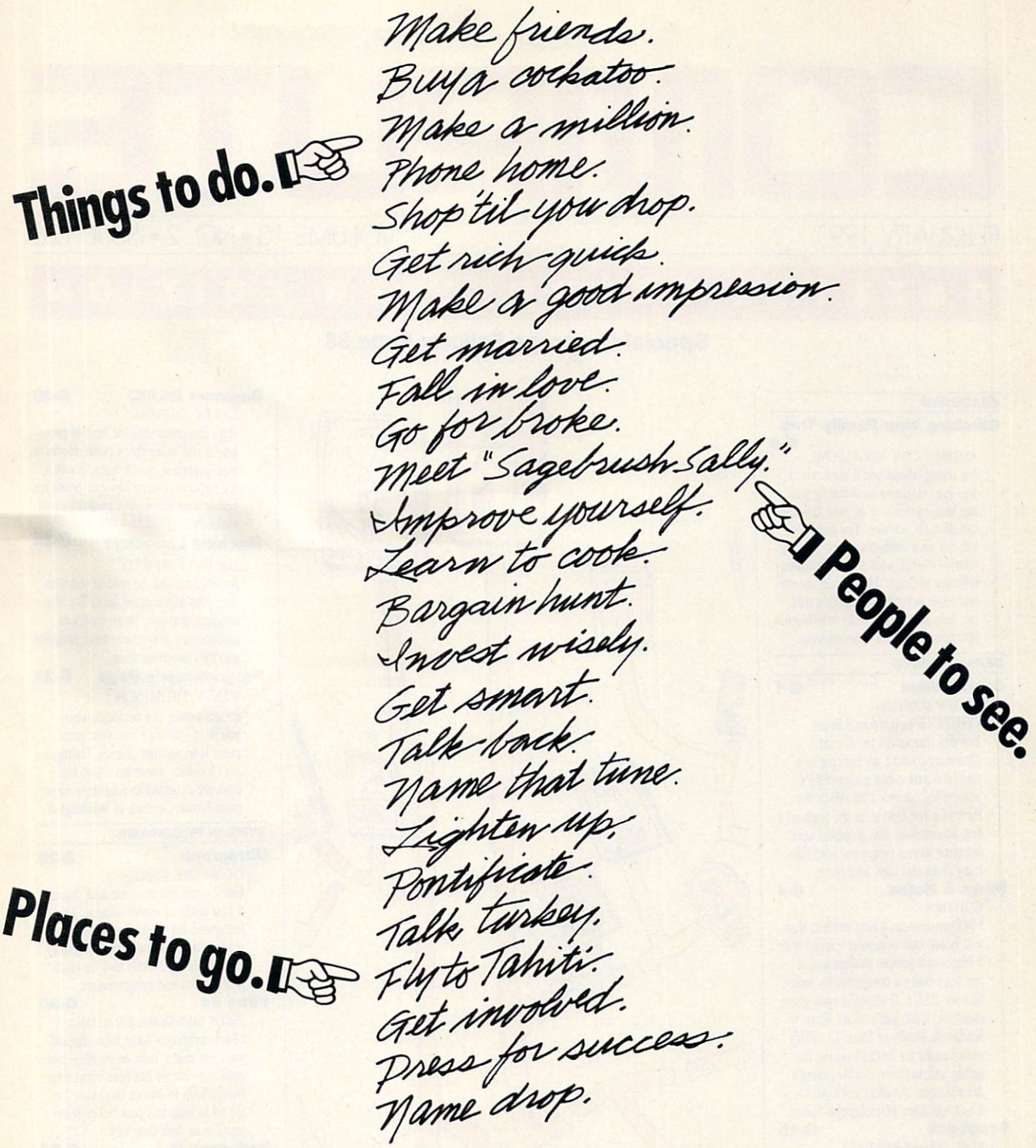

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COMPUTE

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GAZETTE SUBSCRIBER EDITION

Special Coverage Follows Page 88

FEATURES

Climbing Your Family Tree G-8
AUDREY COX VOGELPOHL
No telling whom you'll meet when you start climbing your family tree, but keeping track of all your relations can be quite a chore. You won't be left out on a limb, though, if you use your 64 or 128 with a good genealogy software package. This article investigates four genealogy programs that can help you organize the information you discover about your relatives.

DEPARTMENTS

64/128 View G-1
BRUCE BOWDEN
COMPUTE programmer Bruce Bowden introduces the *Gazette Operating System*, an exciting new multifeatured menu program he's written for *Gazette Disk*. With the click of a fire button or the press of a key, you can use this graphical user interface to run programs, read files, copy disks and files, and more.

News & Notes G-4
EDITORS
CMD announces a new product that will boost your computer's speed with a Hayes-compatible modem and a cartridge that's a compatibility interface for REUs. If action is your game, check out UBI Soft's *Skate Wars* or Konami's *Blades of Steel*. To satisfy your hunger for football during the spring and summer months, there's *MicroLeague Football, the Coach's Challenge* from MicroLeague Sports.

Feedback G-15
EDITORS and READERS
A reader calls for faster chips for the 64, and another needs a new manual for his flight simulator. Will the real artist who drew *Natalie* in "Gazette Gallery" please stand up? Mail-order user groups, UPS deliveries, and relative files are also discussed.

COLUMNS

D'Iversions G-18
FRED D'IGNAZIO
An enlarged image of a computer chip looks like a silicon city to Fred D'Ignazio; he even wrote a book about it. What will computer cities of the future have to offer?

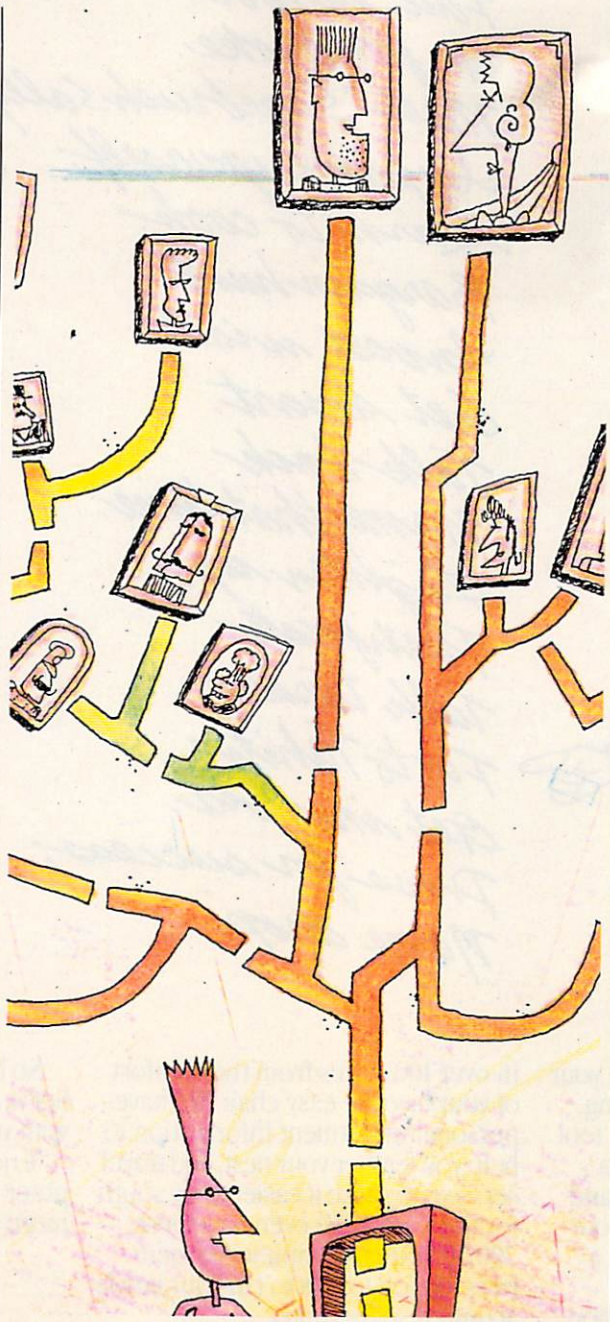

ILLUSTRATION BY DAVID POVILAITIS

Beginner BASIC G-20
LARRY COTTON
Bugs can creep into the best of programs and make them crash. If you're a programmer, you'll want to watch for and avoid these obvious problems before they infest your programs and make them grind to a halt.

Machine Language G-22
JIM BUTTERFIELD
A computer can do several independent jobs at the same time. Try this program that uses three sprites to demonstrate how a scheduler program allocates processor time.

Programmer's Page G-24
RANDY THOMPSON
Programming can be tough when you're in one state and your computer is in another. Randy Thompson isn't too sure where his 64 is, but both are expected to find their ways from North Carolina to Washington.

TYPE-IN PROGRAMS

Ultragraph G-25
GEOFFREY SPARKS
Use *Ultragraph* to create and display a vast range of screen images. This integrated set of utilities, which includes a character editor and display module, is a powerful tool for computer artists and programmers.

Virus 64 G-30
JESUS MENDOZA ESCALONA
Other computers have been plagued with one pesky virus or another, but until now the 64 has been virus free. Now it's up to you in this game for the 64 to stop this pest before it destroys your disk directory.

Periscope II G-32
ROBERT BIXBY
When you want to unscratch a file, change a file from sequential to program, reconstruct a damaged disk, or find the load address of a particular file, a disk sector editor such as *Periscope II* comes in handy.

Bounce G-35
BEN CAMPBELL
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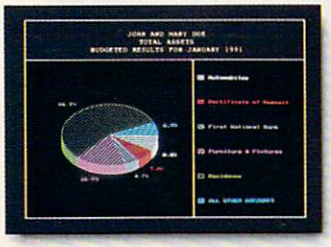

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AC Hunter
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ON THE COVER

Artist Doug Strothers used surface modeling techniques and a digital painting tool in creating *Dragonfly*, this month's cover art, on a Digital Equipment Micro Vax II.

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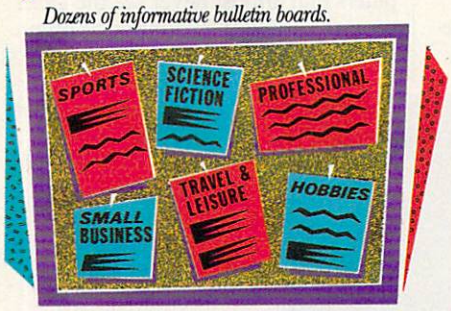

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EDITORIAL LICENSE

PETER SCISCO

A report from the desert. Not from the sands of Saudi Arabia (which, by the time you read this, I hope are empty of tanks and the talk of war), but from the sands of Las Vegas (quite literally, as the notes that construct this essay were scribbled in the corridors of the hotel that bears that name).

COMDEX is the biggest American trade show devoted to the personal computer. Ostensibly, it's held for computer dealers and large-volume computer buyers and serves as a place for those folks to meet, plan, plot, and deal with the biggest and smallest names in the computer industry. If you're looking for a new product, you'll find it here. If you're searching out the latest technological wrinkles, the halls are full of them.

November's show was remarkable for several reasons, and amid the hoopla emerged some genuinely interesting announcements, introductions, and partnerships. A lot of things happened behind the scenes that will have a direct impact on computer users at home. Hardware, software, and new directions competed for equal space in my imagination as I searched through the glamour and the glitz, the fancy booths and Hollywood stage productions.

On the hardware side, the most interesting announcement wasn't of a new high-speed computer network server, but of a single chip from Edsun Labs. With what the company calls "Continuous Edge Graphics," this chip is a direct pin-compatible replacement for the graphics chip used on VGA cards. What it does to VGA graphics is analogous to what nitro does to a modified stock dragster.

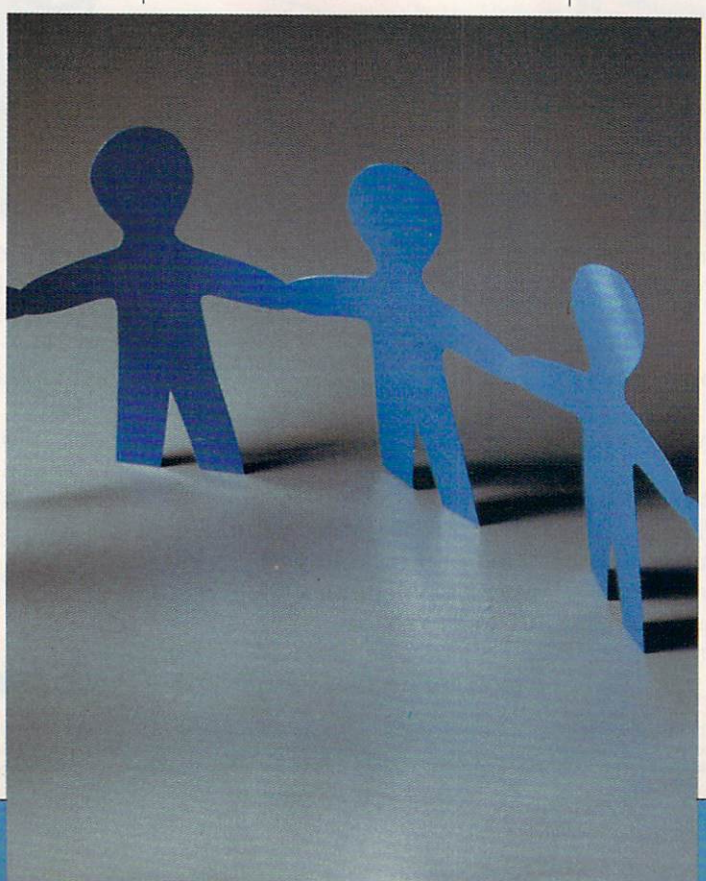
You don't need to replace your monitor or make any other changes to your basic hardware configuration to use CEG. All that's needed is to swap your board for one of the newer graphics boards due to come from major graphics card makers like ATI Technologies, Genoa Systems, Headland Technology, and others.

So who needs this kind of display—especially if replacement boards are going to cost just under $1,000? Desktop publishers, especially those looking to incorporate full-color images into professional documents, will certainly benefit. Designers, artists, engineers—anyone looking for the most accurate graphic detail once available only on a CAD workstation will reap benefits from CEG.

And the rest of us? Well, some computer makers, like Northgate, are planning to include the CEG chip in their newest machines. So if you're planning to upgrade to a top-flight system this summer, you might want to look closely at the various options in graphics boards.

Computer makers are also making some interesting moves on the software side. The show belonged, predictably enough, to Microsoft's *Windows,* which practically dominated the main floor. Targeted at computer users in corporate environments, Microsoft's GUI (Graphical User Interface) will eventually trickle down to the home front, given Microsoft chairman Bill Gates' announcement some months back that *Works,* his company's entry-level integrated software package, will be rewritten for *Windows.*

Expect to see *Windows* and DOS 5.0 on ROM chips as early as this summer, creating graphical personal computers that almost never see the DOS prompt. And don't count out *Ensemble,* an integrated GUI from GeoWorks, which finally hit the streets in mid December.



In June, *COMPUTE* will look at *Windows* 3.0 on the occasion of its one-year anniversary and will explore further the possibilities of graphical computing in the world of MS-DOS. Before that, however, PC Editor Clif Karnes will be exploring GUIs in a column to appear this May, "Point & Click."

Also in May, *COMPUTE* will examine the ill-defined world of multimedia. Associate Editor David English will explain what it means for you. Meanwhile, Gregg Keizer will report from the front lines of virtual reality.

So stay tuned as *COMPUTE* sails into new waters. There are definite surprises ahead. ⊡

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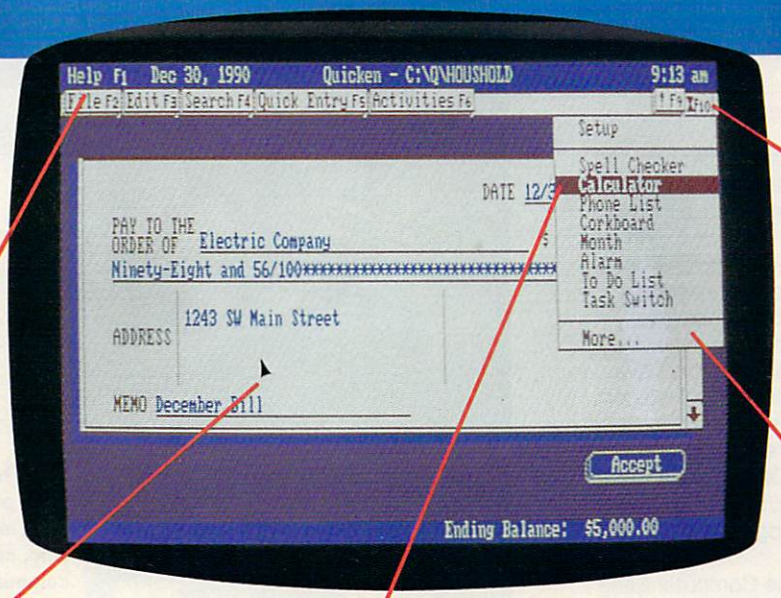

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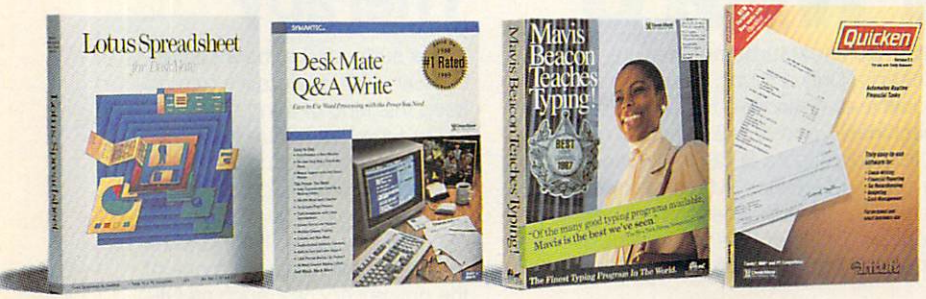

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NEWS & NOTES

Bridging the Gap

How do you bridge the generation gap and introduce computers to senior citizens? With Computer Ease, a highly successful program in which fourth and fifth graders tutor senior citizens one on one. The seniors find the program a great way to relate to technologically adept children. Responses have been enthusiastic, and many seniors have volunteered to monitor school labs or work with individual students. This joint effort of a senior center and city schools in Upper Arlington, Ohio, has promoted learning, friendships, and an appreciation for computer programs in the schools.

For a copy of the Computer Ease Program Manual, send a check or money order for $15 (made out to City of Upper Arlington) to Susan Drenning, Senior Program Coordinator, Upper Arlington Senior Center, 1945 Ridgeview Road, Upper Arlington, Ohio 43221.

MIKE HUDNALL

Top: The Computer Ease program encourages learning, friendship, and support for computer education in public schools.

Left: Senior citizens work one on one with 4th- and 5th-grade Upper Arlington students.

Less Is More

Think small businesses are lusting after the latest turbomonster machines? If so, it must only be in their hearts. Only a fourth of small businesses are estimated to be using a local area network—the specialized application that best favors 80386 machines—and only 39 percent of PC purchases over the next year are expected to be 80386 machines, according to the Business Research Group of Newton, Massachusetts. Well over half of the machines purchased by small businesses will be low-end 8088- and 80286-based machines. Sales of PCs to small businesses will account for $2 billion of the total PC market in the coming year.

Businesses of fewer than 100 employees employ nearly 40 percent of all private nonagricultural workers and represent 98 percent of all business enterprises. These small businesses are seen as a growth area for computer retailers and home-based consultants.

Small businesses are good customers of local computer stores, making 31 percent of their purchases there. Direct sales by manufacturers and distributors each account for 16 percent of purchasers.

ROBERT BIXBY

Group Therapy

It was supposed to be a secret, but with 1000 testers it's hard to keep this kind of thing quiet. Sierra On-Line has begun testing a new multiplayer game technology that will allow large groups of people to play its games simultaneously. You would link up with the other players through one of the online services, such as GEnie, CompuServe, or Prodigy. According to Anita Greene, public relations director for Sierra, the company is pleased with the results but won't comment on any future products that might use this technology.

DAVID ENGLISH

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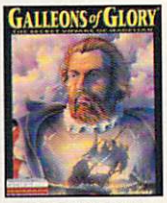

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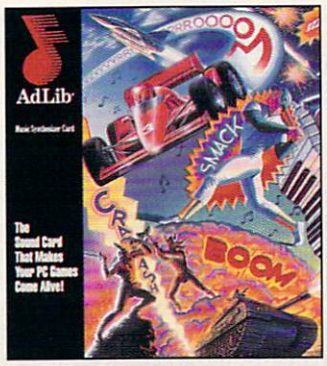

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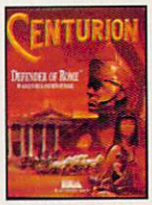

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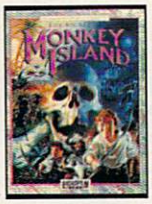

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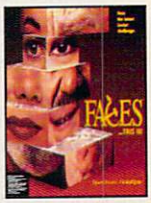

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LETTERS

Choice Sources

Could you tell me how to find copies of *College Explorer* and *The Perfect Career*, two of the award-winning programs in your January 1990 issue?

A. CHRISTE
COLUMBUS, IN

The College Board Publications offers College Explorer, *now in version 3.0, for $59.95. If you have a credit card, you can order by calling (800) 323-7155. For the 5¼-inch MS-DOS version, request item 00388l; for 3½-inch disks, the number is 003861. It also comes in an Apple edition: 003848 for 5¼- and 003845 for 3½-inch disks. You can also call the regular customer service number, (212) 713-8165, or write The College Board Publications at Box 886, New York, New York 10101-0886.*

Mindscape's The Perfect Career *has been discontinued, but some copies of the Apple version of the program are available through The Software Toolworks. For more information, write to The Software Toolworks, 60 Leveroni Court, Novato, California 94949. Or you can phone The Software Toolworks at (415) 883-3000.*

Perfect Importing

I really enjoyed Marvin Osaki's review of *Express Publisher* in your October issue of *COMPUTE*. However, I'm puzzled by his claim to have imported *Word Perfect* 5.0 (.WPG) graphics files. I would like to know just how Mr. Osaki did it.

R. S. REICHERT
BREVARD, NC

Marvin Osaki responds:
*I goofed. Instead of .WPG (*WordPerfect *Graphics format), I meant to indicate .GIF (CompuServe Interchange Graphics Format).*

If you've had trouble converting pictures for use in Express Publisher *or any other DTP program, check out the many graphics-conversion utilities available on CompuServe in the Format Conversion Library of the Graphics Support Forum (GO GRAPHSUP). One shareware utility I found especially useful is* VGACAP, *a memory-resident utility that captures and saves VGA and SVGA pictures with up to an 800 × 600 pixel resolution and 256 colors. A program called* VGAFIL, *which comes with* VGACAP, *converts pictures captured with* VGACAP *into .PCX or .GIF file formats. If you aren't a CompuServe subscriber, you can purchase* VGACAP *and* VGAFIL *for $27.95 from Marvin Gozum, 2 Independence Place #1105, Philadelphia, Pennsylvania 19106.*

The New Computer Market

"Editorial License" on page 6 of the October issue was great. I got quite a chuckle out of it. In it, you contended that the "computer's potential is no longer limited to . . . propeller heads, game players, . . . and electronic hobbyists. . . ."

Really? That same issue of the magazine contains 46 full-page ads, by my count, for individual computer software packages that we "40 million American households" should presumably have for all those computers we're going to buy during the 1990s. Of those, 36 (nearly 80 percent) were for "games" (in the computer world, apparently, the accepted term for bigger and better violence in brighter colors). These intellectual pursuits include such edifying exercises as putting Joan of Arc's nose on Napoleon's face, "having your body drained of blood," or experiencing the "raw emotion and harrowing danger" of air combat over Vietnam. Four of the remaining offerings dealt with sports.

It does not appear that your advertisers are quite up to speed with the editorial viewpoint.

Or were you serious?

R. L. NAILEN
HALES CORNERS, WI

continued on page 60 ▷

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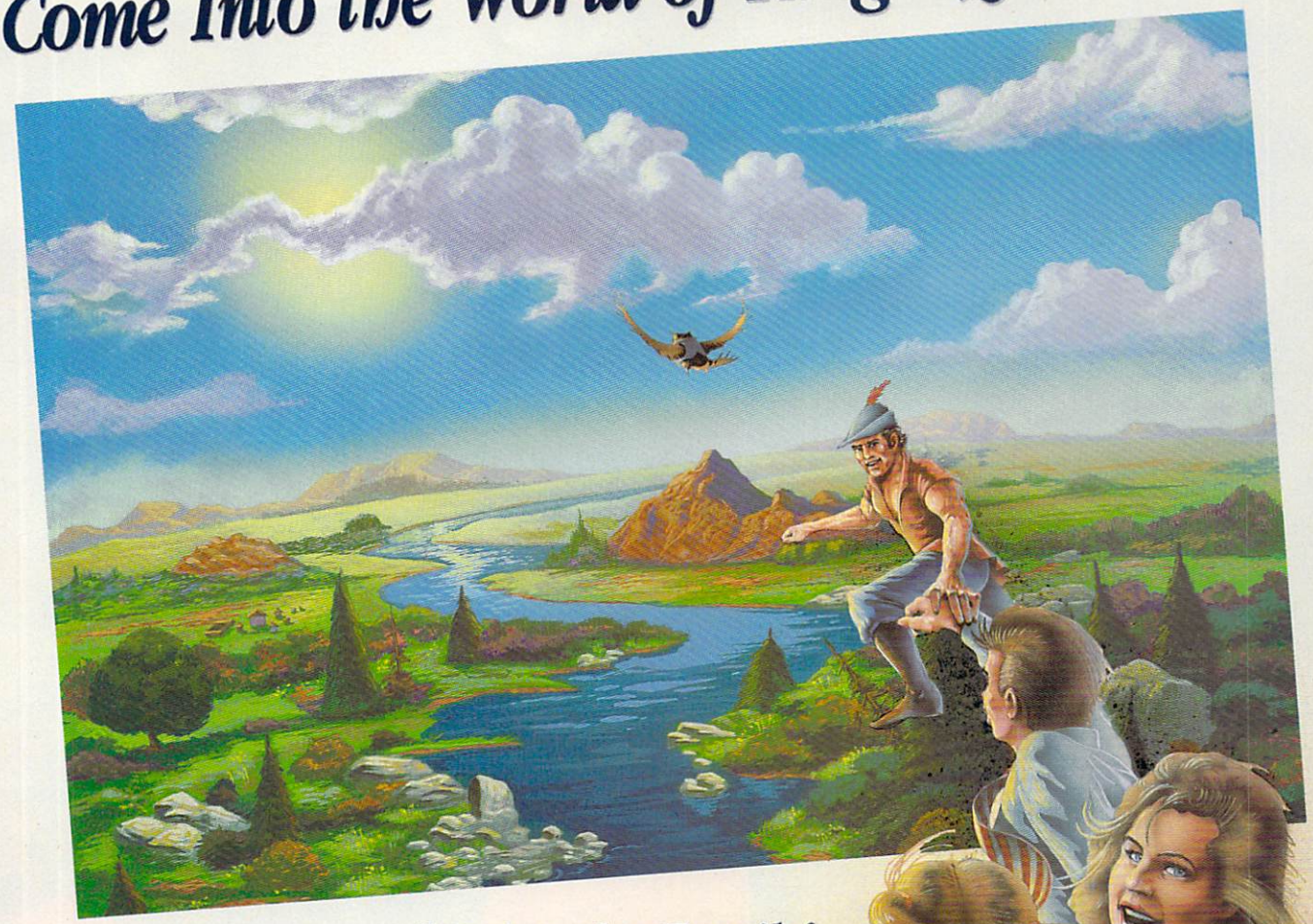

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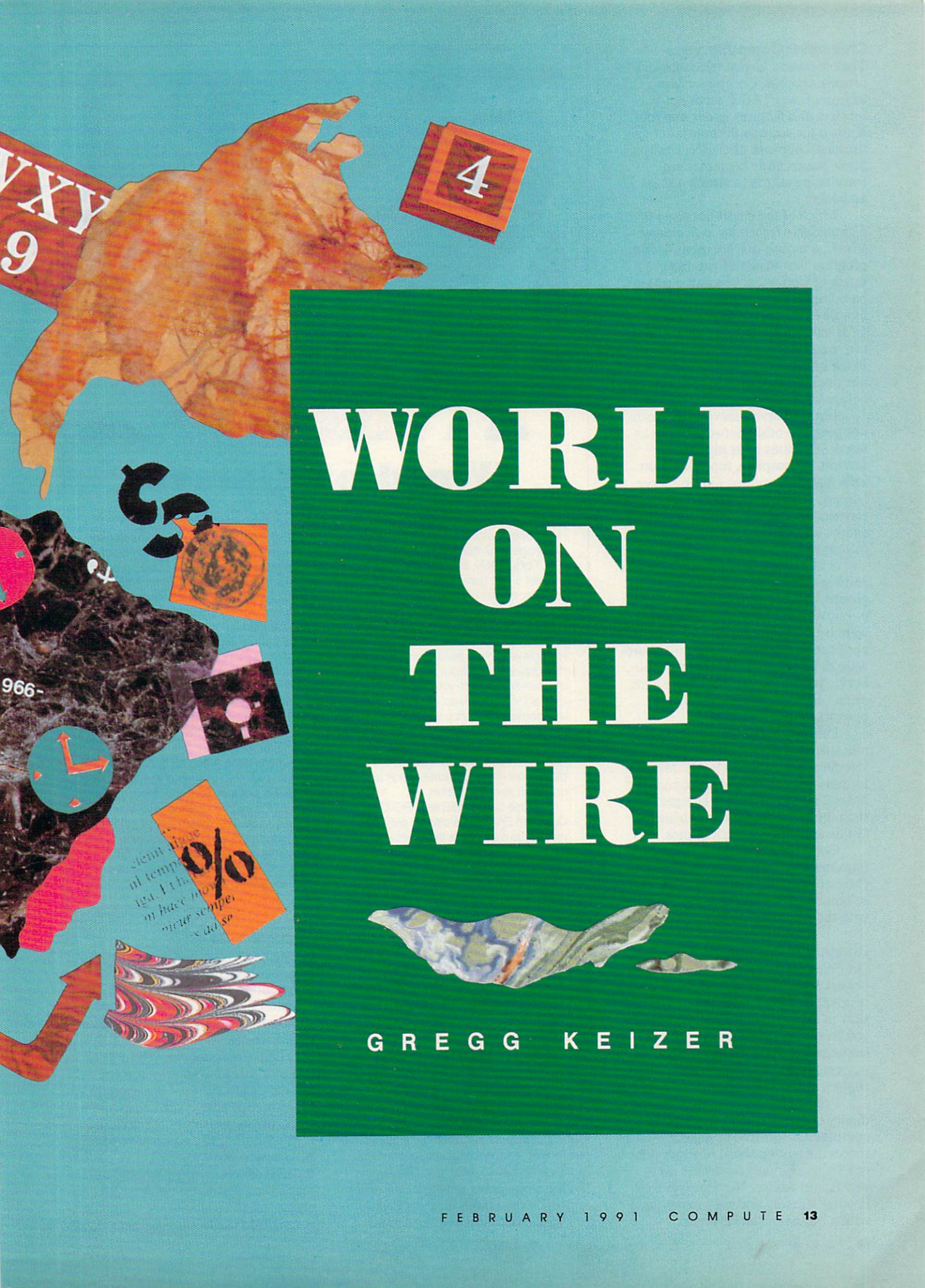
Telecommunications—connecting PCs with huge, remote computer systems via a modem and the phone line—is the network of the 1990s. Like cable television and the VCR of a decade ago, telecommunications and computers are poised to explode into the mass market.

New, intuitive, and graphical interfaces make telecommunications much easier. Also, price reductions and the spread of flat-fee rates now make constant connecting economical.

Five major telecommunications networks compete for your interest. Each network puts its own spin on the process and provides a different menu of services.

This guided tour gives you a preview of the networks. Pick one, or more, and jack your PC into the phone line for telecommunicating pleasure.▷



WORLD ON THE WIRE

GREGG KEIZER

Channel 1: CompuServe

The oldest and largest telecommunications network, CompuServe is a collection of over 14,000 separate services and features under one roof. Known for years as the computer enthusiast's network of choice, CompuServe has recently been making convincing efforts to attract a mass audience.

Much of the credit has to go to *CompuServe Information Manager (CIM),* a mouse-driven, menu-laden program that insulates you from much of CompuServe's dated text-based operation. Although it can't handle every part of CompuServe, *CIM* lets you get online quickly and move easily from place to place within the network. *CIM*'s only flaw (a minor one) is a tendency to connect before you're ready.

CompuServe's services are without peer. No other network offers as many selections or as much information. A complete, top-to-bottom information provider, CompuServe lets you gather stock quotations, order transcripts from most television news shows, and share experiences and information.

Still, CompuServe's strength is its software libraries. Special interest groups, called *forums,* pigeonhole public domain and shareware software by computer type and software application. Since no ambitious shareware developer dares ignore CompuServe, you'll find great software here, often before it appears on other networks.

Unfortunately, CompuServe's rate structure hasn't caught up with its interface. You still pay by the minute for network access, and surcharges are heaped on top of regular charges for such things as the Official Airlines Guide and current stock quotes.

CompuServe's minute-by-minute rates make it the most expensive choice by far. But CompuServe can't be ignored. It's the biggest network with the widest range of services.

Channel 2: Prodigy

Graphics galore mark Prodigy as the newest network around. Heavily dependent on a picture-based look and slow in delivering information (unless you have a fast modem), Prodigy is leading all the rest of the services toward cable TV–like flat-rate monthly charges and easier-to-use interfaces.

Prodigy knows its audience—ordinary consumers who think of the computer as tool and appliance—and serves it a smorgasbord of shopping, news bites, E-mail (electronic messages), and advice. Novices will find Prodigy friendly and easy to navigate with a mouse or the keyboard.

Only $12.95 per month provides unlimited access to everything Prodigy carries. And the list is impressive. Prodigy is best at providing lifestyle services like online shopping and banking.

Though Prodigy raised its rates (from $9.95 to $12.95 per month) when it went national (and reportedly raised some users' tempers when it began charging 25 cents for each message after the first 30 per month), new features such as an electronic encyclopedia and a movie database make the increase easier to swallow. Prodigy is the least expensive network. No other network even comes close to Prodigy's ease of use and graphic appeal.

Channel 3: GEnie

GEnie has always had a warmer, more personable feel than CompuServe. Subsections are called *round tables,* the games arena is extensive, and some special interest areas are downright friendly.

Like CompuServe, GEnie puts text, not pictures, on your screen. Unlike CompuServe, GEnie's numbered menus always offer help and a clear way to return to the previous menu—both make navigation somewhat easier. Still, you've got to wade through several screens before you reach your destination unless you memorize the page number that takes you right to the feature. GEnie's *Alad-*

Wired on Games

There's more to the networks than news briefs, stock quotes, and zipping electronic mail from coast to coast.

Fortunately, every network harbors at least a few games, puzzles, brain-teasers, or just plain silliness to keep you entertained.

The best game network is GEnie, primarily because of *Air Warrior,* its multiplayer online aerial-combat game that drains hours from your schedule and ten-spots from your wallet faster than a P-51 can climb. *Air Warrior* is an awesome experience when you're mixing it up with half a dozen other players from across the nation. Other GEnie games of note include a clutch of multiplayer role-playing games, such as *Federation II* and *Gemstone.*

Close behind GEnie is PC-Link. *Quantum Space* is a classic play-by-electronic-mail game that gets you making deals, swapping enemies, and stabbing backs as you forge a future in the universe. *Rabbitjack's Casino* is loads of fun; you download special software and then head to the tables to play high-resolution blackjack and poker or to the slots for some arm-bending action. But I pick PC-Link's *Franchise Football* as that network's most fun for the dollar. You select teams through imaginary drafts of real players and then set your team against others.

CompuServe deals only with text-based games, and its high rates make game time expensive, but *MegaWars* and *Sniper!* are two games you should check out for some anxious moments in future space and on the ground during World War II.

Online games can be habit-forming—so much so that you have to watch the clock or you'll be floored by the tab. It's no coincidence that flat-rate networks relegate their most popular games to their per-hour rate areas. Electronic entertainment is great fun, but it's still one of the most expensive ways to amuse yourself.

IN 1972, AN ELITE AIR CORPS FLEW OVER VIETNAM. FLY WITH THE BRAVE AND THE BOLD.

Feel the adrenaline kick in as you scream down the carrier runway. You're up! And so is your squadron of F-4's. Now nothing can stop you —except the deadly fire from those MiG 21's, SAMs and anti-aircraft flak.

Experience the raw emotion and harrowing danger of intense air combat over North Vietnam in this simulation based on Stephen Coonts' best-selling novel, *Flight of the Intruder*. Authenticated by Vietnam pilots who flew in the Linebacker Campaign of 1972, you won't find any other simulation so like the real thing.

Off you go to adventure, danger and excitement.

Zero in on the MiG, before he zeros in on you.

Mission accomplished! Now back to Yankee Station to plan your next attack.

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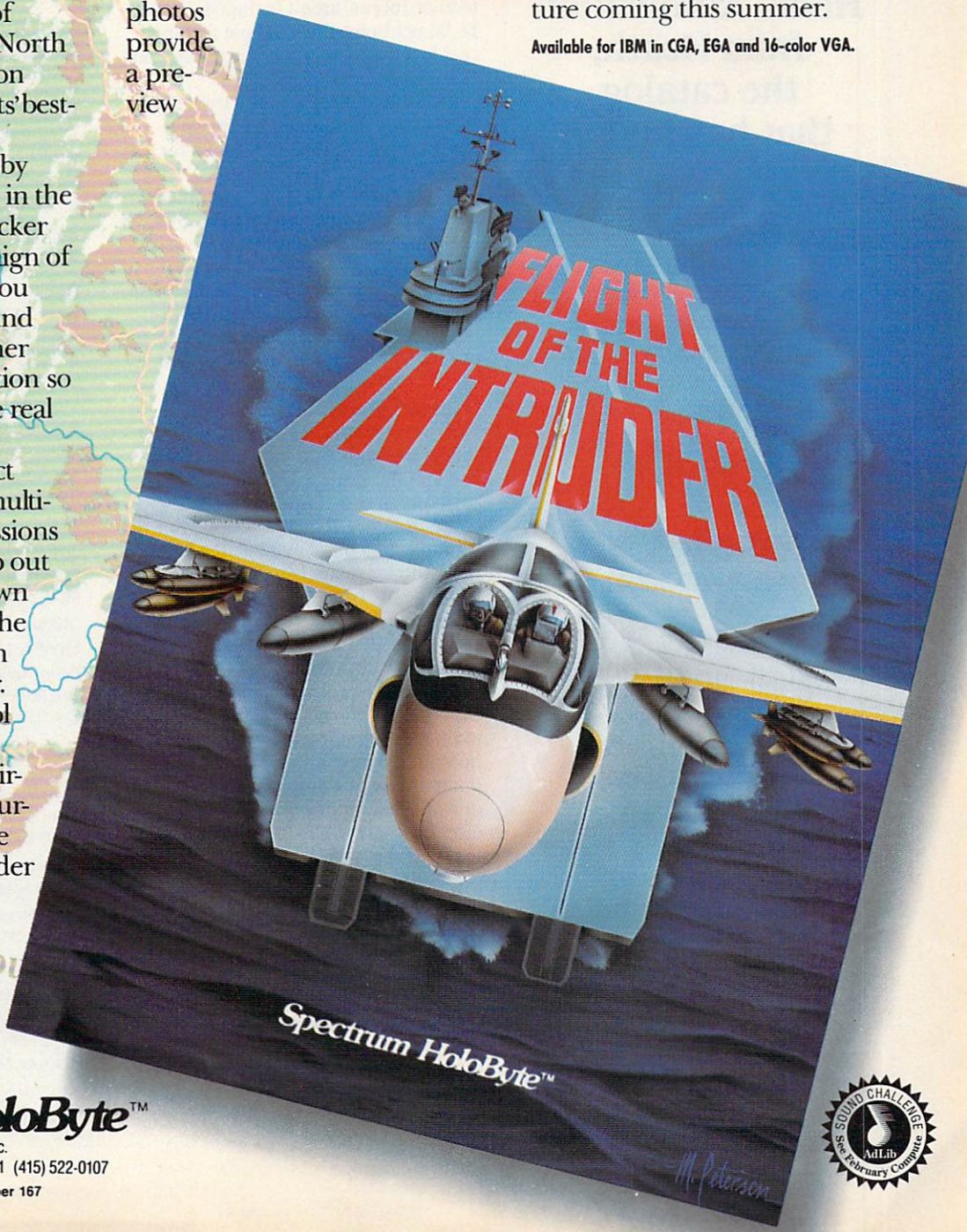

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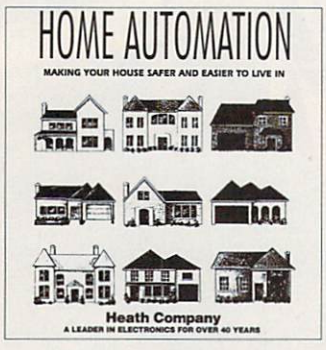

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CL-807 Circle Reader Service Number 160

din software helps. This free program (you download it from GEnie) calls up the network, sends you directly to the area you want, and even retrieves E-mail and new messages. *Aladdin* can't match *CompuServe Information Manager* for ease of use, but it takes some of the sting out of GEnie's text-based operation.

Price is where GEnie shines. This network has always been less expensive than CompuServe, and a rate restructuring last fall made it even more attractive. A flat $4.95 a month buys access to more than 100 services, including many essentials like E-mail, the online encyclopedia, airline reservations, and truncated news and weather information. The really enticing parts of GEnie, such as the computer round tables, the multiplayer games, and the realtime chat and conference rooms, aren't included, but at $6.00 per hour, those GEnie features cost less than half the price of those on CompuServe.

GEnie is started in the right direction, though the flat fee doesn't cover enough to make the $4.95 the only telecommunications outlay you'll make each month. Combined with its broad range of services, this foray into flat-rate telecommunications marks GEnie as a network to watch. GEnie may not be much easier to use (actually less easy if you compare *Aladdin* with *CIM*), but it's a less expensive alternative to CompuServe.

Channel 4: Delphi

The only network that doesn't insert a software interface to mediate between you and the system, Delphi offers the basics in an easy-to-navigate text-based interface. Though you move from place to place by selecting from the standard menu lists, in Delphi you just type the first few letters of your choice. That means more typing, but you'll quickly feel comfortable with the English commands.

Delphi handles the telecommunications staples—news, weather, E-mail, travel, conferences, stock quotations, games and puzzles, computer advice and software ready to be downloaded, online shopping, and electronic encyclopedias. Don't look for much beyond those essentials. The shareware and public domain libraries in Delphi, especially in the PC Compatibles/IBM Group, are well stocked but not as extensive as those in CompuServe or even GEnie.

Bright spots in Delphi's offerings include travel (there are three services that make plane reservations), two ready-to-read encyclopedias, and a topnotch science-fiction special interest group manned by professional writers and loved by fans.

Delphi has left high prices behind. You can connect for as little as $1.00 per hour with the network's 20/20 Advantage plan, which gives you 20 hours of access time a month for only $20.00. Or if you're a light user, you can opt for the basic program, which has rates comparable to GEnie's: Pay the $5.95 monthly fee (which gives you 1 hour of time); then pay $6.00 per hour for any additional time. Only Prodigy is cheaper, but the comparison isn't quite fair since Delphi lets you download software, a popular pastime among users of networks like CompuServe and GEnie.

Delphi isn't an alternative to CompuServe or GEnie, but it can be a replacement if you scale back your telecommunications expectations. This network takes good care of you if you're looking for the basics. ▷

Channels for Change

CompuServe
5000 Arlington Centre Blvd.
Columbus, OH 43220
(800) 848-8199
Startup: $39.95
Monthly Minimum: $1.50
Price/Hour (prime/nonprime): $12.80/$12.80

Delphi
3 Blackstone St.
Cambridge, MA 02139
(800) 544-4005
Startup: $49.95
Monthly Minimum: $5.95 (Basic Plan), $20.00 (20/20 Advantage Plan)
Price/Hour (prime/nonprime): $16.00/$6.00 (Basic Plan), $10.20/$1.20 (20/20 Advantage Plan)

GEnie
401 N. Washington St.
Rockville, MD 20850
(800) 638-9636
Startup: Free
Monthly Minimum: $4.95
Price/Hour (prime/nonprime): $18.00/$6.00 (for services not under the Star*Services plan)

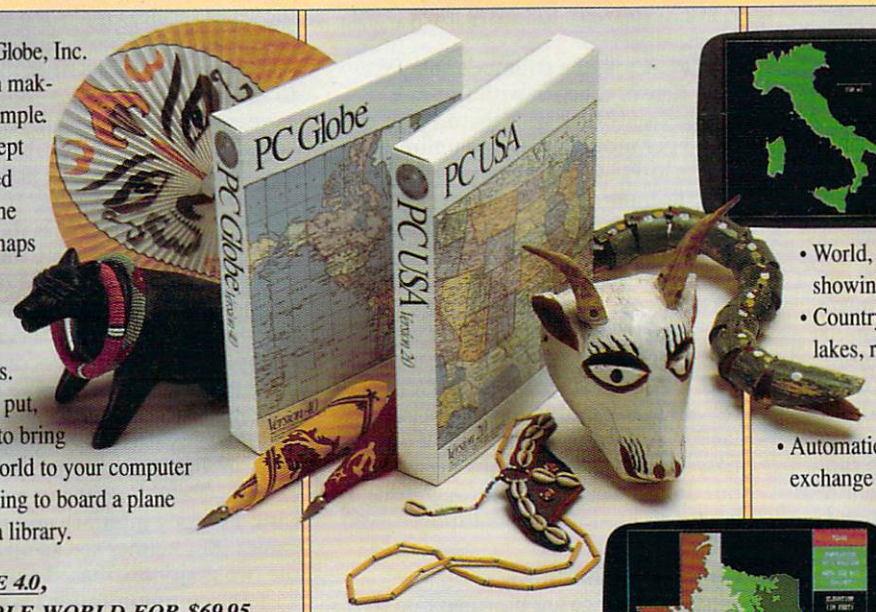
PC-Link
Quantum Computer Services
8619 Westwood Center Dr.
Vienna, VA 22182
(800) 458-8532
Startup: Free
Monthly Minimum: $9.95
Price/Hour (prime/nonprime): $15.00/$6.00 (PC-Link Plus services)

Prodigy
445 Hamilton Ave.
White Plains, NY 10601
(800) 776-3449
Startup: $49.95
Monthly Minimum: $12.95
Price/Hour (prime/nonprime): Free/Free

THINK OF OUR SOFTWARE AS AN ENDLESS SUPPLY OF FREQUENT FLYER MILEAGE.

At PC Globe, Inc. we thrive on making things simple. It's the concept that's allowed us to combine traditional maps and geography with world facts and statistics.

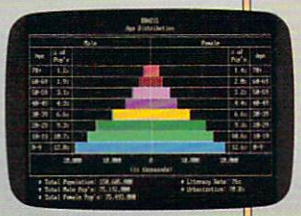
Simply put, you're able to bring the entire world to your computer without having to board a plane or manage a library.



PC GLOBE 4.0, THE WHOLE WORLD FOR $69.95

Here, in the efficient space of a few diskettes, is a simple to use "electronic atlas" that provides instant profiles, detailed maps and enhanced graphics for 190 countries and dependencies. What would ordinarily take hours to research becomes accessible in the split second it takes to press a button.

An almost endless combination of data may be displayed on detailed maps or via colorful bar charts.



What's more, PC Globe software supports popular programs for creating graphics and preparing text.

PC USA 2.0, DISCOVER AMERICA

Packed with many of the same features as PC Globe 4.0, PC USA provides current and historical information for all 50 states and Puerto Rico. Included is a self-updating time zone map, detailed state and city data, colorful state flags and songs. It's as if you could take a tour of the states without ever leaving your chair.

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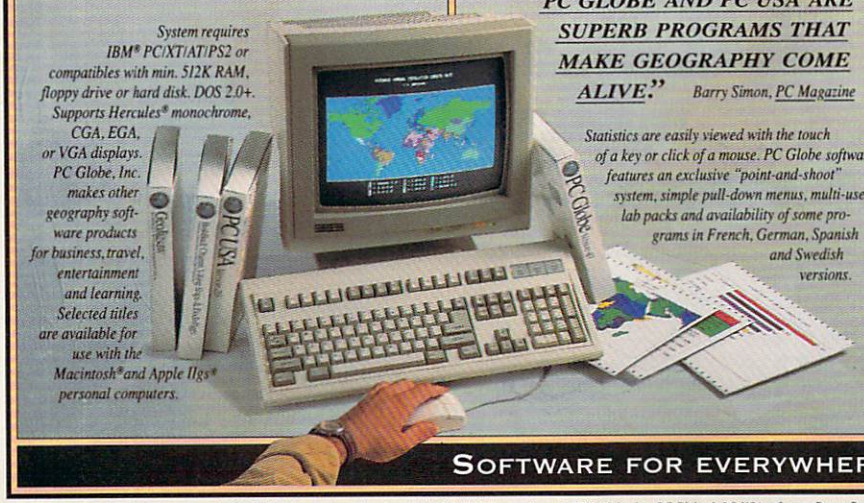
System requires IBM® PC/XT/AT/PS2 or compatibles with min. 512K RAM, floppy drive or hard disk. DOS 2.0+. Supports Hercules® monochrome, CGA, EGA, or VGA displays. PC Globe, Inc. makes other geography software products for business, travel, entertainment and learning. Selected titles are available for use with the Macintosh® and Apple IIgs® personal computers.



"PC GLOBE AND PC USA ARE SUPERB PROGRAMS THAT MAKE GEOGRAPHY COME ALIVE." *Barry Simon, PC Magazine*

Statistics are easily viewed with the touch of a key or click of a mouse. PC Globe software features an exclusive "point-and-shoot" system, simple pull-down menus, multi-use lab packs and availability of some programs in French, German, Spanish and Swedish versions.

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Channel 5: PC-Link

Toss pull-down menus and mouse control in with a broad range of PC-specific telecommunications features, and you've got PC-Link, the Tandy-sponsored network. PC-Link's special telecommunications software leans heavily on Tandy's *DeskMate*, a clean-cut, low-end graphical interface that looks dated when compared to Prodigy or *CompuServe Information Manager*. But then, time on PC-Link costs less than half that on CompuServe; and though it's poky here and there, it breezes by Prodigy in any race.

From registration to sign-on to day-to-day viewing, PC-Link makes extensive use of menus and pop-up text boxes to simplify your telecommunications experience. Help is always available, and most sections have a how-to item to fill in specific details. Everything you need to run the network is on pull-down menus. If you have a mouse, you'll point and shoot your way through the network easily. Even on the keyboard, PC-Link is the easiest network to navigate, next to Prodigy. The only complaint of substance is the herky-jerky way text flows onto the screen at 1200 bps.

PC-Link is a solid network, with news, sports, entertainment, financial, travel, software, E-mail, and more—all the basics you expect. More than 500 demos of commercial software are ready to be downloaded, and there's enough shareware and public domain software to satisfy most PC users.

PC-Link, the country's sole PC-only network, began with flat-rate charges and stuck with them. Your $9.95 per month gives you unlimited access to PC-Link, the basic set of telecommunications features. The extended set, PC-Link Plus, costs an extra $6.00 per hour (but you get one hour free each month). You'll spend most of your connect time in PC-Link Plus, where you can download software, send E-mail, play online games, and chat with other PC-Link viewers.

PC-Link's advantage is its interface. If you want the features of a text-based telecommunications network but don't want to work through text to get them, PC-Link is a natural.

Changing Channels

Winds of change are blowing: rate reductions, flat-rate service, beefed-up features, graphical interfaces, gung-ho games that keep you glued to the screen and modem, and more.

Telecommunications is transforming itself from a hacker's social hall into an information provider for the masses. Along the way, the five networks duplicate each other here, distinguish themselves there.

Prodigy's low price and fascinating set of services make it a must-have for any home PC user. But it leaves out too much—necessities like access to shareware and public domain software, sophisticated forums of knowledgeable PC owners, flexible E-mail, and fax capabilities. You need another network to fill the gaps. If money is no object, CompuServe is the pick. Unfortunately, it's simply too expensive for many. That's why I'd choose GEnie. GEnie may not have the same quantity of features and services as CompuServe, but its low cost—a third to half of CompuServe's—more than makes up for its deficits. Delphi and PC-Link each have something to recommend them as your channel of choice—Delphi's low cost and PC-Link's snappy interface and funky games. But neither stacks up against the two major text-based networks.

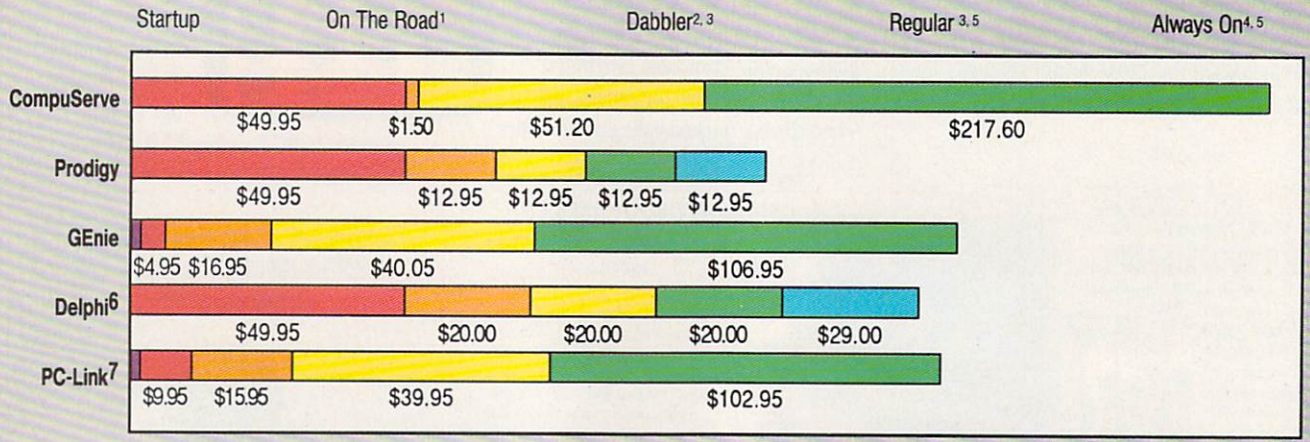
Telecommunications is heading in the right direction—down the same road cable TV and the VCR took ten years ago. Your TV is already wired to the world. Now it's your computer's turn. ⊡

Tale of the Tab

Four of the five networks now use a flat-rate fee structure (I consider Delphi's 20/20 plan a flat fee, since few users spend more than 20 hours per month on a network). At the same time, all but one network charges at least some time by the hour.

These three typical telecommunications users dramatically illustrate real-world costs. Though you could restrict yourself to the flat-fee services in GEnie and PC-Link, it's unrealistic to assume you'll spend most of your time there.

The figures assume you're using a 2400-bps modem, calling within the continental United States, and accessing the network through a local number.



[1] Temporarily not using the service
[2] One nonprime-time hour per week
[3] Two nonprime-time hours per week
[4] Four nonprime-time hours per week plus one prime-time hour per month
[5] First two hours each month in flat-fee features (if available), additional hours in the extended service features
[6] Calculated using the 20/20 Advantage Plan
[7] Includes one free nonprime-time hour of PC-Link Plus each month

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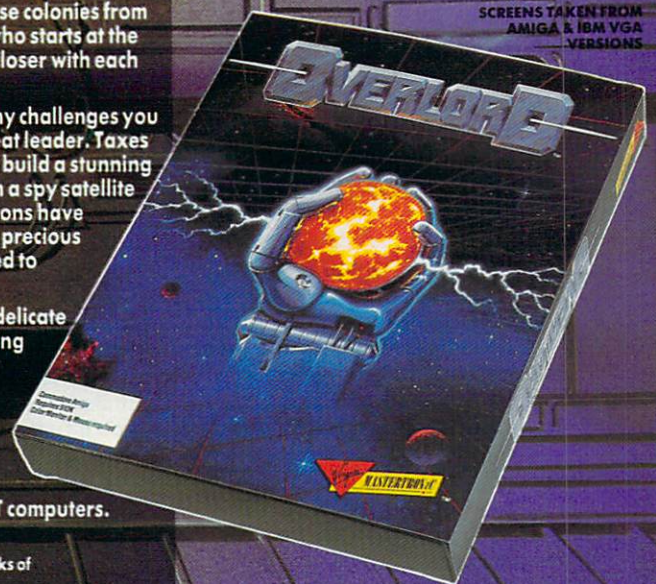

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Circle Reader Service Number 122

SHAREPAK

RICHARD C. LEINECKER

When you bought your computer, you made a list of things you'd do with it so everyone would be convinced you were making a wise purchase. Make good on your resolutions with this month's *SharePak*. It's packed with programs that will edify and entertain active minds. These programs put a wealth of information at your fingertips and bring you more closely in touch with the world around you.

If you had to scour the online services for these same programs, you'd pay many times the price of this month's disk. We pay the online charges, and we devote hundreds of hours to screening programs so that you can have the very best for your software collection.

Our United States

How much do you really know about your own country? Can you spout facts about the good ol' U.S.A. with authority and assurance? Or does your command of the facts leave—ahem—something to be desired? Develop your knowledge of landmarks around our country. Go even further and have a great time learning and impressing friends and family by playing *Our United States*. It's a terrific trivia-style game about our country.

Sure—you could buy a board game or use flash cards. But this game's colorful screen effects and distinctive sounds make playing and learning much more fun. Each problem has a time limit that's depicted toward the top of the screen as a decreasing bar graph. The problem timer adds just the edge needed to keep your adrenaline flowing, your heart pumping, and fun-filled excitement coming in waves.

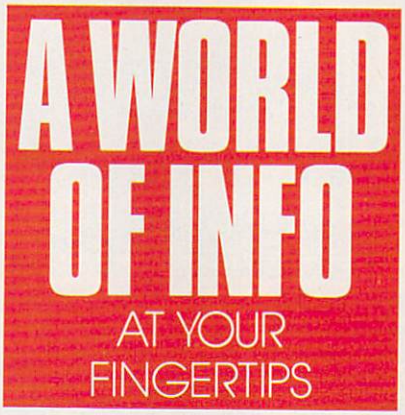
If you're smart enough to get an answer right, the game offers you some extra tidbits of trivia on the screen. Answer quickly and correctly, and you'll qualify for bonus points.

You'll find that the game is easy to play. All of the instructions fit in one help screen that you can view with the press of a key. And if your score is high enough, you'll qualify for the high-score list. Then your friends and family can try to beat your score and earn a higher rung on the list of all-time great players.

Trivia Whiz

Those trivia board games are hard to beat for fun and entertainment. But you can't always find people who have the time when you have the itch to play. That's where *Trivia Whiz* comes in.

When the urge strikes, just turn



on your computer and run *Trivia Whiz*. Colorful, well-planned menus give this program a truly professional look. Questions appear randomly on a variety of topics such as sports, general interest, and science. A timer gives you just enough time to think (a few seconds) but not enough time to dwell on any one question.

Don't worry if you're a little rusty. There's a nice mix of easy and hard questions. And if you play long enough, you'll find that there's nothing trivial about how much you've learned and how adept you've become at answering these questions. If you prefer to focus on certain subjects, you'll find a good mix of those, too; so you'll get plenty of what you want.

For exciting fast-paced trivia action that will make you a quiz whiz, this game is a must.

Word Whiz

Like body language, your vocabulary reveals more about you than you might be aware of. Are you well educated, ambitious, polite, or aggressive? Mastery of the language gives you a substantial advantage as you present yourself—and as you analyze others. *Word Whiz* will advance you toward that goal.

More than just a vocabulary drill program, *Word Whiz* is an effective and entertaining game. It keeps score and even gives you bonuses for doing well. This easy-to-use, professional-quality program will keep you and your family on the edge of your seats for hours.

If you want to knock 'em dead with your brilliant vocabulary or just have some fun learning more about words, this program will give you hours of satisfaction.

The World

Imagine the world at your fingertips. Now you can have it with this comprehensive world map, atlas, and information program. Plan your vacation, do research, and prepare school assignments with this feature-packed package.

The choices seem endless. View a specific latitude and longitude, see an entire area of the world, look for a city and state in the United States, view cities of note, and find capitals of every nation. There's something for everyone who has a geographical question.

You can get plenty of information by pointing to a spot on the world map and pressing Enter. You'll see a blowup of that area with information about it. If you keep pressing Enter, the area will become more and more magnified, giving you a detailed view of a small area.

For the geographically curious and the scholastically inclined, this program will fill an important need. You won't have to wonder where Madagascar and Malaysia are anymore; just use *The World* to easily find and learn more about them. ⊡

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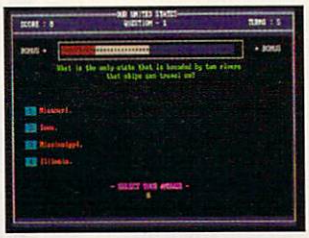
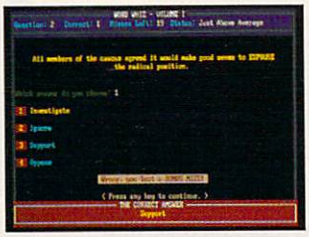
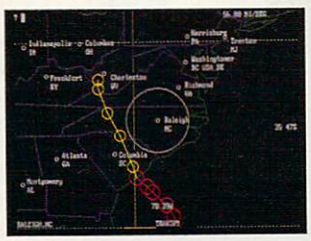


Our United States

Trivia Whiz



Word Whiz



The World

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BIT$, BYTE$, AND BUCK$

SAVING TIME AND MONEY ONLINE

DENNY ATKIN

Online services are fascinating to newcomers. If you haven't been online before, you'll be overwhelmed at the number and range of people across the nation—and around the world—with whom you can communicate. You'll also be amazed at the wealth of information and software you'll be able to access. If you're not careful, though, what you may find most astounding is the sudden upsurge in your VISA bill.

Some Enchanted Evening

It's easy to spend an entire evening exploring your favorite telecommunications service, but there are a number of reasons to limit your online time.

The first and most important reason is the expense. Some services (such as Prodigy and GEnie's Star*Services) bill at a flat fee, but most charge an hourly rate. Every extra minute you spend online will show up on your bill. And even if you use a flat-rate service, your family will probably be irritated if you tie up the phone all night.

Using a combination of shortcuts, special software, and common sense, you can significantly reduce the time you spend online.

Gearing Up for Speed

Perhaps the most important thing to remember is that you can do many of your online tasks offline. Unless you're still hanging onto your vintage 300-baud modem for sentimental reasons, chances are good that your computer can talk to your online service much faster than you can type. Why spend time hunting and pecking online? Your computer can zap information to the host network as fast as the host can accept it.

In the early days of computing (the 1980s), you'd usually spend $20–$30 just learning how to get around the system. Now, long after graphical user interfaces have appeared on every computer, they've finally come to the online services.

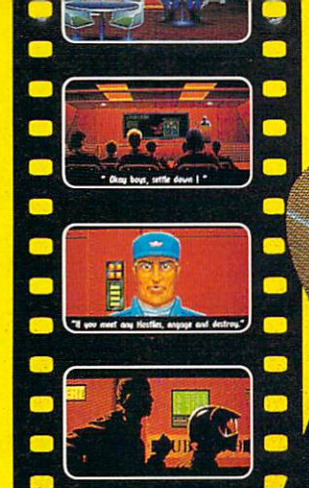
Called *front ends,* these programs work just like GUIs to isolate you from the low-level commands usually needed to navigate online services. For example, instead of having to remember a special code such as M 555;1 to get to your favorite message base, you simply select it by name from a menu.

Another way front ends help is by minimizing connect time. Instead of wading through a list of new downloads one by one, you can have the front-end program grab the list and log off. Then you select the programs you'd like to download. The front end automatically logs on, downloads the selected files, and logs off.

Front ends save even more time in message bases. After you've set up your front-end program by letting it know which message bases you like to read, the program logs onto the network, captures all new messages nonstop, saves them on disk, and logs off.

This allows you to read individual messages offline at your leisure. No more skimming through messages because the clock is ticking. If you see a message you'd like to respond to, choose a menu item, and you'll find yourself in a text editor. The message you're responding to is displayed at the top of the screen for reference. Simply compose your reply and save it. Continue this till you've read and replied to all the messages.▷

M. ANGELO/WESTLIGHT



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The front-end program will then log on, post all of your responses, optionally grab all new messages, and log off. You end up paying for a fraction of the time you would spend online under ordinary circumstances.

Heavenly Hosts

Not all hosts have front-end programs. GEnie currently offers *Aladdin* free of charge (you pay only for the download) to all of its MS-DOS and Atari ST users, and it has versions for other platforms in the works.

CompuServe offers the *CompuServe Information Manager (CIM)* for $24.95, including $15.00 worth of free connect time, for MS-DOS and Macintosh computers. *Whap!* offers similar functionality for CompuServe's Amiga users for $39.94.

Quantum's online services (PC-Link, America Online, and Quantum-Link) can *only* be accessed through special front-end programs. Although Prodigy requires a proprietary terminal program to access the service, the software doesn't allow the user to process information offline.

No complete front-end programs are available for American People/Link, but Amiga owners can use the shareware BSHELL *ARexx* program and the *Baud Bandit* terminal program to take some of the manual labor out of their downloads.

Getting Around

If you don't have a front-end program or if you want to stick with your favorite terminal software, there are still many ways to speed up your online sessions.

You spend a lot of time online just getting from one area to another, especially if you wade through the system's menus each time you log on. Almost all online services provide ways to quickly jump to a specific area, bypassing all of the menus.

Suppose you wanted to find hints for the frustrating adventure game you just bought. To get to the Gamer's Forum on CompuServe, you could work your way through four levels of menus, or you could just type GO GAMERS at any prompt. On GEnie, you could type M 805 or SCORPIA at any prompt to get to Scorpia's Game RoundTable.

When you find an area online that you think you'll come back to, write down the name (or page number, in GEnie's case) of that area. That way you can go directly to that area next time, saving valuable minutes of connect time.

If your terminal program offers programmable function keys, programming keys for each area you usually visit is a great way to navigate. I program F1–F10 to take me all the way through my session. F1 contains my user name and password, and F2–F9 are programmed with the page numbers of areas I commonly visit. F10 contains the log-off sequence for that network. That way I don't even have to spend time looking for a sheet of paper containing the page numbers.

Making the Capture

You don't need to have a front-end program to respond to messages offline. All you need is a terminal program that will capture incoming text to an ASCII file and send ASCII files to the online service.

Simply log on to the service, move to the message base, and open your capture file. Give it an appropriate name; if you're capturing messages from the IBM support group on Christmas Eve, you could name the file IBM1224.CAP. Make sure your terminal settings on the network are configured so that the service doesn't pause at the end of each screen of text. This is usually accomplished by setting your screen height to 0 rows or by setting your terminal type to TTY (TeleTYpe).

Once you're in the message base with your capture file open, choose the *read all new messages* option. The messages will scroll by and be captured to disk much faster than you can read them. Once the messages stop, close your capture file. Repeat this process for each message base you wish to read; then log off.

The easiest way to compose your responses is to use a word processor or text editor, like *Microsoft Works* or *TurboText,* that lets you have more than one file open onscreen. Load the capture file in one window, move it to the top of the screen, and open an empty document in a window at the bottom. As you read the messages in the top window, you can compose your replies in the bottom window. Save each reply in a separate file with an appropriate name. Make sure you save the file as ASCII or TEXT, because the special codes your word processor uses will confuse the online service. Once you've written responses to all the messages, log back on, move to the message bases to which you wish to respond, and post your messages. When the network's editor prompts you to begin typing, use your terminal program's ASCII Send feature to send the text. You may need to slow down the ASCII send, as the network may be expecting a slower human typist. You can slow data transmission with a command in most terminal programs. Look for an adjustment with a name like ASCII Send Speed or Character Delay.

Following Protocol

You can save downloading time simply by using a faster file-transfer protocol. While most networks support XMODEM, it's one of the least efficient transfer protocols available. After XMODEM sends 128 bytes of data, it has to stop and wait for confirmation before sending the next block. This adds a lot of overhead, especially on packet networks such as Tymnet (used by Delphi and BIX) which send data in large packets capable of holding more than 128 bytes.

Newer protocols like XMODEM-1K and YMODEM attempt to speed up transfer by sending data in 1024-byte blocks, but the problem of the computer's just waiting for confirmation remains. The most efficient error-checking protocol is ZModem, which sends 512- or 1024-byte blocks but doesn't wait for confirmation before it sends the next block. If there's a problem with a previous block, ZModem resends the bad block. With ZModem, you're able to tranfer files at your modem's full potential. ZModem is available on GEnie, Delphi, BIX, and most bulletin board systems.

CompuServe Quick B protocol is similar to ZModem, with send-ahead and large blocks. It's the transfer protocol of choice if you're using CompuServe.

American People/Link uses a unique protocol called *WXModem* (Windowed XModem) to speed transfers over packet networks. It's available in many commercial terminal programs, such as *ProComm Plus* and *Baud Bandit,* and as a shareware desk accessory for the Macintosh. Plinkers will find it almost twice as fast as telecommunicators using XModem.

Keeping to the Script

Some terminal programs will actually record your entire online session, allowing you to create a script file that you can use for future sessions. Programs with this capability include *Mirror III* on MS-DOS computers, *White Knight* on the Macintosh, and *Online! Platinum Edition* on the Amiga.

Networks feature a built-in help facility better than any software package's: other users. If you're not sure what the fastest protocol on your favorite online service is or how to find a list of all the message bases, the best way to find out is to ask online. Everyone online was a beginner once, and there are always a lot of friendly folks who will be glad to help you out.

If you follow these tips, you should save money in your online travels. Then you can use the money you save to explore even more fascinating online activities. ◻

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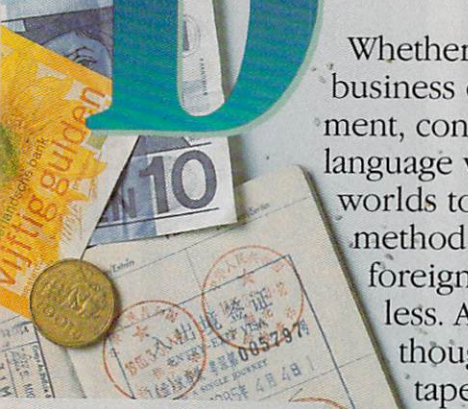
There's a little adventure in everyone, but you don't need to travel further than the pages of *Compute* to go exploring. Sit back, relax, take off your shoes, and boot up for a peek at the prizes in the first Great *Compute* Treasure Hunt. Then check next month's issue for the rules and clues that may help you gain access to our cache. But it's up to you to take a byte at these and other prizes. Grand prize: a 1991 Jeep Wrangler, valued at $11,267. Second prize: Northgate Computer Systems hardware and accessories; value: $10,042. The third prize-winner will take home a Casio combination TV/VCR, and for when you're not at home, a mini color hand-held TV; the package also includes electronic instruments, his-and-hers watches, and an Executive B.O.S.S. with electronic dictionary card, spell checks for financial and medical terms, and expansion card. Total value of the Casio package: $4,346. Fourth prize: a 1991 Honda Nighthawk 750 motorcycle; value $3,998. Fifth prize: a Mitsubishi 40-inch stereo Big Screen monitor/receiver; value: $2,399. Be sure to pick up a copy of the March issue of *Compute* for the official rules and clues—and many more prizes, too.

1991 Jeep Wrangler

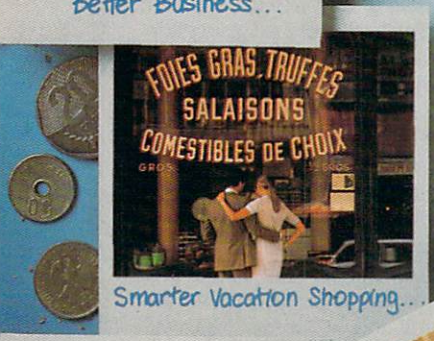
Jeep Eagle

Do you know the incredible learning a foreign

Whether for travel, business or entertainment, conversing in a foreign language will open up whole new worlds to you. And now there's a method that makes learning a foreign language simpler. Painless. And faster than you ever thought possible. The first 15 tapes of this package are the very same tapes used by the U.S. State Department to train career diplomats. They're tried and proven effective. But it's the second 15 tapes utilizing the latest *European* learning techniques that make this system so special. This marriage of two teaching concepts literally gives you <u>two courses in one</u> . . . the best of both worlds in language instruction.



Better Business...



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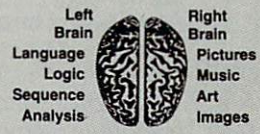
BREAKTHROUGHS in language technology by European learning researcher **Dr. Georgi Lozanov** are the basis of the remarkable Accelerated Learning Language Series. The series is so effective, we guarantee you'll be hearing, reading, understanding and beginning to converse in your new language in 30 days - or your money back. This unique new system links the left side of the brain (language and logic) with the right side of the brain (music and art) for dramatically increased retention and learning speed. In the same way you remember the words to a song with little or no effort, Accelerated Learning uses Baroque music to "un-stress" the learning process.

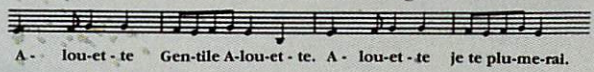
> "American managers with language skills open more doors."
> *Wall Street Journal Editorial*
> July 25, 1988



> "(the superlearning method is) fascinating . . . the results are extraordinary."
> Prof. Lawrence Hall
> Harvard University

Boost your memory with music.

Have you ever wondered why you can remember the words to a song with little or no conscious effort? Music stimulates right brain



activity. Speech is a left brain activity. When the two are combined, as in a song, you have left/right brain linkage. You've used your whole brain, so your memory is much stronger. Accelerated learning uses the same technique. You will learn the language as *stresslessly* as a child does, by hearing new vocabulary and phrases in alternately loud whispered, and emphatic intonations, all accompanied by slow, rhythmic music. The effectiveness of Baroque music as a memory aid is well documented and leaves you feeling alert and rested.

> "American ignorance of other tongues has been hurting American business executives in their competition for (overseas) markets."
> *The New York Times*
> September 5, 1988

rewards of language?

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"I'm 52 years old, and if someone had told me I would have become articulate in a foreign language in four weeks, I would have said they were wrong."
Joseph A. Kordick
Ford Motor Company

"I decided to concentrate on Spanish around 1965, and after I became proficient in 1967, my business with Spanish-speaking countries increased from nothing to over twenty million dollars yearly."
André Crispin
Industrialist

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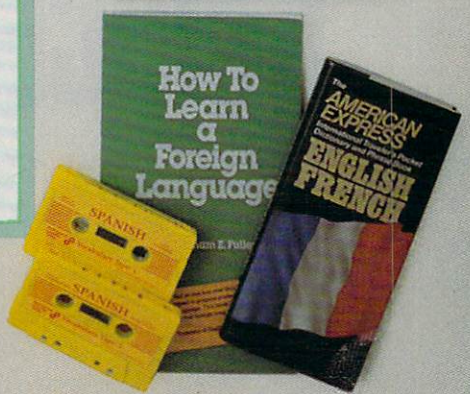

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Another language is a major social and business asset.

*** Bonus Offer!**

HOME O

COMPUTE CHOICE

FOR PERSONAL ACCOUNTING, PORTFOLIO MANAGEMENT, OR KEEPING TRACK OF THE PROFITS AND EXPENSES OF A SMALL BUSINESS, *QUICKEN* DOES IT ALL

PEER L. PLAUT

To be comprehensive, an accounting program must have several important features for personal, business, or investment use. Intuit has managed to bundle all of these necessary accounting modules into a single inexpensive software package—*Quicken* 4.0. *Quicken* allows you to change, review, or generate financial reports without leaving the program. With its pull-down menus and hot-key calculator, *Quicken* is a real time-saver. Practically anyone can set up the software and use it.

Because the checking and budgeting features are so well integrated, you can easily generate a report indicating whether your cash flow is in balance. If you show a surplus, you can easily set up an investment account and add it to your *Quicken* reports.

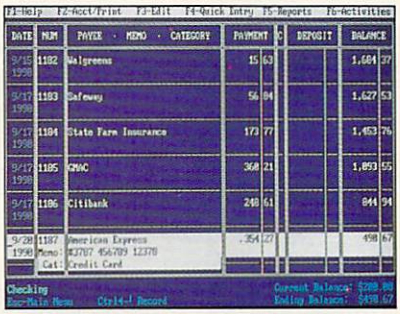
Here's an example of how the checking and budgeting modules work together: If you have budgeted $525 per month for rent and you pay it by check, the $525 will automatically be debited from your *Quicken* checking account. But you can also set up *Quicken* to generate various kinds of reports. You can generate a budget report to show that rent has been paid for the month. You can also generate reports at the end of the week, month, or year showing expenditures in a variety of categories. If, at the end of the year, you were unable to put any money into savings and the year-end report shows that you spent $5,000 for entertainment, you have suddenly found a place to cut back.

FFICE

MARK WAGONER © 1991

You can use *Quicken* to set up an account with *Check Free* (not affiliated with *Quicken*) and use its electronic bill-paying feature to save money on postage and per-check charges. (Some institutions may charge for electronic debits, however, so confirm this with your bank.) If you choose to print your checks, *Quicken* has special checks and window envelopes so you won't have to address each envelope by hand. (This feature can be quite expensive; consider whether paying nearly $60 for 250 envelopes and checks is worth the time saved.)

Quicken is packed with other timesaving features. For example, it can memorize transactions, so if you use *Quicken* checks, the address and amount are automatically filled in when you print your checks every month. Just slip the check into the *Quicken* envelope—no wrong addresses, incorrect payees, or account numbers.



***Quicken* makes checking a breeze.**

Using *Quicken* to set up income and expense categories will help you find out where your money is going. You can set up broad categories such as taxable income and utilities while having subcategories like spouse's income, electricity, gas, and telephone. *Quicken* allows you to give your personal categories names you'll recognize and set up your business categories in accounting format. Once again, *Quicken* makes it easy for you to operate your personal and business affairs in the same software package, saving you time and money.

Another feature is split transactions. If you have six rental properties (six is the maximum number of splits per transaction) and your annual hazard insurance is due, then, using the split function, you can assign the appropriate amount of insurance premium to each property by using the ditto mark instead of retyping each category six times. *Quicken* will use the same category in all six split transactions.

Quicken can also handle credit card accounts, lines of credit, mortgages, investment properties, savings accounts, investment accounts, and tax reporting. The only requirement is that you initially set up the accounts with *Quicken*. You'll be prompted for the correct account-type information, allowing your new savings, investment, or tax accounts to be set up in no time. *Quicken* even asks you for your credit limit, so you can determine quickly how much available credit you have. This feature can be used on any type of revolving line of credit—just enter the account as a credit card account. For fixed-period liabilities such as mortgages or auto-

mobile loans, enter them as any ordinary liablilty.

Quicken can even remind you to pay your bills. Billminder, another of *Quicken*'s features, can be installed in the AUTOEXEC.BAT file on your hard drive, so each time you turn on your computer, *Quicken* will search your financial information and alert you to bills that are due or nearing their due dates. This should help eliminate late charges. It's a good idea to set Billminder in advance of when your bills are due—*Check Free* needs a couple of days to process the information, and the postal service needs a couple of days to deliver your check, if you decide to use first-class mail.

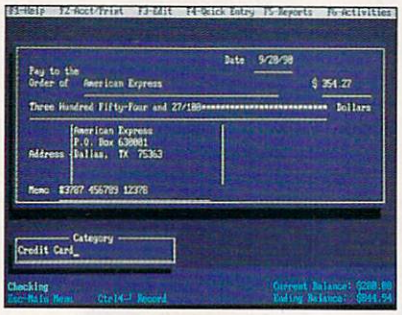
To make handling your finances even more effortless, reports can be generated that compile all the information you've entered into *Quicken* into a usable and understandable format. Generating reports using *Quicken* is so simple that anyone could do it. *Quicken* comes with a set of financial reports, and you can generate your own. For example, if you use *Quicken* for personal and business accounting, you may not want to include certain business assets and liabilities in your personal net-worth statement. *Quicken* will ask you which accounts are to be included in the report; then the software does all the dirty work—addition and subtraction—and lays the information out neatly on your screen or on paper.

Taxes. Everybody hates them, but *Quicken* can do many of your tax accounting chores for you, saving you time and headaches. Furthermore, your accountant will be impressed by the precise tax reports you send in at the end of the year. However, *Quicken* does not fill out tax returns. If you do your own tax returns, you may be able to export tax information stored on *Quicken* to the tax software program you currently use (*Turbo Tax* is compatible with *Quicken).* When using *Quicken* for tax reporting, simply set up categories for each type of transaction you expect to use (for example, medical expenses for personal use and payroll tax for business use). At the end of the year, you can print the reports and send them to your accountant, saving time and money.

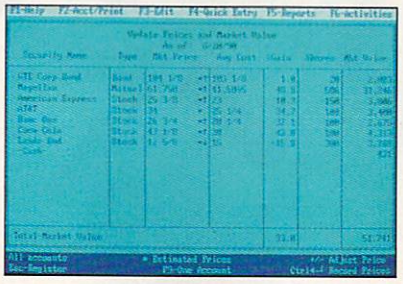
Quicken's Investment Account management abilities are the icing on the cake. As with most other investment management software, *Quicken* handles many common types of transactions for stocks, bonds, mutual funds, long accounts, short accounts, margin accounts, and more.

Quicken's custom investment reports are a real asset, too. If you've had a security many years and want to find the annualized return of the investment for the past 15 years, *Quicken* allows you to get this information quickly and easily.

Quicken has the ability to import ASCII file security price quotes, but I would prefer to be able to dial the quote vendor directly from the *Quicken* program. Using *Quicken*'s method, stock options traders won't be able to enter option contract prices the way they're used to. I overcame this by entering the number of contracts traded



Pay your bills by computer.



Let *Quicken* maintain your portfolio.

and the total amount. Using this method, a three-eighths price contract shows as 37.50 per contract, which is its true worth.

If you're a bond buyer, you'll be happy to know that you can enter your prices the way you're accustomed to seeing them. Just enter the price of your latest bond purchase (such as 95.00, 85.00, 100.00, or whatever purchase price your confirmation shows) and then enter the quantity of bonds you bought—say ten. *Quicken* will then automatically multiply the price by 100, giving you the final purchase price.

Quicken can also handle the reinvestment of dividends and interest on your securities—a definite advantage when you sell. By using *Quicken* to calculate the cost of your reinvested dividends, you won't have to spend hours poring over five years of mutual fund statements. This reinvestment feature can help you figure out your cost basis for five years of quarterly—or worse yet, monthly—reinvested mutual fund dividends. (This feature can also be used with reinvested stock dividends, but far more people reinvest mutual fund dividends.)

Mutual fund statements can be difficult to understand. As an investment broker, I discovered that many clients had been misreporting their mutual fund dividends to Uncle Sam's advantage. The latest mutual fund dividend-enhancement gimmick includes a return of capital along with the ordinary dividend. *Quicken* is there to handle this return of capital. For anyone who owns high-income funds, this will be a valuable tool for figuring out true returns at the end of the year.

Another of *Quicken*'s advantages is its ability to integrate its investment modules with the net worth, income, budget, and tax reports. Many investors have their investment information in one software package and tax information in another. When they want a financial report, they must compile all the information by hand and enter it into a third software package. I have seen (and paid for) far more expensive portfolio-management software that does less than *Quicken.*

Quicken is like a lump of clay on a potter's wheel. It can be molded to fit just about any accounting project your individual needs dictate. The documentation is the key to *Quicken*'s power. Although the software is designed for the computer illiterate, you must have some idea of the goal you wish to accomplish using the software. There are many useful examples in the text to get you started. When you use them, you'll easily grasp the documentation and get good ideas in the process. The bottom line: *Quicken* will help *your* bottom line.

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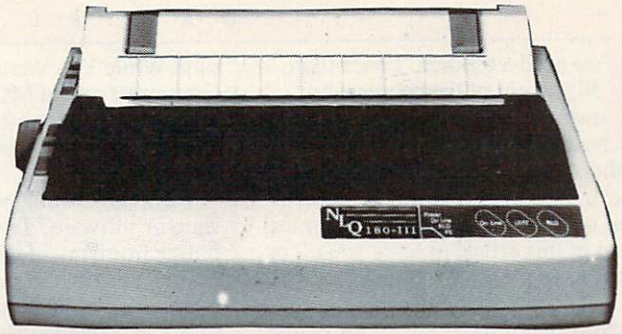

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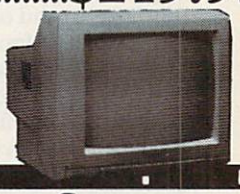

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TAPPING INTO ONLINE POWER

DANIEL JANAL

You need a modem. Fewer than 30 percent of the people who own PCs own a modem, yet no home office worker should be without one. If you've put off buying one or even looking into the matter, read on. There won't be one technical word in this article to scare you off or confuse you.

Modems are devices that hook up to your computer and your phone line, allowing you to browse through libraries, send mail, exchange ideas with other home office workers and marketeers, get support for your software and hardware, and do a whole lot of other things—if only you'd give them a chance.

Let's look at the services you can obtain from a major information service, such as CompuServe, Prodigy, Dow Jones News Service, America Online, QuantumLink, GEnie, and MCI Mail.

If you can't spare a couple of hours to drive to the local library, find a parking spot, and wait till the entire eighth grade class finishes using the reference room, you might enjoy researching with your computer and one of the information services mentioned above. Most systems let you browse through an encyclopedia, today's news, and old magazine articles.

Are you afraid to call your stock broker ten times a day to see how your stocks are doing? You can read stock prices as often as you wish from many online services (although quotes are delayed 15 minutes). Before you buy stocks, you can study the pricing history, company news, and financial information. Several services even let you make trades online.

Want to get noticed fast? Send mail electronically to others who are on your system. MCI Mail is the predominant system for doing this. If you're in the computer business, chances are that everyone you know—or need to know—sends and receives MCI Mail. People respond quickly to MCI Mail. You can bypass the crowds who have left phone messages buried under the mountain of pink While You Were Out slips. CompuServe and MCI Mail can send an electronic document to your client's fax machine—even if you don't have one.

Having trouble with your hardware or software? Try getting support online from any of the nearly 100 manufacturers and publishers on CompuServe. With many manufacturers charging for phone support or requiring up-front contracts for support (the privilege of staying on hold for half an hour at long-distance rates), this online service is a bargain, even at standard online charges. You can usually get answers to your questions the same day, and you might even obtain information at 2:00 in the morning.

You can discuss common problems and get advice from peers who may be on the other side of the continent. The best forum for home office workers is CompuServe's Work at Home Forum, which features advice on such topics as how to set up a business, run it profitably, hire lawyers and accountants, market a product, and decide which software works best in a home environment. Forum hosts Paul and Sarah Edwards have turned their years of experience running home offices and writing books on the subject into a cornucopia of information for the home office worker.

You can also find places to "talk" with people who are in the same profession (such as journalists, public relations practitioners, lawyers, computer consultants, entrepreneurs, pilots, and others).

Believe it or not, a lot of friendships get established online through these chat sessions. "Cupcake," who runs a forum on CompuServe dedicated to chatting, swears on a stack of microprocessors that two people met online and got married. How's that for curing home office isolation?

Many of these online services are making their services easy to use with sign-on kits, pull-down menus, and toll-free support. Of course, these services aren't free. You must pay $6.00 an hour and up to use them. However, the services can pay for themselves in saved time and access to hard-to-find information when you really need it.

Sounds pretty good, huh? Then why haven't the great unwashed, the other 70+ percent of PC owners, gone out, bought modems, and found the information and persons of their dreams?

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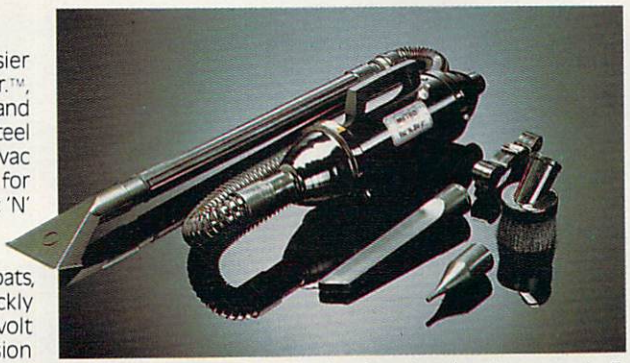

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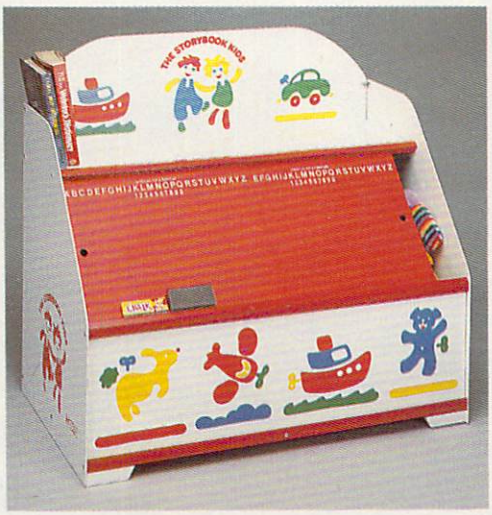

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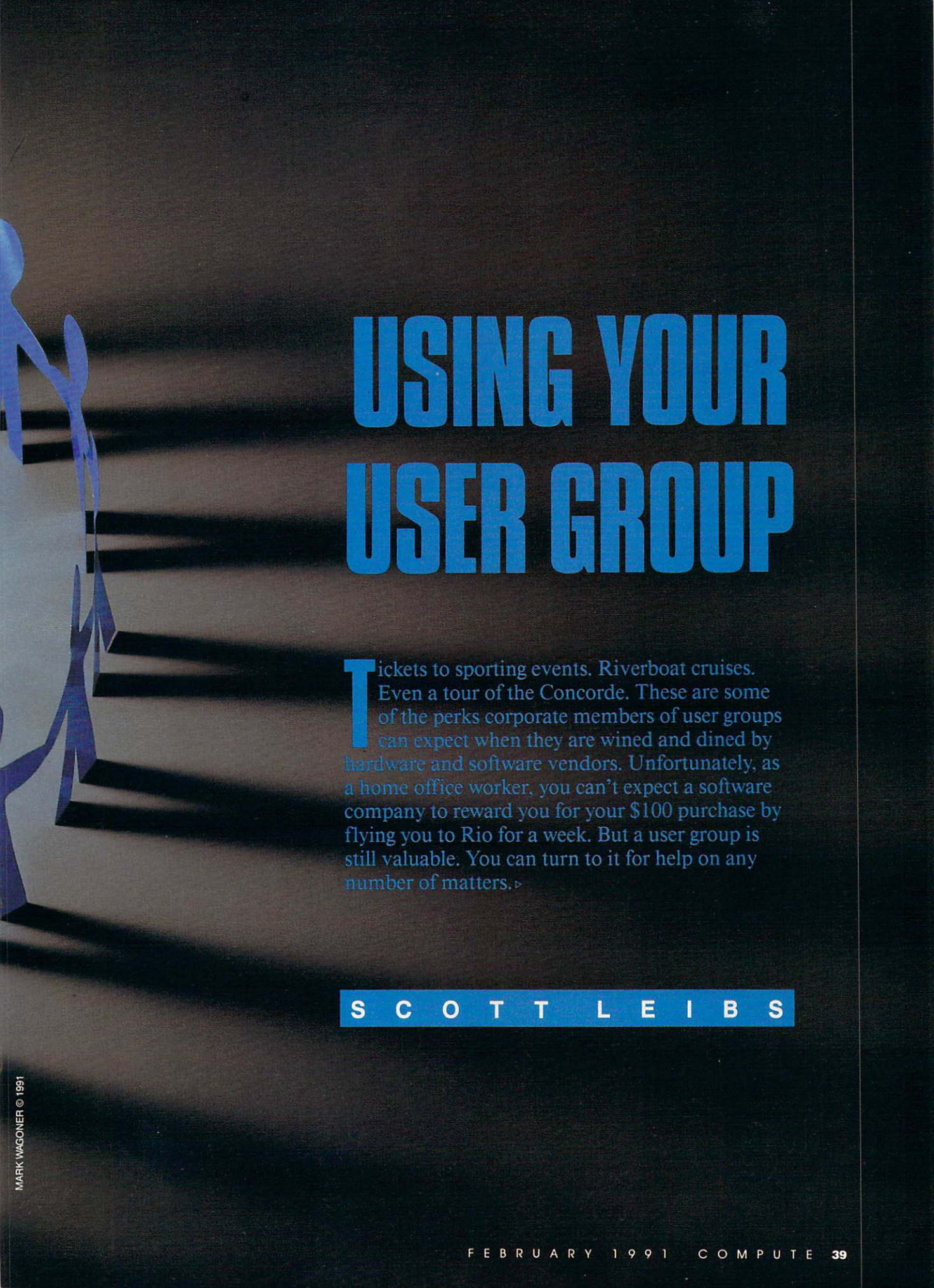


USING YOUR USER GROUP

Tickets to sporting events. Riverboat cruises. Even a tour of the Concorde. These are some of the perks corporate members of user groups can expect when they are wined and dined by hardware and software vendors. Unfortunately, as a home office worker, you can't expect a software company to reward you for your $100 purchase by flying you to Rio for a week. But a user group is still valuable. You can turn to it for help on any number of matters. ▷

SCOTT LEIBS

MARK WAGONER © 1991

Most cities in the U.S. have at least one user group. And while these groups vary greatly in breadth and quality, you should find out what your local user groups have to offer, look into other user groups outside the immediate area, and, if your needs are too specialized for existing groups, consider starting your own.

Input/Output

User groups are like computers: You get out of them what you put in. Virtually all user groups encourage members to take the lead in determining what sorts of activities the group will undertake. The focus can be as straightforward as acquainting new computer owners with the intricacies of printer cables and DOS commands or as specific as helping members of a particular profession get the most from a specialized software package.

Consider the Boston Computer Society, the largest user group in the country, with over 27,000 members and over 50 special interest groups (SIGs). Boston Computer Society SIGs focus on everything from artificial intelligence to real estate to helping the blind and visually impaired use computers.

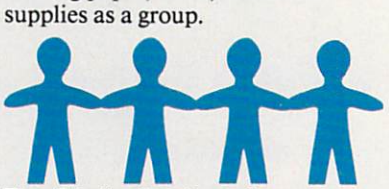
The Boston group leverages the power of its vast membership by holding over 1500 meetings and special events each year. These aren't restricted to Boston, either, but are held throughout New England. In addition to the regular meetings, some of these special events focus on training, displaying new equipment, and sharing information on technological advances.

Sales and Service

Such a busy schedule would be beyond the resources of most groups, but you can expect a core of services from virtually any group you join. These include a newsletter, usually monthly, that describes the group's activities. The newsletter may contain articles of interest on new products, how-to features, or classified ads for used equipment. Many groups also maintain electronic bulletin boards, which not only contain electronic copies of the publications produced by the user group but also allow users to download public domain software and communicate with each other.

Most user groups have libraries of shareware, available free to all members, and demo copies of software that, while not available to copy, can be borrowed for a trial run to help users decide whether to make a purchase.

Many user groups receive hardware on loan from vendors. Some groups not only let you get your hands on the hardware at the meetings but also allow you to take it home for a thorough shakedown. If you decide to buy something, group membership may include discount rates on purchases. At the very least, you can get together with other members and benefit from quantity discounts by purchasing paper, disks, and other supplies as a group.



The Bird's-Eye Lowdown

The primary purpose of most groups is to disseminate information. This can range from the nuts and bolts of hooking up peripherals to pointers on how to become a sophisticated user of a given software package. It can even include ambitious educational undertakings such as becoming proficient in

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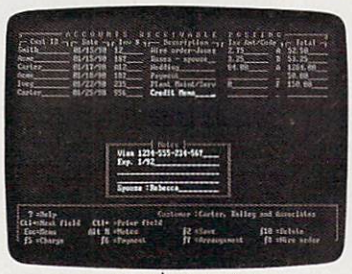

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all aspects of desktop publishing. To achieve this, user groups try to tap the expertise of their members. A home office worker not only can get training but can give it, too.

You are likely to find people at a user group who share specialized interests. The demographics of user groups are changing, according to Daniel Janal. Janal Communications, based in Fort Lee, New Jersey, sells *The Definitive PC User Group Directory* to help vendors reach user groups. "These groups are becoming more focused on business users. There are far fewer students and hackers and technology enthusiasts than there used to be."

Vendors now feel much more comfortable dealing with user groups, according to Janal, and that reaps many benefits for members. For example, software companies not only supply groups with demo copies but may send representatives to speak at meetings about how to use the software to maximum advantage. Representatives may also brief the group on forthcoming products. Vendors sometimes foster good will by bringing along a few copies of their products to give away as door prizes.

Esprit de Corporation

Some companies take user groups seriously enough to devote staff resources to reaching out to them. Apple Computer and Commodore take a strong interest in groups devoted to users of their machines. Elena Fernandez, user group coordinator at Lotus Development, spends much of her time on the road meeting with the 40 or so largest groups in the country. "Members of user groups are a great barometer of the PC world," she says. "They'll tell you right away how they feel about a product."

While Fernandez focuses her efforts on user groups of 500 or more members, smaller groups can also get direct involvement from Lotus. "We often get calls from smaller groups, and when we do, we can usually help them through a local sales office," Fernandez says.

Part of Lotus's interest in user groups, Fernandez says, stems from the fact that it views "user group members as educators of other PC users." To foster that relationship, Lotus recently began supplying user groups with disks containing technical information on its products. The company may also begin downloading current information to groups' electronic bulletin boards.

On the Rise

If you're considering joining a user group, you aren't alone. Groups are forming virtually everywhere, and membership is on the rise. Consider the Northwest Arkansas Microcomputer Users Group, based in Springdale. The group's newsletter editor, Bill Shook says, "Every meeting we gain two to six new members." The group currently stands at about 90 members and plans to launch some SIGs in the near future.

Joining a group will provide you with access to hardware, software, and all kinds of technical help. But the real benefit is meeting new and interesting people with similar interests and concerns. The networking possibilities are only limited by the number of business cards you can afford to print up.

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Shook says, "We encourage everyone to interface and get involved. It's not a place for advertising yourself—at least not openly—but it *is* a place to meet lots of people." That's good advice for anyone who's thinking of joining a community computer user group.

There are a number of ways to find the user groups in your area. One of the best is to visit or call your local computer dealer. Most user groups make it a habit to let computer retailers know of their existence. They may even post ads in the store. A number of computer publications also list user groups. If you live in a medium-sized or larger city, you may have a number of user groups to choose from. Shop around. One will almost certainly stand out as most likely to meet your needs.

Once you've found a group, the only way to know if it will be of value is to attend some meetings. Virtually all user groups will let you try them on for size before you pay annual dues (typically $25–$50). Ask questions, find out what SIGs the group has, and gauge the members' backgrounds and interests. Ask to see copies of the newsletter and other publications. If the user group has an electronic bulletin board, find out if as a nonmember you can dial in and see what's happening during club meetings.

Hot Links

A serious home office user might want to expand his or her reach by joining the user groups in larger cities. In addition to Boston's, there are very active groups in Houston, Chicago, San Francisco, and other major cities. Even a remote member can benefit from the publications and bulletin-board access. Many of these groups also sponsor special events at trade shows and other venues.

If all else fails, you could simply launch your own user group. According to Jerry Schneider, founder of the Association of PC User Groups in Washington, D.C., the process is fairly simple:

- Find a location (most groups meet in schools or libraries).
- Advertise (computer retailers, other user groups' publications, and simple word of mouth work well).
- See who shows up.

Once you have a membership, however small, Schneider says the key to succeeding is "to continually assess member needs and communicate goals." Make sure all members identify their needs up front. You may want to make it clear that, at least in the beginning, the group will focus on a specific goal, such as the equipment and educational needs of home office workers. This will prevent the paralysis that may set in when ten members want to pursue ten different goals.

Schneider also notes, "Information drives every group, and we encourage groups to set up arrangements with vendors because ultimately they are the source of most information."

If your group becomes large enough, vendors can help in ways that might not occur to you. Fernandez of Lotus says that in October 1990 her company launched a program in which it does direct-mail marketing that benefits both Lotus and the user group. "When we're going to be giving a presentation at a group, we sometimes pull the names of 10,000 or so customers living nearby and send them an announcement that we will be there. We may also take out ads." The potential for user groups to gain new members from such a presentation is enormous.

Home Away from Home

Technical help, free software, business contacts, and even some relief from the isolation that sometimes plagues home office users—all this and more may be available, for a nominal price, at your local user group. ⊡

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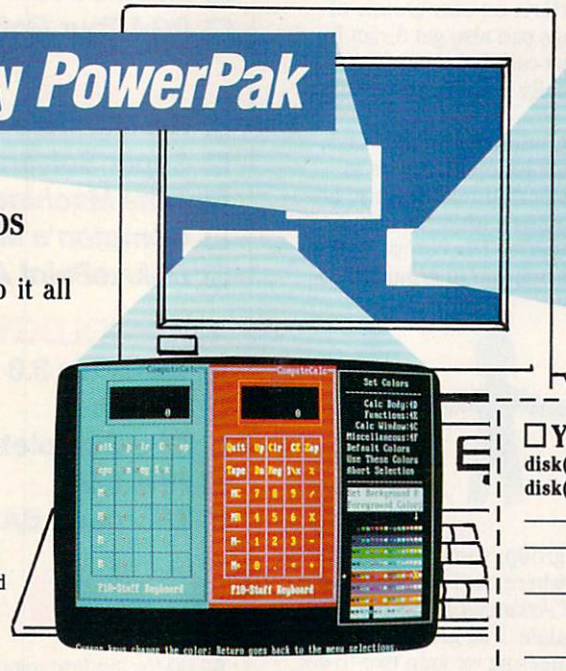

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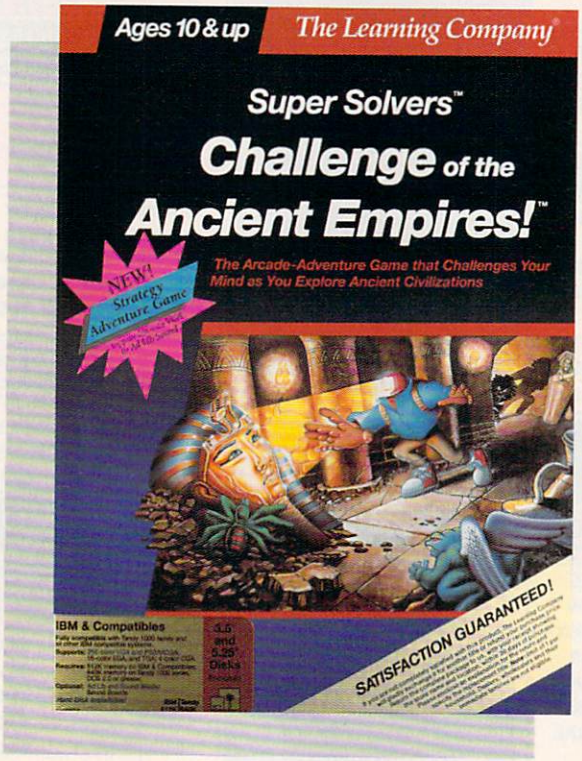


COMPUTE CHOICE

EXPLORE CAVERNS, ELUDE MONSTERS, SOLVE PUZZLES, FIND HIDDEN TREASURES, AND LEARN ABOUT ANCIENT EMPIRES

LESLIE EISER

Dear Diary,
I just don't believe this. I thought I had Morty Maxwell under control. After chasing him around the school in *Midnight Rescue* and through the TV station in *Outnumbered,* I thought I'd gotten rid of him for good. But no, he's back in the *Challenge of the Ancient Empires,* and he's into more mischief than ever.

It seems that several underground caverns have been found near the sites of four ancient civilizations. The cavern near present-day Iraq, Turkey, and the Middle East contains valuable artifacts from the ancient Babylonian, Phoenician, Sumerian, and Hebrew civilizations. In Egypt there's a cavern filled with glorious art treasures, jewelry, a burial mask, and even mummy coffins. Mosaics, temples, and magnificent statues are in the cavern near present-day Greece and Rome. In the cavern under India and China are everyday objects and priceless artwork created many thousands of years ago.

Unfortunately for the explorers of these caverns, there's evidence that Morty Maxwell has been snooping around. Because of our ability to thwart his attempts at mischief in previous adventures, the Super Solvers have been called in. This time our goal is to explore the caverns, get past all the traps and mazes left by the ancient builders, and figure out how to save the priceless artifacts from the clutches of that mad fiend.

RY

MARK WAGONER © 1991

To help us out, we've got some notes left by previous adventurers. Each cavern has four chambers, and each chamber is a maze of rooms, hallways, and passages. Our goal is to roam the maze looking for the six pieces of an artifact.

You're simply not going to believe what these caverns look like. On a color VGA monitor, they spring to life. The walls glow with an eerie blue light, three-dimensional knotted rope ladders hang from the ceilings, and curious inscriptions decorate the walls. Scattered all around the chambers and halls of the caverns are priceless works of art, ancient sculptures, and other remnants of civilizations long dead.

In the long years since the caverns were built, awesome cave creatures gradually have been taking over. Mutations of relatively harmless creatures creep, crawl, slither, and fly around the chambers. Huge spiders hang from the ceilings, suddenly dropping down toward you, frantically wiggling their legs. Scorpions curl up their tails and then toss fireballs across the rooms. Barrel Blaster Bugs hide under staircases and around overhanging pieces of wall, while the Bowling Ball Beetles seem to prefer the more open spaces.

Cave creatures add to your challenge.

Fortunately we Super Solvers never go anywhere without some special tools. My personal favorites are the turbo tennies. I've been using them to bounce over obstacles and to make the most impossible jumps. They even make it easier to land lightly when I fall. Think how much fun they'd be in the gym at school. They aren't exactly easy to control, though. Every time you want to jump, you have to press at least two keys in exactly the right order, at exactly the right time. After a little bit of practice, I managed to get good enough to explore most of the caverns, but my mom never did figure out how to get the turbo tennies to work. Maybe the next version will offer support for a mouse or a trackball to help her out.

A portable force-field generator provides even more protection. It's good for only four fields per chamber, so you have to learn to budget your use of it. The first few times through the chambers, I'd use up the force field in the first room and then have to duck everything else. One thing you should know—after you've turned on the force field, you can switch to your turbo tennies and really blast around the room.

The miner's hat serves two purposes. By getting it to shine a short but powerful beam of light at the right moment, you can stun cave creatures for a few seconds. The light beams also turn on the light switches found in the caverns near Egypt.

By the way, don't worry about the creatures actually killing you. They can only drain some of your energy away. After four hits, you run out of energy and have to start the chamber all over again—a bit depressing if you're in the last room, ready to grab the last artifact. But it's better than dying. It's kind of nice to explore some place that really isn't all that violent.

Each cavern has its own atmosphere and challenges. Conveyor belts add to the challenge in the cavern un-

der India and China. Naturally, they're never going in the right direction when you first enter a room. To make them change direction, I had to jump up and hit a switch with my head. Ouch! Sometimes I had to hit several in combination to get all the conveyor belts in a chamber heading the right way.

There's a pretty decent group of monsters to avoid as well. A flying I-don't-know-what kept sticking its tongue out at me, and there were bats all over the place. But it was the spiders that definitely gave me the most trouble until I finally figured out there was a pattern to their movement. If I planned ahead carefully, I could just sneak past without touching them.

In the caverns in the Near East, there are sliding panels to open. Head and foot switches scattered around the room control the panels. Sometimes getting them all open requires hitting four or five switches in the right order, at the right times—a tough problem to figure out in the best of times but even trickier when you have to dodge a collection of ugly cave creatures.

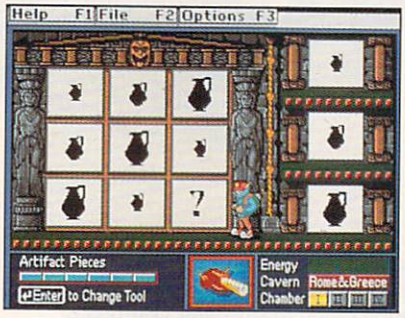
In my opinion, the toughest cavern to solve is the one near Egypt. Revolving mirrors and light switches add a decided physics challenge to these rooms. Each time you bump into a head switch or step on a foot switch, one of the mirrors rotates slightly. The trick is to use the light beam from the miner's hat to trigger the light switch. It took some pretty sophisticated planning to get four separate mirrors all lined up in the right way so that a single beam of light could bounce off all four before hitting the light switch in the far corner. Not the easiest way to open doors, I'll warn you right now.

And there's never an end to the challenges. Just when you think you've got a cavern figured out, something new pops up. The number of conveyor belts increases, ropes that lead to nowhere appear, and multiple switches in different locations in the room have to be hit in exactly the right order, or the gaps between the floorboards suddenly get larger. Every room leads to one that's more baffling than the last, every chamber has tougher puzzles to solve, and every cavern offers a fresh challenge.

After you've finally struggled your way through a chamber gathering the required artifacts, your reward is a jigsaw puzzle and a logic problem. The jigsaw puzzles are particularly beautiful images of famous artifacts, rendered in stunning golds and brilliant blues and purples. After you've completed the puzzle, the computer displays information about the piece of artwork. Pressing any key will scroll this information on the screen.

Your next ancient empire challenge is to solve a logic puzzle. Study eight shapes placed in a square, and figure out what the missing piece must look like. Miss twice, and you'll have to repeat the chamber from the beginning. Get it right, and it's on to the next chamber in the cavern.

Piece together ancient artifacts.



To make progress, use your logic.

When you've solved all the puzzles in all the caverns, you get to add your name and score to the roll of honor. To play again, just pick a new name and start over. Figure out a safer path through the mazes to get a better score. If you think you're too good for the regular game, there's an expert level. Rumor has it that the expert level has different art objects, more creatures to avoid, tougher mazes to decipher, and harder logic problems. For right now, though, just finishing one chamber at the explorer level is challenge enough for me.

Do you know what I really like about *Challenge of the Ancient Empires?* It's the combination of arcade game and educational content. You can't possibly meet the challenge by simply blowing up everything you see. Instead, the race goes to the careful thinker and planner. With three different types of switches, reflector triangles, conveyor belts, energy apples, and coded panels, there always seems to be a new twist to figure out.

I really like the music and sound effects, too. When the Sphinx opens its foot to let you into the first cavern, the groan is almost enough to make you decide not to go in.

But there are some things that really bother me. For one thing, I sure wish the keyboard made using those turbo tennies easier. You really have to work to make them do the right thing at the right time. And if you aren't in exactly the correct position, you can't grab a rope or climb a ladder. There were times when I just quit out of frustration with the keyboard, not because I was bored with the game.

And somehow I'd have liked it to be a bit more educational. It's a good arcade game, but it doesn't quite look educational enough to convince anyone that I'm really learning anything. Certainly when I kept failing to master a chamber at the very end of the maze and had to repeat all the earlier steps over and over again, it seemed like an arcade game to me, too. On the other hand, I did have all those neat puzzles to solve, and if I took the time to read about the artifacts in the jigsaw puzzles, I always learned something new.

Anyway, I've got to go now. I still have to finish exploring Greece and Rome. I'll tell you something, though; the gongs in those chambers are pretty cool. You play them by jumping up and touching them or letting a cave creature do the work for you. The challenge is getting the order of the notes right. Believe it or not, the hints are in Greek. Maybe I'll pick up some of the Greek alphabet this way.

Talk to you again, diary.

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

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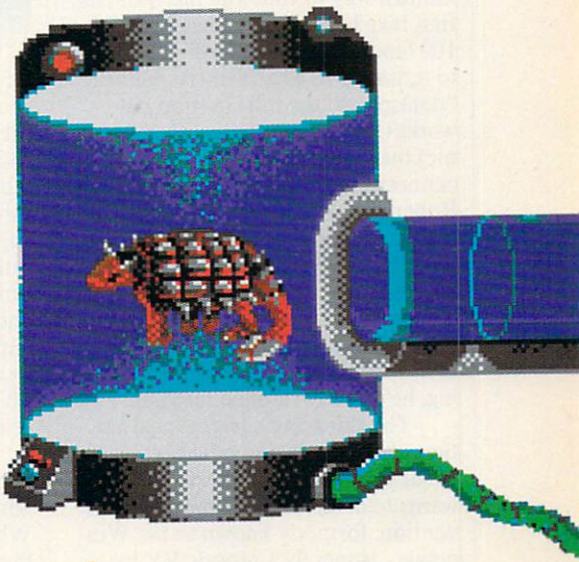

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STEVEN ANZOVIN

HAPPY TRAILS OF A ROLLING COMPUTER NOMAD

Computing has to be sedentary and solitary, right? Isolated from the world, surrounded by a drab partitioned office, parked behind a big desktop PC, cradled by an ergonomic chair—that's the standard picture of the computer user. There's not much romance or excitement, either, unless ripping the perforations off tractor-feed paper sends chills up your spine. But for the few, the bold, the technically adroit, and the familially unencumbered, computing can be the central activity in a life of adventure. Witness the continuing exploits of high-tech nomad Steven K. Roberts, chief wizard of a loose network of computerized gypsies.

Roberts decided in 1983 to "trash his lifestyle," as he puts it, when he was living in Columbus, Ohio. The "standard technoid life" of an engineer and freelance writer was boring, so he took to the road in what would prove to be a 16,000-mile trip across the U.S., following the paths of all the "new alchemists," "coevolutionists," and other appropriate technologists who wandered America in the 1960s and early 1970s. Since bicycling and computing were his passions, he found a way to combine the two. His first bike had a Radio Shack Model 100 laptop and a ham radio strapped to it, linked to what Roberts calls the "dataspace," the information networks (first CompuServe, then GEnie) that provide his only stable connection to the wider world. But Roberts's real breakthrough into high-tech came when he realized that a laptop couldn't do the job—he needed a sophisticated, completely self-contained system that could take him anywhere and perform any computing task. After years of dedicated tinkering, he's nearly reached his goal.

The third and current incarnation of Roberts's nomadic dream bike is not your ordinary Schwinn. Roberts wants to dispel any notion that his invention, formerly known as the Winnebiko, is merely a prosaic RV by calling it the Behemoth (for Big Electric Human-Energized Machine, Only Too Heavy). Tipping the scales at a portly 350 pounds (a standard bike weighs under 30) when fully loaded, the Behemoth sports a custom recumbent frame, under-the-seat steering, a multiple-derailleur gearing system with 54 speeds (including a super-super-low gear for pedaling those 350 pounds uphill), and microprocessor-controlled braking.

The bike's onboard computing systems aren't exactly lightweight, either. In the big front panel, a modified Macintosh Portable swings aside to reveal an AT-clone DOS-based VGA system; both machines have hard disks and are networked together. Control is through a helmet-mounted display like the ones fighter pilots use, complete with a head mouse that moves the screen cursor as Roberts moves his head. A trailer-mounted solar-powered generator supplies power, while a microwave unit provides worldwide telecom and links the rider with satellite mapping and tracking networks. Roberts still depends on ham radio for most of his local communications. And, of course, no bike would be complete without a cellular phone, fax, and modem.

The Behemoth isn't a vehicle you can ignore—in fact, it causes motorist whiplash everywhere Roberts goes. When he heads into town to recharge the Behemoth's wetware component (that is, to get himself a Big Gulp at the 7-Eleven), he's likely to hear comments like "Hey, you with NASA?" or "Man, that dude could survive a nuclear war!" He has attracted quite a bit of press as well, much of it outside the United States. Japan and Australia have invited him to tour in the next year or two, as has the Soviet Union. Much of his equipment has been donated by big corporate sponsors including Apple, Motorola, Hewlett-Packard, and Sun; but he has not yet been approached by the Pentagon.

Proving that the human brain is still the most effective multitasking system, Roberts can write, do computer-aided design and "bike-top publishing," and generally operate his nomadic research/consulting business—all while cruising down the highway. (Roberts claims he has no problem steering his bike and typing at the same time, but I wouldn't recommend the practice to hunt-and-peck typists.) He publishes a newsletter, the *Journal of High-Tech Nomadness* ($15 for a yearly subscription), and has written a book, *Computing Across America* ($11.95). Both are available from the author at Nomadic Research Labs, Box 2390, Santa Cruz, California 95063; (408) 459-9780; GEnie/MCI: WORDY; uucp: wordy@cup.portal.com.

Roberts takes every opportunity to rhapsodize on the high-tech gypsy life. "When most people go on the road, they decide to go from point A to point B, and everything between becomes an obstacle. My approach is to just be *here*, wherever here is at the moment. The key to nomadic technology is to reduce the significance of where here is." But there's more than just tech to nomadness. "A computerized recumbent bicycle is appropriate and endlessly entertaining, but it's not the heart of my wanderings. The heart is a wild, throbbing thing of thermos coffee, road maps, strange eyes, and exploratory kisses—of faded packs and mountains, harbor smells, and camp stoves." Even if nomadness is not for you, just thinking about it can be a welcome escape when your office seems the dullest place in the world. ⊡

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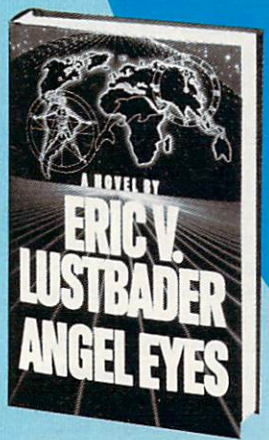

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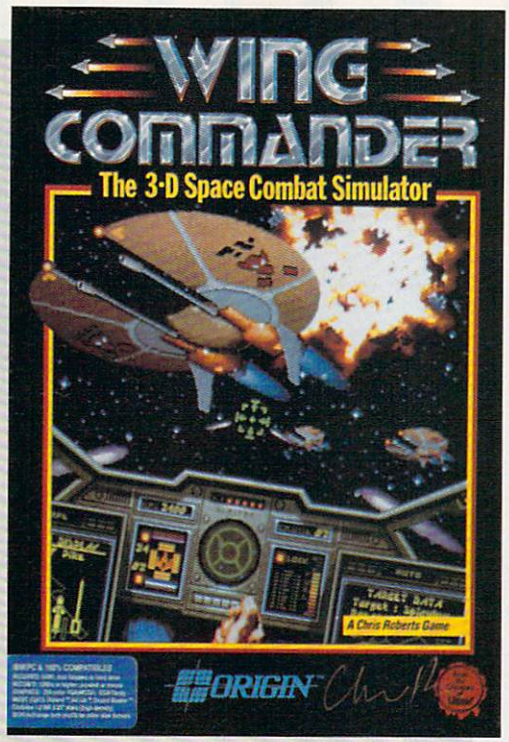


COMPUTE CHOICE

GROUNDBREAKING 3-D GRAPHICS COMBINED WITH REALISTIC CHARACTERS MAKE THIS A HEAVY FAVORITE FOR BEST GAME OF THE YEAR

RICHARD SHEFFIELD

I was terrified. It's still hard to admit, but I almost lost my wingman, and it would've been my fault.

Things just happened so quickly. It was just a routine mission, if there is such a thing. We knew that the Kilrathi had been dropping into the Vega system through one of the jump points in the area, so Spirit and I were out making the rounds, checking the possibles. Then—boom!—out of nowhere, we found ourselves in a swarm of Dralthi-class medium fighters. I gave the order to break, and Spirit kicked in the burners and headed into a group that was coming in low. I lit 'em up, too, and headed straight into two fighters dead ahead.

We traded laser blasts during a head-to-head pass. Then I took a chance and guessed that one of them would break straight up. I got lucky and slid neatly onto his tail. Playing the afterburners just right, I managed to stay behind him until his shields wore down, and I sliced right through his ion drive. Such a pretty explosion. A similar blast off to the right told me that Spirit was doing her thing, too.

Meanwhile, a loudmouthed furball had come around behind me and was heating up my shields with his lasers and heating up the comlink with a steady stream of insults. I had had it up to here with his "monkey boy" comments, so I honked the stick back into my lap for a quick loop and acti-

INMENT

MARK WAGONER © 1991

vated a heat-seeker. We fought to a stalemate for several minutes as both our shields got weaker and weaker. Then the fleabag made a mistake; he got predictable. I anticipated his move and cut in behind him. Dead meat. They don't call me Catskinner for nothing!

Two blasts took his shields down to nothing, but some fancy flying kept me from finishing him off. That's when the first call for help came in from Spirit. She had been my wingman on my very first combat mission; we were compadres. I knew she was rock-steady but quiet—if she called for help, she really needed it. But just one more shot would finish off this arrogant cat-head in front of me. I really wanted him. I missed with another shot, and Spirit called for help again. Another shot was lining up nicely, but it would take a couple of seconds—time Spirit might not have. And I owed her, big time. So I gritted my teeth, whipped my fighter around, and headed off to help her, burners blazing.

Star systems are divided into those controlled by the Terran Confederation and those controlled by the Empire of Kilrath.

She was really in a heap of trouble by the time I got there—no shields, no guns, and two Kilrathi on the hunt. I caught the first one by surprise and splattered him with a missile, but the other was lining Spirit up for the kill. I fired my laser at him till it overheated. His shields were down, but I couldn't finish him. I was desperate and could only think of one thing to do. My shields were strong, and his were down; so I lined him up in my sights, hit the burners, and flew right through him. The crash knocked my shields totally out, but my ship held together. His didn't.

Spirit and I managed to beat feet back to the *Tiger's Claw,* but I was badly shaken. I had almost let my wingman get killed because I let a fight get personal. I vowed not to let that happen again.

Right there. That's when you know a game has got you. When you start to think about the game characters as real people. When you start to get an emotional attachment to them. *Wing Commander*'s characters get to you better than those in any other game I've seen.

In *Wing Commander,* it's the year 2654. After a peaceful expansion and colonization of space, mankind has run into the Kilrathi, a race of catlike warriors intent on our destruction. You're a new fighter pilot, just assigned to the carrier *Tiger's Claw.* Things aren't going well for the home team, and your performance in battle could swing the tide from defeat to victory. How's that for pressure? ▷

Flying your fighter is easy and pretty straightforward. The controls are simple, and the cockpit displays give you enough information without giving you too much. The ship is controlled with a mouse, keyboard, or joystick; but the joystick seems to have the best feel. Just to make sure you get off to a good start, there's a walk-through of your first mission and a simulator to hone your flying and fighting skills. The manual is well written and very entertaining. It's made up to look like the ship's magazine, *Claw Marks,* and is designed to put you right into the plot of the game.

As a pure flight simulator, *Wing Commander* is among the best. Everyone is raving about the 3-D graphics, which are without doubt the best of any simulation game, period. But that's certainly no accident. The game's designer, Chris Roberts, wanted to get the look and feel of the space combat in *Star Wars, Battle Star Galactica,* and *Buck Rogers,* but he realized early on that the current state of the art just wasn't good enough. High levels of detail aren't possible with the filled polygons used in most combat sims. And bitmapped graphics look jerky and take too much storage space.

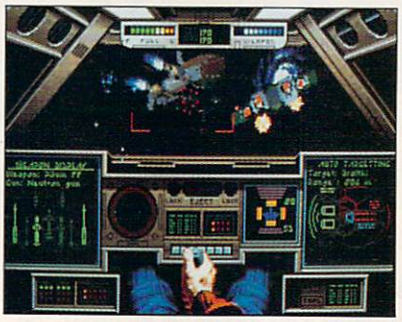
Still, bitmapped graphics seemed the way to go if he wanted to display a great amount of detail. So his team developed a new 3-D graphics driver based on ray-tracing technology and engineering diagrams of the fighters. This new driver can not only produce smoothly-scrolling space fighters, but it can do it with the proper shading, reflectivity, and textured surfaces. Something totally beyond anything we've seen before.

But this still wasn't the gaming experience Roberts was after. There was something lacking—involvement. So the team linked the combat sequences together with cinematic sequences that take place on board the ship. Created from a digitized videotape of live actors, these sequences bring you into the *Tiger's Claw* and introduce you to some of the characters. This gets you involved with the game and the plot before you get involved in combat. It's these conversations with the nonplayer characters in the bar and during flight that are the key to the emotional involvement that marks a first-rate game.

Interwoven with the cinematic sequences and the combat portion of the game are an absolutely superb musical soundtrack and sound effects. The soundtrack sets the tone for the sequences on board the ship, as well as in combat, where the mood of the music changes with the action on the screen. The sound is so important in this game that playing without a sound board greatly reduces the experience.

Which brings me to another point. Hardware. This all sounds like the perfect game, right? Give me two! But all this performance comes at a stiff price, and that price is hardware. To use the musical score throughout the game and to use all the great

Use the ship's simulator to practice your flying and fighting skills.



The *Rapier* is one of four Confederation spacecraft with an array of weapons.

graphics features, you need a very high-end system. According to Origin, the optimal platform for playing *Wing Commander* is a 16+ MHz 386 with 1+MB expanded memory; a hard drive with 6.5MB free; a Roland, Ad Lib, or Sound Blaster sound card; VGA graphics; and a joystick. Not your average home machine, at least not yet. Origin has chosen to program the best games it can, even if that means leaving those of us with less powerful systems behind.

Of the items on that list, the most important is VGA graphics. The game is much more enjoyable on a 12-MHz machine with VGA than it is on a 25-MHz machine with EGA. The EGA graphics are functional but nothing special. The detail is lost, and at times you can't tell which way the enemy ships are heading. I couldn't tell one end of the *Tiger's Claw* from the other with EGA. Once you've seen this game in VGA, you won't be able to look at your old EGA monitor the same way again.

Unlike simulators that generate a new scenario each time out, *Wing Commander* has a story line that takes you through a single campaign. However, the path you take from the beginning to the end depends upon your performance in battle. There are 39 unique missions set up in a sort of tree structure. According to Origin, you can actually win the entire campaign and finish the game in as few as 10 or 11 missions—if you do very well on each flight. But there would still be a bunch of missions that you wouldn't have seen, so there's a good degree of replay value. Just botch a mission or two, and you'll find yourself on a completely different mission path.

The biggest complaint anyone seems to have about this game is that there should be more. Origin is listening. A *Secret Mission* disk is available directly from Origin for $19.95 with a whole new campaign that takes you deep into Kilrathi territory. (Any characters lost in the original campaign will be reborn!) Coming in late spring will be a completely new and improved stand-alone sequel that will include new ships and features.

If you really want to push your computer to the limit, *Wing Commander* does it better than anything else on the market. So heat up your laser cannon and show those feline fleabags that the "hairless apes" of earth know more than one way to housebreak a cat!

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

Wing Commander

IBM PC and compatibles; 640K; 12 MHz or faster processor; dual floppies or hard drive; EGA, VGA, or Tandy 16-color graphics adapter; optional mouse or joystick; optional Roland, Ad Lib, or Sound Blaster sound card—$69.95

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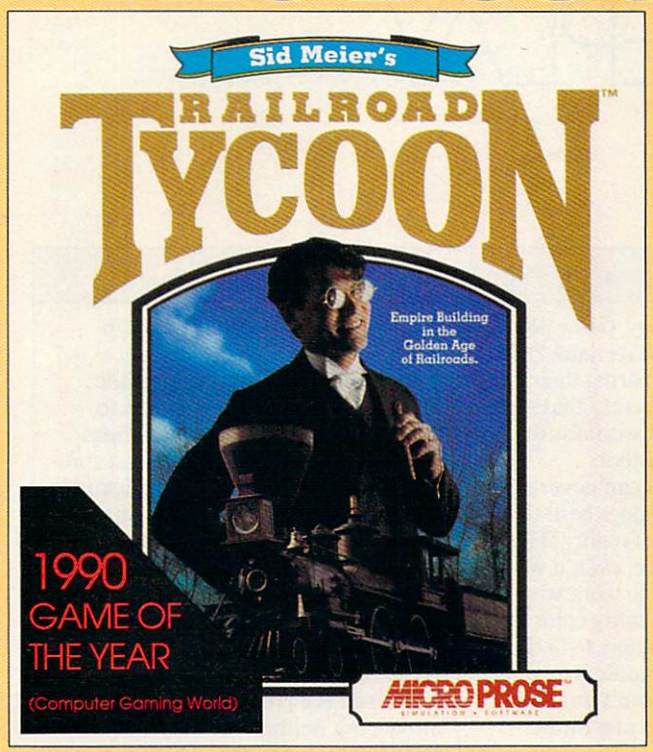
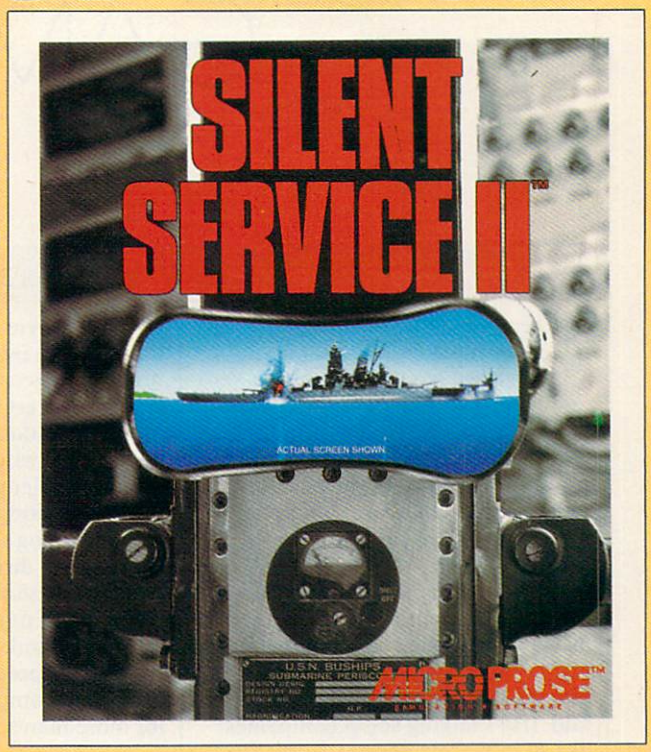
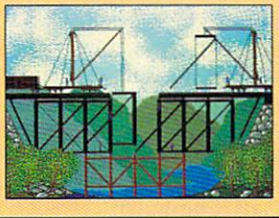
The Best of Times







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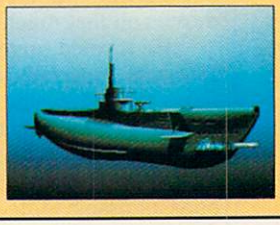

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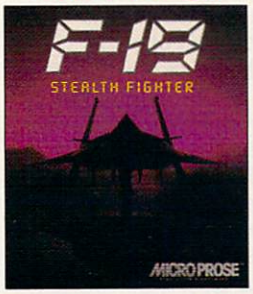

The Software Publishers Association named this one Simulation of the Year. Engrossing game play. Fascinating strategies. Revolutionary graphics. Based on America's radar-elusive jet.

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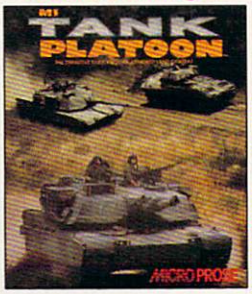

Command not just one tank, but a full platoon of four with controls so smooth they put single-tank games to shame. Call in jets, helicopters, artillery and infantry support, too.

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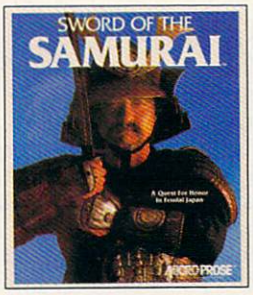

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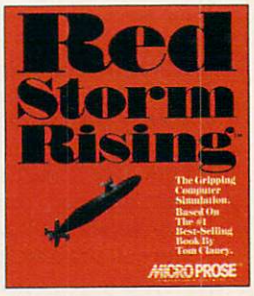

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GAMEPLAY

ORSON SCOTT CARD

The other day I was talking to game designer Hal Barwood. Barwood has one of those careers that make you say, "Wow, he did *that*, too?" He was producer and cowriter of the movie *Dragonslayer,* for instance—which is, to my mind, the best medieval fantasy movie ever made. He has also directed films and plays.

During our conversation, Barwood made an observation that really hit home with me. "The companies making animated games keep talking as if the games resembled movies," he said. (He's talking about companies like Access, Cinemaware, Lucasfilm, and Sierra.) "But they don't resemble movies all that much."

He granted some resemblances, of course, especially with animated film. The dependence on artists; the trickle rate of production, where you're producing the game or film at the rate of only minutes, or even seconds, of usable footage a day; and the dominant role of the editing process.

Still, though, when it comes to the art of composing a game, inventing it, he said, "What it really resembles is theater. Plays."

Why? Because as with a play, you have only a few settings you can work with, and they can usually be viewed from only a single angle and at the same distance. You can't do any meaningful work with closeups (to design and program genuine realistic facial expressions just isn't worth the huge investment in time and disk space). It's so hard to make actions clear that you must either rely on dialogue, like most plays, or show only the simplest, most obvious actions.

In movies it's just the opposite. You control the pace and rhythm of the film by cutting and shifting the action from place to place. The camera never gazes at any one thing for long.

On reflection, though, I realized that Barwood's observation was really saying something deeper than merely taking note of a useful analogy with theater. A lot of animated-game designers put far too much faith in that game-as-movie analogy. (How do you think Cinemaware got its name?) As a result, they keep comparing their games to an art so different that most of the techniques that work for the one will fail with the other.

Computer games can never equal film at the thing film does best: the overwhelming sense of reality. There isn't enough disk space, even if we had LaserDisc-ROM to work with, screens with movie-quality color and resolution, and computers with the processing speed to handle it (even a Cray supercomputer can't do it now for more than seconds at a time).

FILMS CAN MAKE LOUSY GAMES

Computer games can't even do what cartoons do, because we can't put in those wonderfully expressive voices.

What Barwood has discovered—and what every good game author eventually has to learn—is that computers are a completely different medium, and great computer artworks will only come about when we stop judging computer games by standards developed for other media. A good animated computer game will, by definition, be a second-rate film or play. By the same token, a good film, if it's adapted *too* faithfully, will invariably make a lousy game.

Take *Gone with the Wind.* The book does a fine job of evoking the rebuilding of Atlanta after the war. There are many details and general statements that, together, build up a good intellectual and emotional feel for that process, for the society in transformation.

Wisely, the filmmakers made only the most cursory attempts to show this—a few shots of buildings under construction—and almost completely avoided the social implications of this process. There simply wasn't time in the film to develop the kind of understanding that could be easily created in the book. The filmmakers concentrated on showing only those parts of the story of *Gone with the Wind* that would work well on film. The result is a great book and a great movie, but neither one even comes close to conveying that which is best about the other.

There's a lesson to be learned. As long as films tried to be plays, they couldn't be good films. As long as television tried to be movies or plays, we had no idea what good television could be. And when plays try to do what film and television do so much better, they also fail. Computer games will only achieve greatness when the game authors stop thinking their goal is to put movies on the computer screen. The art of computer storytelling has to be invented, not copied.

The analogy goes one step farther, too. The art evolves along with the technology. When sound came to film, when videotape came to television, when reliable and variable stage lighting came to theatre, when cheap printing allowed stories and poems to be read silently and in private instead of aloud in a group—with each of these advances, the storytellers were able to take giant leaps forward.

You want to do the rebuilding of Atlanta after the war? *SimCity* does it better than either the book or the movie of *Gone with the Wind.* The computer "don't know nothin' 'bout birthin' babies," but what it does well, it does better than any other medium that ever existed. And game authors will do their finest work when they spend their efforts on what computers do well, instead of wasting time trying to make movies on a VGA screen. ⊡

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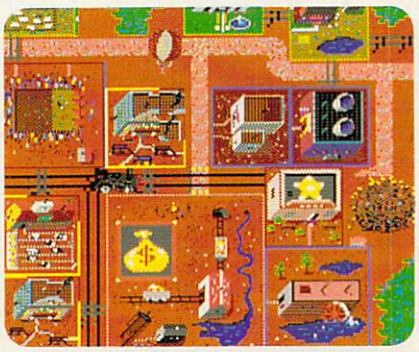
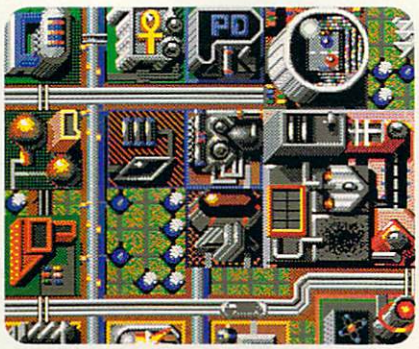


It's home on the range. And you're mayor of a bustling frontier town filled with gold, cows, and plenty o' bad guys.



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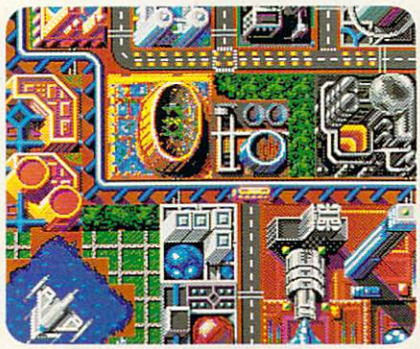
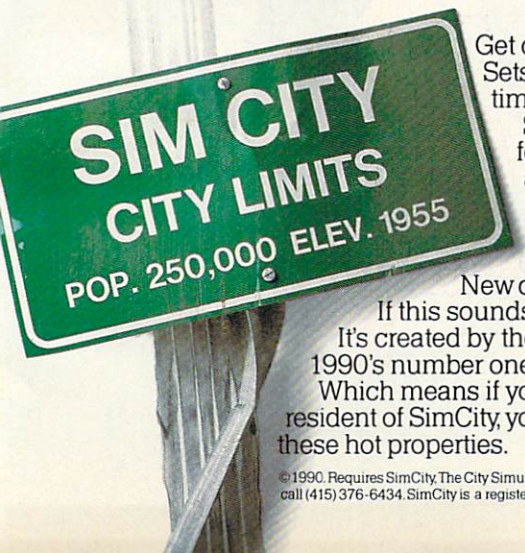


In Europe of the future the universal language is technology. Misuse it and you'll kiss your city au revoir.

You're head of a lunar mining complex. Don't forget your umbrella: there's always a chance of meteor showers.



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If this sounds like acres of fun, it should. It's created by the same people who produced 1990's number one smash hit.

Which means if you're already a permanent resident of SimCity, you'll now have to move to these hot properties.

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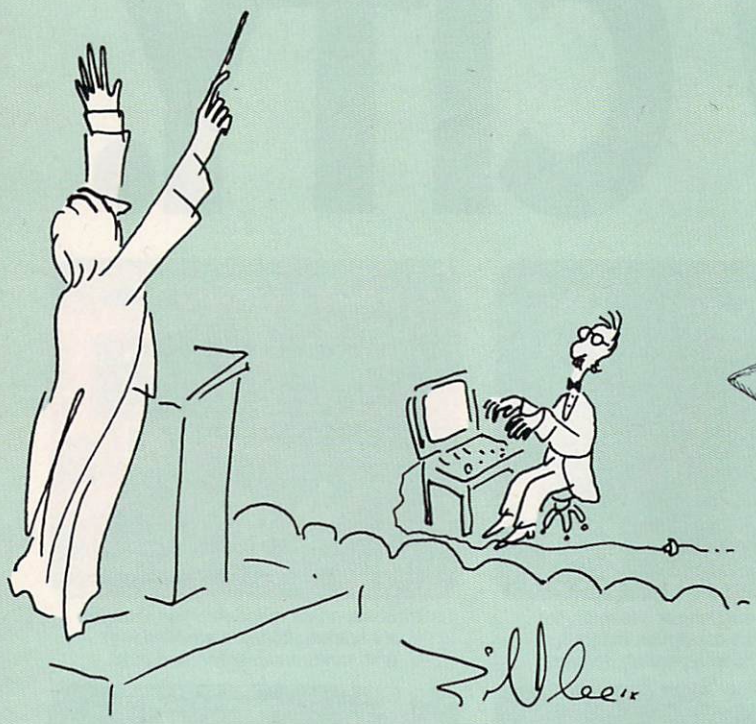

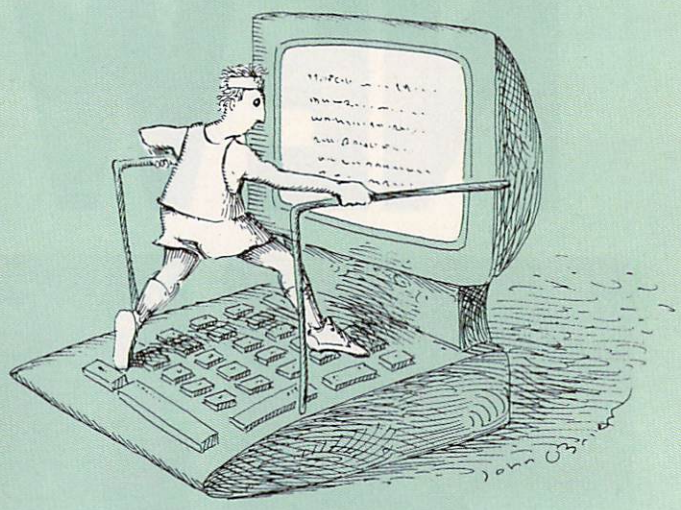

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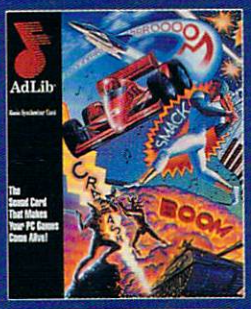

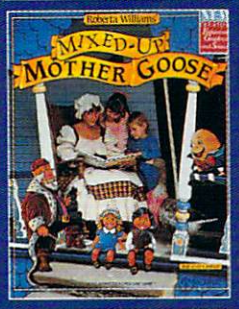

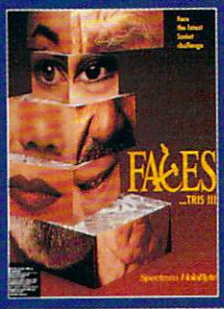

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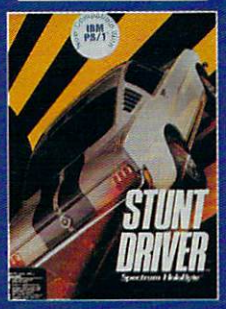

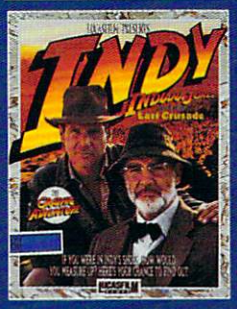

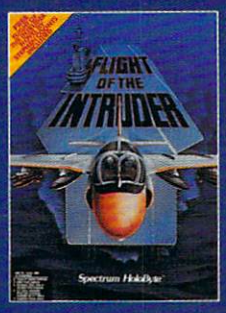

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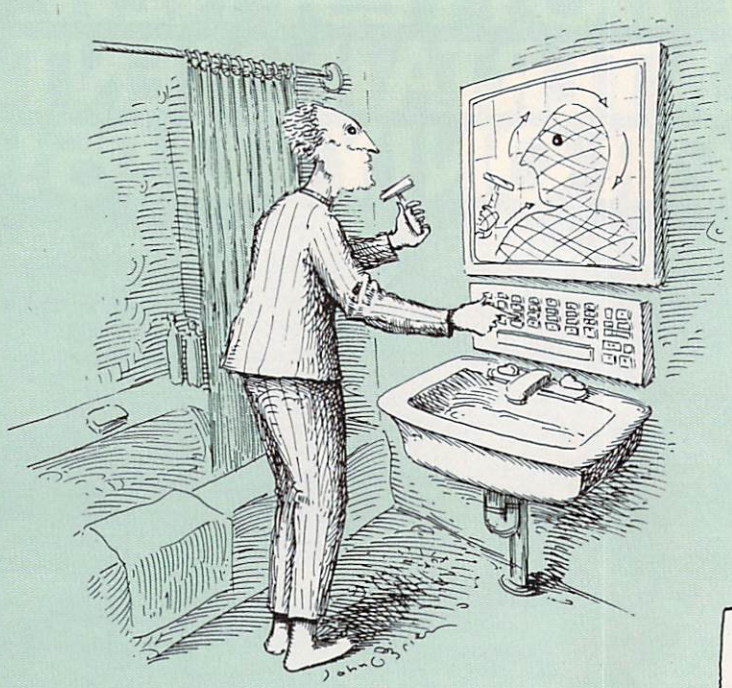

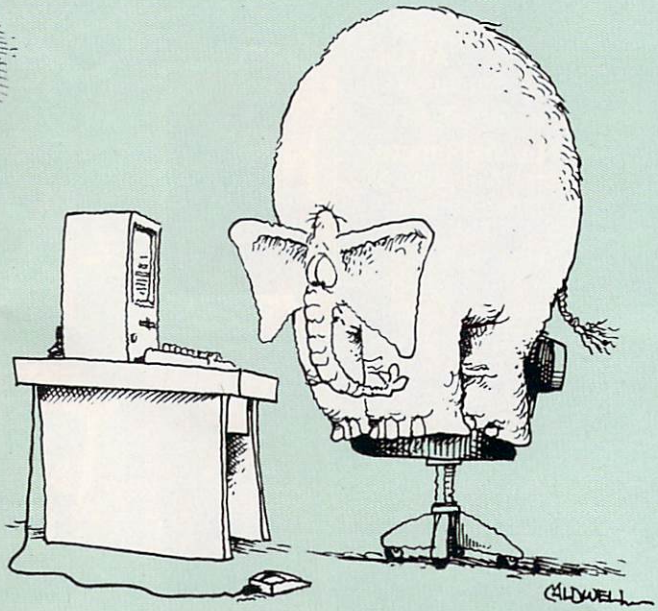

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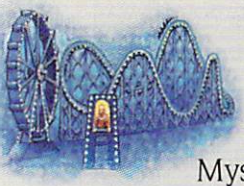

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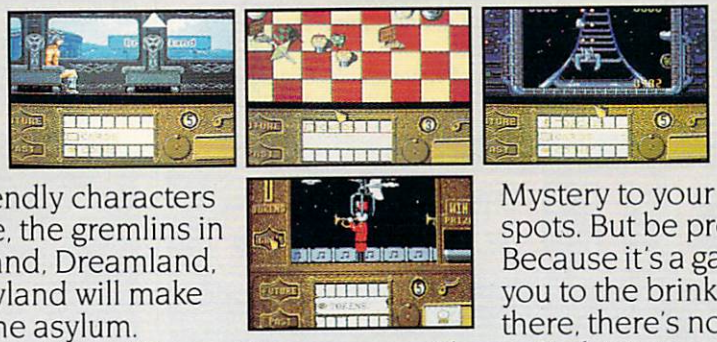

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And on your return trip to Yesterdayland, you'll encounter the keeper of your destiny—Zoltan, who will dispense valuable clues, essential tickets and life saving magic.

Throughout the mystery, you'll also be tested by games of chance, like Bagatelle and the Grabber. Each of these ancient gambling devices will force you to execute supreme strategy. Of course, if you fail to locate secret keys, spare parts for rides and supernatural potions which are hidden throughout the park, all the luck in the world won't save you.

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continued from page 10

Peter Scisco responds:
The key phrase in my column, as you so keenly point out, is computer's potential. *Whether any of the products you mention fulfill that potential is a question answered best by each consumer's individual judgment. That's why they call them* personal *computers.*

Virtual Reality

I just wanted to let you know that I like your magazine very much. I am interested in the new "virtual reality" computers. A story on these new computers was done on the ABC news with Peter Jennings on Tuesday evening, November 27. I'd appreciate it if you would send me any information available on this system. Has your magazine done any articles on this system, or are you planning to do one?

T. G. CASE
PHILADELPHIA, PA

You'll want to pick up a copy of COMPUTE*'s May issue, in which we'll be covering multimedia and the uses of "virtual reality" that are now under development. Steven Anzovin's April "Pathways" column will also focus on this fascinating topic.*

GeoWorks Coverage

Your June 1990 issue outlines a GUI being developed by Berkeley Softworks (now GeoWorks), which will work on an 8088 PC. Since I own a TI Pro 8088 computer, I'm interested in what you can tell me about the product.

JAMES SPENCER
WALTON, KY

I just got my December issue of *COMPUTE*, and I have two questions.

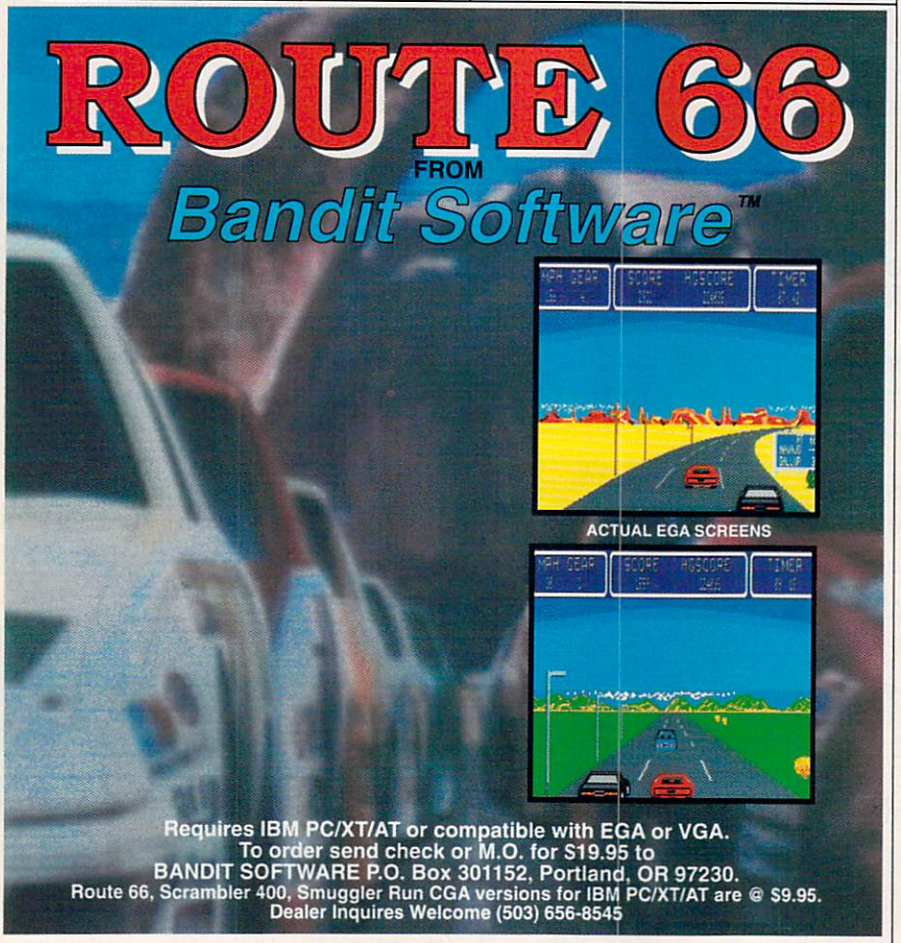
First, I have an old Leading Edge Model D (since January 1987) and am anxiously awaiting the release of *GeoWorks*. I've been reading about it for months. When will *COMPUTE* cover it?

Also, how is Leading Edge doing in its comeback trail?

JOE BLIGH
LAKEWOOD, CA

COMPUTE *offered the first major report on* GeoWorks Ensemble *in its October issue, in an article called "Artful Appliance." As this issue goes to press, the official release of the software is imminent. We plan to do a full review of the package when it arrives.*

As for Leading Edge, the company was showing several new computers at last fall's COMDEX show in Las Vegas. Watch for COMPUTE*'s new Test Lab, starting in May. We'll be giving some of the new Leading Edge equipment a thorough going over during one of our first lab reports.*



Circle Reader Service Number 124

***Tempra* from Mathematica**

The phone number listed for Mathematica, maker of the Tempra *graphics-editing software package (photo above) described in the December* COMPUTE *("Desktop Video Here and Now," page 22) was listed incorrectly. The correct number is (800) 852-MATH (6284). We apologize for any inconvenience caused by the error.*

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

PC VIEW

CLIFTON KARNES

There are two fundamental ways of looking at computer information, and understanding the difference between the two is essential if you want to follow what's happening with computer output today.

The first way to store information is as data, which is a literal picture of the information. The second way is as an algorithm—a formula or recipe from which information can be constructed.

To get a clearer understanding of the difference between data and algorithms, let's look at a character from the alphabet. To store the letter *I* as data, you might use the following pattern:

```
00001000
00001000
00001000
00001000
00001000
00001000
```

In this grid, 0s represent space and 1s represent the elements that make up the character.

To store this letter as an algorithm, think of the columns as *x* coordinates and the rows as *y* coordinates, like the Cartesian system you may have learned in geometry. When you look at the letter *I*'s pattern, you quickly see that it fills column 5. No matter which row you look at, there's a 1 in that row's fifth column. And that's our formula: $x=5$.

There are several things to notice from this simple example. First, assuming each 0 and 1 is a bit, it takes six bytes to store this letter *I* as data. If we wanted a larger *I*, it would take more bytes. We can store the algorithm for this letter, the formula $x=5$, in just three bytes, one for each character.

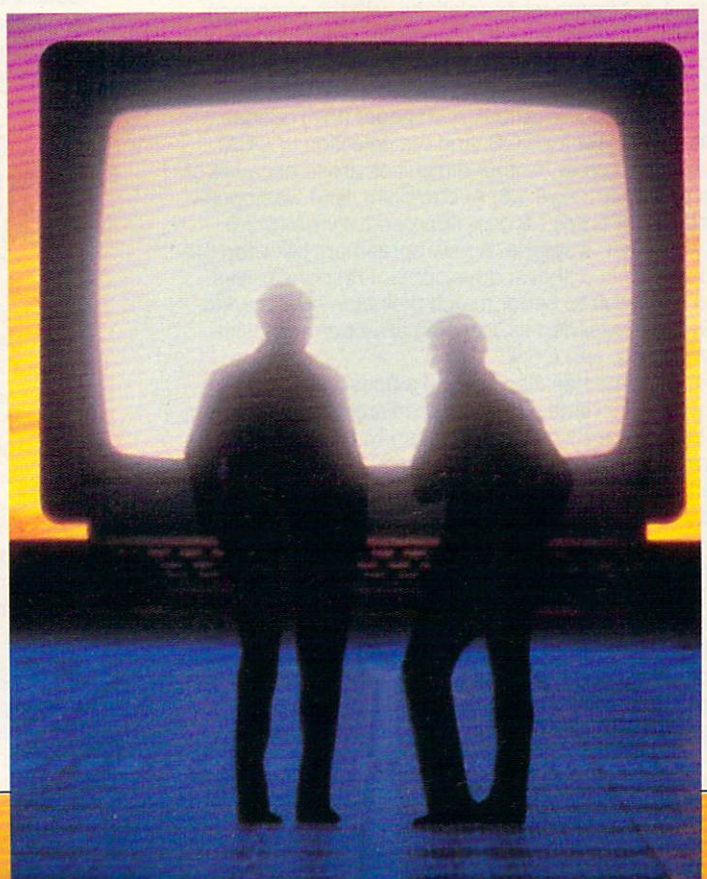
You may also have noticed that while the data used to form the letter's image is a literal representation of the letter, the algorithm is generalized and idealized. The same three-byte algorithm can be used to create an *I* of any size, from one less than a quarter of an inch high to one six feet high.

Computer-science texts are filled with the interplay between data and algorithms, but in font land, the terms are *bitmap* and *outline,* and occasionally *raster* and *vector. Bitmap, data,* and *raster* mean basically the same thing; and *outline, algorithm,* and *vector* are roughly synonymous.

So what are the differences between storing information as data and storing it as algorithms? First, data is faster. Ask any programmer. If speed is essential, you always store your information in a table as data. This will make your program larger, but it will run faster. If it's more important to make your code smaller or give it more flexibility, then you'll want to store the information as an algorithm and reconstruct the information from your formula.

Data almost always takes more storage space than algorithms. This has become such a problem that an entire cottage industry has arisen around compression programs, which make data smaller by turning it—at least partially—into algorithms.

Algorithms are more flexible than data. As we saw with the representation of the letter *I,* an algorithm is a general representation of information and can be resized easily. And it's not limited to any particular output device. This last point is especially important. Bitmaps are device-dependent, but an outline can take advantage of the maximum resolution of your output device, whatever it is.



Until recently, you had to choose one technology or the other—a bitmapped, data-based font, or an outline, algorithm-based one. But things are changing. *Facelift,* Bitstream's newest font package, is one solution that combines the speed of bitmapped technology with the flexibility of outlines. The program produces its proprietary Speedo fonts from outlines, but you also have the option of installing any often-used fonts as bitmaps. That way you can use faster bitmaps for the majority of your work but still have outlines handy. Bitstream is on track with *Facelift* and its combination of outline and bitmapped fonts. Let's hope other font makers follow Bitstream's example. ⊡

NEWS & NOTES

Ancient History

Thanks to the reunification of East and West Germany—and IBM—scientists from six German historical institutions are building a common database of ancient Egyptian information. The project will use computer equipment funded by IBM Germany and will make use of the power of the computer to store and analyze the hieroglyphics of the ancient Egyptian language.

The goal is to construct a modern, comprehensive, and accurate dictionary of the language. The dictionary will be built on a networked database located in a Berlin museum. Eventually, international access to the database will be established. The first phase of the planned system is being set up on six IBM PS/2 computers.

The database will contain tens of thousands of hand-drawn cards, some of them a century old, from the Academy of Science in Berlin, plus text collected by other institutions.

The database won't just be used to assimilate existing information, however. Humboldt University, for example, is planning an excavation expedition to Egypt in 1991. The expedition will take a portable IBM PS/2 Model 70 to record the data of its findings on disks. The disks will be mailed to Berlin for immediate entry to the database, even before the team itself has returned home.

Patching It Up

IBM and Microsoft have overcome tense relations with the announcement of a revised development agreement. For nearly eight months, reports indicated ongoing differences between the two allies on such issues as the choice of graphical application programming interfaces for OS/2, the timing of the initial Presentation Manager (PM) release, the development of a PM subset for DOS, and the selection of OS/2 font technology. This past summer, further difficulties arose because of a dispute over IBM's new 2MB OS/2 1.3. At one point, IBM was openly promoting the advantages of OS/2 1.3 over *Microsoft Windows* 3.0.

Now things are smoother, it seems. A new agreement between the two companies has resulted in a shift in development responsibilities that permits IBM and Microsoft to better match their individual marketing priorities. IBM has also extended its licensing arrangements with Microsoft for DOS, *Windows,* and OS/2.

On another front, Big Blue has also formed a consortium with microprocessor giant Intel to create a new super micro channel, codenamed MCA 2++. Inside reports indicate that Tandy, NCR, Olivetti, Siemens Information Systems, Acorn Data Products, Reply, and Parallan have already lined up in support of the new peripheral interface. Intel has also reportedly completed preliminary engineering on chips based on specifications developed by the group. The new consortium is considered by many to be an attempt at playing catch-up with a comparable group that Compaq organized two years ago. That group created the Extended Industry Standard Association (EISA) interface standard, which analysts say is now winning out over the original Micro Channel in number of applications and peripherals that support it. MCA 2++ will, according to industry sources, offer better system performance and will support Intel's 586 microprocessor and beyond.

Desktop-to-Desktop Publishing

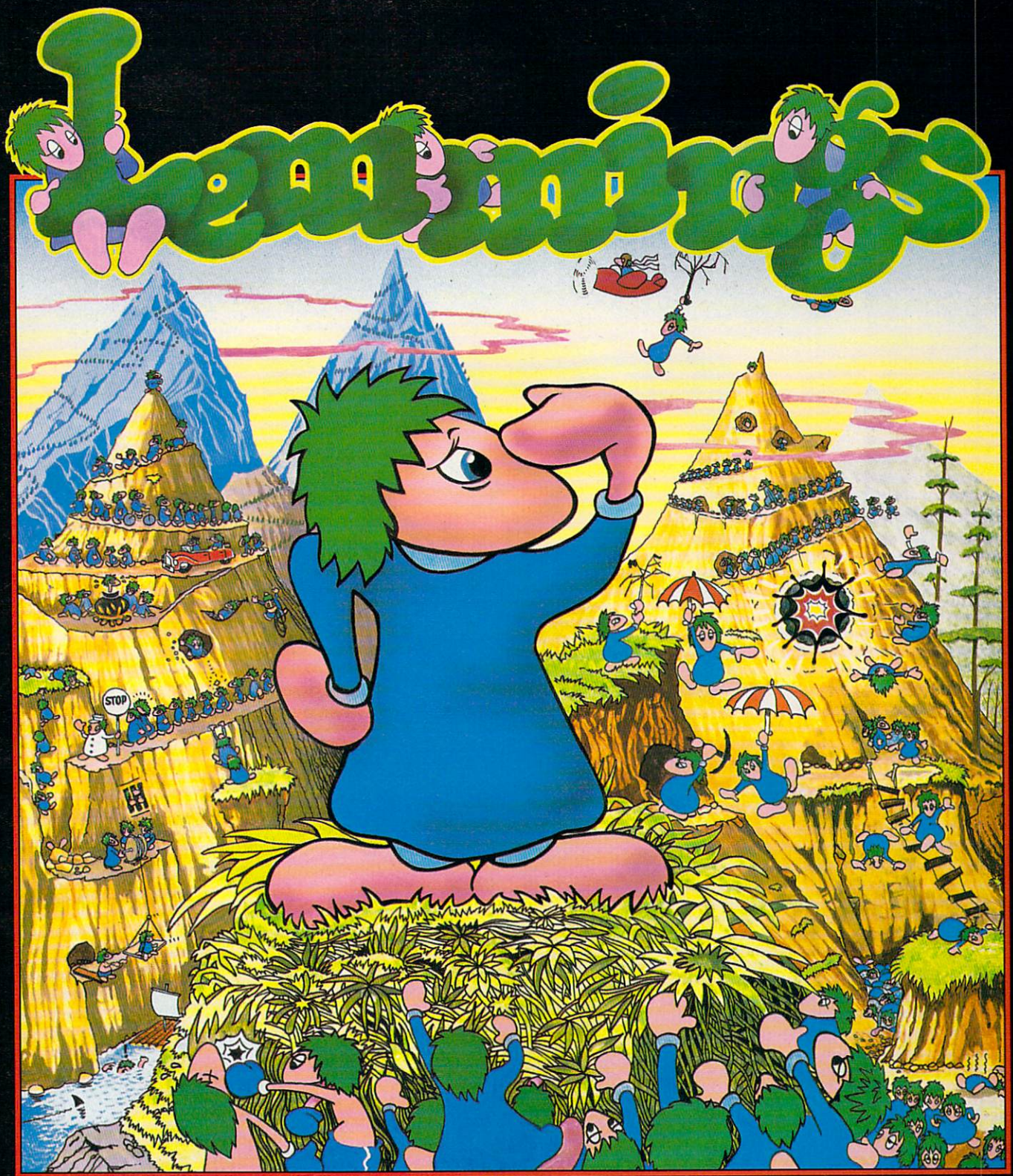
Computer technology has not only revolutionized traditional document design, but it's also added new capabilities never before considered.

Because desktop publishing prepares the document on a computer, the next logical step is to connect distant desktop-publishing computers so two or more users could participate in the creation of a single document as if they were in the same room.

Xerox DocuBuild, for example, allows project teams to collaborate on the creation of production-quality documents across computer networks. With *DocuBuild,* multiple authors in different locations can access and modify documents across computer networks, manage work flow, and simultaneously view the status of all aspects of a publishing project. Sporting a host of advanced publishing fields and Xerox's usual penchant for graphics quality, *DocuBuild* operates within the *Xerox GlobalView* networked desktop environment, noted for its icon-based, mouse-driven graphical user interface. It runs on personal computers equipped with Xerox GlobalView for the PC, a coprocessor board and software that turn personal computers into multitasking, networked workstations. It will begin shipping in the U.S. in the second quarter of 1991. Pricing starts at $2,500 per workstation and $495 per PC.

Xerox, 800 Long Ridge Rd., Stamford, CT 06904

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



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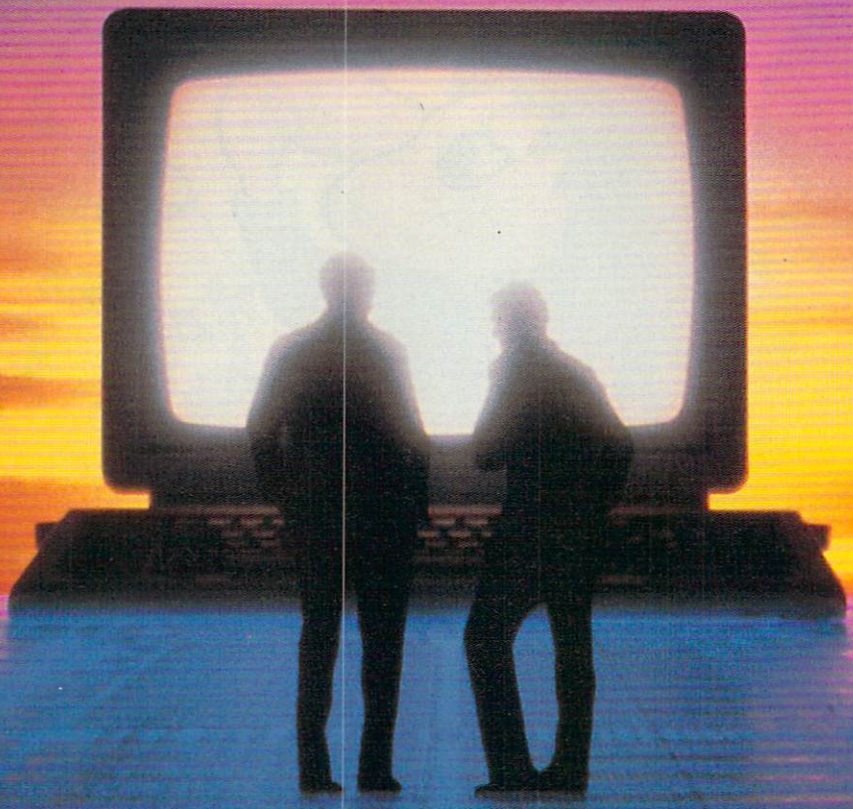
AFTER YEARS OF BEING PASSED OVER FOR LANGUAGES SUPPOSEDLY FASTER AND SLEEKER . . .



BASIC IS BACK

TOM CAMPBELL

PC IBM, TANDY, PC COMPATIBLES

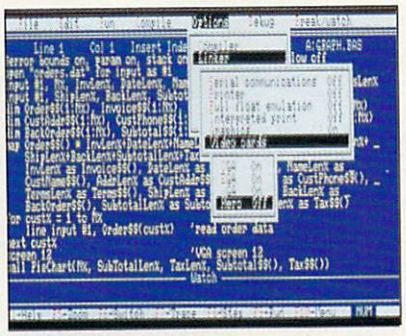
It wasn't supposed to work out this way. By now, BASIC should've been history. In the late 1960s, Pascal was expected to have knocked off BASIC. In the 1970s, C was touted as the BASIC killer. These languages were miles ahead of BASIC.

Little wonder the fans of emerging languages had little good to say about it. BASIC was unstructured, claimed the partisans of Pascal. It was too much like FORTRAN, observed the C wizards.

And they were right. But the reports of its demise were premature. BASIC, like Rocky with a pocket protector, keeps coming back with astounding resilience.

History Lesson

BASIC was created in the early 1960s to give Dartmouth College students a way to use computers easily without becoming experts in FORTRAN. BASIC is an acronym for Beginner's All-purpose Symbolic Instruction



***QuickBASIC* revolutionized PC BASICs.**

Code. And while they weren't very good at dreaming up convincing acronyms after the fact, BASIC's creators, John Kemeny and Thomas Kurtz, could invent languages like nobody's business.

It's impossible to overstate the effect BASIC had on the computing world. Almost everyone—whether involved in programming or computers or not—recognizes the name of the language. Even the uninitiated can learn a few BASIC statements in a short time.

Back Talk

BASIC is interactive. When it was introduced, the mere fact that you could type in BASIC statements at the terminal was revolutionary. Real byteheads wrote their programs a week in advance, painstakingly typing them out on IBM cards that looked like airline suitcase tags gone bad and submitting them to the computer's operator, who would then run the cards and see that the resulting printout was returned to the programmer eventually. BASIC changed all that. It took a computer that was a distant, cloistered beast and turned it into a friendly intelligence with which programmers could directly interact—in terms not very different from conversation (or at least not very different from a conversation among byteheads).

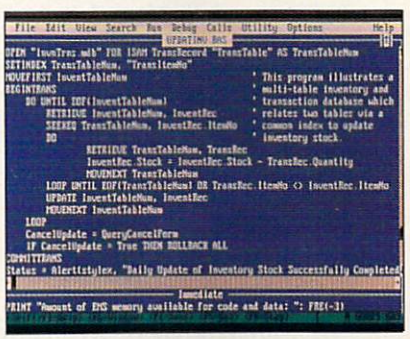
Not only is it interactive, but BASIC (unlike most other languages available at the time of its creation) was not hideously difficult to learn. Take variables, for example. Variables in computer languages are something like the variables that gave you nightmares in high school algebra (as in $4X+2=Y$), but they're more useful and less threatening. In PL/1, another computer language, if you wanted to use a variable, you had to warn the compiler in advance that you'd be using it. You even had to say how many *bits* it took up. BASIC is more tolerant. If you need a variable, just start using it—BASIC handles the bookwork.

The original BASIC, introduced in 1964, was primitive by today's standards, but it was profoundly influential. It spread like measles through the programming world, which at that time was entirely concerned with minicomputers and mainframes.

Meanwhile, as Kemeny and Kurtz take pains to point out, Dartmouth's BASIC was evolving at a fantastic pace. The popular version of BASIC was not their brainchild, but its mutant, obsolescent offspring. For example, the requirement that each line begin with a number was dropped early on in the Dartmouth version, but line numbering was still common practice until 15 years later, when Microsoft released *QuickBASIC*.

A more important difference lies in the fact that Dartmouth BASIC was *compiled* from the start, but it was compiled so quickly that it was invisible to the user. In short, it looked as if it were *interpreted*.

The difference is that compiled code is completely converted into a form the computer can read directly, and therefore it runs much more efficiently. Interpreted code is read by a second program called an *interpreter*, which then instructs the computer in



Power and size mark Microsoft BASIC 7.1.

***PowerBASIC* is a fast alternative.**

its own language, telling it how to go about following the commands in the BASIC program. The result is slower, less efficient execution. Another near-fatal shortcoming of interpreted BASIC is that you normally can't distribute an interpreted program and expect it to run on the target machine because it needs the interpreter. Compiled programs, on the other hand, are self-contained. Dartmouth BASIC had the immediacy of an interpreted language, but it was a compiler—again, a feature that would not see implementation commercially until *QuickBASIC* was released in version 4.

BASIC got a bad rap from academics and computer snobs even as it was making spectacular progress, much to the frustration of its creators. All involved in the controversy seemed blind to the fact that BASIC was by far the most popular language in the world by the time the IBM PC was introduced.

The Language

BASIC is the Swiss Army Knife of computer languages. Like that versatile tool, bristling with corkscrews, trimmers, and a toothpick, BASIC is adequate to accomplish just about any small task you'll run across in the field.

Likewise, if you have a big programming job, you'll probably find other languages better suited to your task. Modern versions of BASIC (*QuickBASIC, Power BASIC,* or *TrueBASIC,* but not the free BASIC—probably BASICA or GW-BASIC—that came with your copy of DOS) can legitimately be regarded as stepping stones to other languages.

All the concepts inherent in more advanced languages can be employed in BASIC.

BASIC is probably used professionally by more contractors than any other language. If your company wants to computerize its inventory system, needs a terminal program written to let customers jack into your proprietary BBS without having to learn a communications package, or needs to have a one-time program written to convert your mainframe

THE IMAGE BANK

data to *dBase* format, there's a good chance that the person you hire will write that program in BASIC.

BASIC is increasingly popular as an embedded language. A multimillion-dollar California firm called Pick Systems has for years existed solely on a hybrid operating system/database manager, and the language users work with is Pick BASIC, a variant of BASIC that allows end users to write some pretty hairy relational database code in very few lines—without having to call in the company guru.

Bill Gates of Microsoft has long threatened to make BASIC a common language to bridge *Windows* and OS/2 applications, and the latest version of Microsoft's powerhouse word processor, *Word for Windows,* actually has a BASIC interpreter to supplement its macro language.

For years, Digital Equipment's smaller computers were powered by an operating system with BASIC as its user interface. *VAX BASIC, Business BASIC,* and *HP BASIC* are all hugely popular in the minicomputer world, but this fact is treated like a dirty secret. A company in my vicinity sells turnkey CAD systems with a CAD program written in 250,000 lines of *VAX BASIC.* The price for the lowball configuration is $100,000.

Why Use BASIC?

Despite its reputation, BASIC is great for a large variety of applications. There are dozens of good books on BASIC; there's no shortage of BASIC programmers around. A lot of great programming tools are written with BASIC programmers in mind, and it's a forgiving programming environment. BASIC is good for one-time-only projects, medium-sized projects where getting the job done quickly and on a small budget is important, communications programs (BASIC has facilities built into it for communications that would take a good C or Pascal programmer weeks to duplicate), database managers, high-precision math for dollar or other decimal amounts, and programs where a slick user interface is important.

Nor can I resist pointing out that programming in BASIC is fun. After years of programming in C professionally, I still find C less fluid and enjoyable to work with than BASIC, although the demands that C places on a programmer have made me a much more capable one.

Why Not Use BASIC?

There are times to avoid BASIC. If you want your program to have portability (the ability to run the same program on many machines), you won't want to use BASIC. With careful planning, nothing beats C (and even older versions of FORTRAN and COBOL) for code that has to run on other machines.

C was designed with portability in mind. FORTRAN and COBOL are popular enough that lowest-common-denominator versions will work on just about any computer.

Group projects are another reason not to use BASIC. BASIC doesn't make you declare variables, which can be a liability on large projects where BASIC's innocent habit of creating a new variable when you've actually mistyped the name of an existing one can pose horrific maintenance problems.

Finally, programs that require dynamic memory allocation also extend beyond the scope of BASIC, which is sadly lacking in memory allocation/deallocation routines similar to malloc( ) and free( ) in C, or New and Dispose in Pascal or Modula 2.

Meet the King

The undisputed king of microcomputer BASICs is *QuickBASIC,* which is widely credited with pulling BASIC back from the edge of doom. It didn't. The installed base of BASIC code was far too immense for that. (My theory is that *QuickBASIC*'s wide recognition is due to the fact that journalists, who never really understood C, found that legitimizing *QuickBASIC* in this way meant that they could justify viewing themselves as serious programmers because even *they* could program in it.)

Structured Programming in the Spotlight

You've probably heard the phrase *structured code* juxtaposed with the phrase *spaghetti code.* Here's the good, the bad, and the ugly about spaghetti code. Especially the ugly.

Older versions of BASIC on microcomputers—quite possibly, the BASIC that turned you away from coding—were sharply limited in the ways decisions were handled, often being limited to IF/THEN statements. We'll illustrate this in a moment, but first take a look at some of the new choices available to you now. Even if you don't know what they mean, it's enough just to see the variety: SELECT CASE, WHILE/WEND, IF/THEN/ELSEIF/ELSE, and DO/LOOP, to name the major alternatives.

BASIC's SELECT CASE is even better than Pascal's and C's. It lets you make choices based on string constants, string variables, string expressions, numeric constants, numeric variables, numeric expressions, and subranges. Pascal offers only numeric constants and subranges. C offers only numeric constants.

Who cares? You do, because the only alternative to IF/THEN in older BASICs was to use tons of GOTO statements. GOTOs used in place of *real* control structures such as SELECT CASE cause horrifying maintenance problems because constructs like IF/THEN/ELSEIF/ELSE/ENDIF are replaced by IF NOT. . ./GOTO 100/GOTO 110/GOTO 120/GOTO 130. . . . You end up having to figure out what line numbers to go to. Later, if you have to modify your code, you'll end up wedging lines 17 and 18 between lines 16 and 19.

Below is a concrete illustration, excerpted from a recent program I wrote. The first example shows the structured version. It contains no GOTOs (meaning I didn't have to keep track of line numbers) or long variable names (since modern BASICs aren't limited to two characters for variable names as old BASICs were). And I could use meaningful subroutine names like IsAlpha% or IsPrint%, rather than undescriptive line numbers.

Structured BASIC:

```
' The QuickBASIC version:
IF StrSize =0 THEN
   IF IsAlpha(NextByte$) THEN
      StrSize =1: Word$ = NextByte
   END IF ' IsAlpha
ELSE
   IF IsPrint%(NextByte$) THEN
      StrSize = StrSize + 1: Word$ = Word$ + NextByte
   ELSE
      StrSize = 0: Word$ = " "
   END IF
END IF ' IF StrSize = 0
```

Unstructured BASIC:

```
5 REM The "street BASIC" version:
10 IF SS < > 0 THEN GOTO 100
15 GOSUB 300 ' IsAlpha equivalent routine. Sets global IA.
20 IF NOT IA THEN GOTO 60
30 SS = 1: WD$ = NB$
35 GOSUB 400 ' IsPrint equivalent routine. Sets global IP.
60 IF NOT IP THEN GOTO 100
70 SS = SS + 1: WD$ = WD$ + NB$
90 SS = 0: WD$ = " "
100
```

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Circle Reader Service Number 106

Built for comfort and speed, *QuickBASIC* is like a Mercedes: engineered so well, built so right that using it is an experience verging on the sensual. *QuickBASIC* was always a compiled language, but BASIC compilers were nothing new. Starting with version 4, *QuickBASIC,* like its ancestor Dartmouth BASIC, offered an environment that *looked* interpreted but offered true compiled programs by compiling on the fly.

One of the problems with compilers is that they normally operate in a sort of batch mode. You write a routine and then run it through the compiler—a process that usually takes a few minutes but can take much longer, depending on the compiler. If the routine passes muster, you run it a few times to shake the bugs out and start the cycle all over again when you begin to write the next routine. When you have enough routines, you've written your program. Programming can take on a routinized, recursive aspect that tries one's patience.

Interpreted BASIC leaves the bad part out. Using an interpreted BASIC, you write your program, press the Run key, and voilà! Instant gratification. The program runs without the bothersome compilation step.

Quick Solution

QuickBASIC skirts this problem by compiling in the background as you type. The code it compiles to isn't really machine code, so it's not as fast as native code—that is, a program the processor can run directly—but it's fine for testing purposes and much faster than older interpreted BASICs such as GW-BASIC.

When you've debugged your program, you can choose a menu option to create an EXE file. *QuickBASIC* runs a rapid compiler to create the final executable program file. In other words, *QuickBASIC* provides all the fun of the old BASIC and the advanced compiler technology of a company that's been in the BASIC compiler business for almost a decade. It's an unbeatable combination.

Nonetheless, Microsoft goes even further. *QuickBASIC* comes with strong graphics abilities, standard-setting online help and tutorials, slick mouse support, and the ability to write much larger programs than you can in traditional interpreted BASIC. My only gripe is that Microsoft expects you to rely on online help or purchase a $25 book (from—you guessed it—Microsoft Press) for reference. There is no printed reference manual provided with the language.

On the other hand, maybe *QuickBASIC* isn't unbeatable. Maybe BASIC 7.1 beats it.

ASIC: The Beginner's Inexpensive Alternative

On this issue's disk, you'll find *ASIC,* a shareware BASIC with a registration fee of only $10. It's a true compiler that generates small COM files and doesn't need GW-BASIC or *QuickBASIC,* so you can embark on your first adventures in compiled languages at a great price. BASIC power users need not apply: *ASIC* is an entry-level product at a fair price, but *QuickBASIC, True BASIC,* and *PowerBASIC* have nothing to fear. Yet.

ASIC is a fast, in-memory compiler with an integrated editor and no link step. You normally work from the editor screen and compile from within that environment, but ASICC.EXE, a command line version of the compiler, is included for diehards like me who can't part with their own editors. This is a thoughtful item that shows foresight. Programming languages shouldn't tell you how to work.

The *ASIC* language looks much like traditional BASIC without line numbers. While you can use line numbers if you like, the preferred syntax is to use labels for GOTOs and subroutines. Instead of constructions like this:

```
GOSUB 11000
. . .
GOTO 650
```

you have the luxury of much more descriptive labels, like this:

```
GOSUB DisplayScore:
. . .
GOTO Initialize:
```

ASIC's integrated editor is small but useful. It supports the fundamental operations needed by the language. The fact that there is any sort of an editor bundled with a $10 compiler is miraculous. You can load, save, and compile *ASIC* programs from within the editor. The editor isn't line-oriented like EDLIN but is full-screen like the *Turbo Basic* editor. It's capable of block operations for copying, moving, and deleting text; has search and replace functions; and lets you jump to errors in the compiled source code.

One *ASIC* feature you will rarely see in any integrated environment is its symbol-table generator. The symbol table is an alphabetical listing created during compilation that shows the location of all subroutines and labels. It's one of those things that every compiler should have but doesn't.

ASIC does lack some features. It doesn't support READ/DATA statements. There's a MID$, but no LEFT$ or RIGHT$. (That's not as bad as it seems, since you can do the equivalent of LEFT$ or RIGHT$ using MID$, but the reverse is not true.) There's no PLAY statement, although SOUND is available. Because *ASIC* uses integers only, you may miss floating-point numbers. On the plus side, integer math is many times faster than floating-point math.

ASIC was written using *Turbo C,* and its C roots show in file I/O. File I/O is limited to text mode, and string variables are fixed-length 80-character arrays ending in a 0 byte. LPRINT, PRINT#, and INPUT# let you manipulate these files. OPEN and CLOSE let you perform the housekeeping.

I was delighted to find a memory map in Chapter 8 of the manual; this map gives the location of *ASIC* system variables so that you can poke and peek them at runtime. Whereas other compilers make this information strictly off-limits to developers (they're actually warned away from such behavior), *ASIC* encourages it. That's real programming! Like the command line version of the compiler, it's the kind of thoughtful touch that keeps users coming back for new versions. You can tweak such values as the random seed, cursor position, screen width, and input buffer with the utmost safety and confidence. Naturally, PEEK, POKE, DEFSEG, and VARPTR are implemented in the *ASIC* language, giving you all the tools you need to play with any memory location in the PC.

If it's graphics you like, *ASIC* obliges you with a subset of BASIC's graphics features: COLOR, SCREEN, PSET, and PRESET go hand in hand with the aforementioned POKE, PEEK, and VARPTR. SCREEN is a subset of the BASIC version but contains the essentials; I felt BLOAD and BSAVE were the only glaring omissions. The text-based CRSLIN, POS, and LOCATE round out the features you need to move characters around onscreen; in fact, the example program with *ASIC* is an excellent version of LIFE, the cellular automation game.

Perhaps my favorite extension is ZMODE, which returns 1 if the current video mode supports color and 0 if it's a monochrome card. This is important for games and other applications that write directly to video memory; since *ASIC* supports POKE and PEEK, you can use ZMODE to locate the screen.

Oddly, there's no straightforward way to do this in other BASICs; you're forced to employ a machine language routine or, as so many programs do, ask the user what kind of screen is attached. Not only is this almost the zenith of tackiness (after all, shouldn't the program know more about itself?), but many users are unable to give the correct answer.

The manual is clearly written and weighs in at an impressive 63 pages. It's on disk in ready-to-print form and contains a Getting Started section, a tutorial, and reference for the integrated environment and the command line compiler.

The bulk of the reference section consists of a syntax chart and description for each keyword, function, and statement; but few entries contain examples. It's a common failing in first manuals and is hardly fatal, but it's an inconvenience.

Since there's only one sample program, you must resort to other books on BASIC to get the full picture.

If you're just getting your feet wet in BASIC and you need to distribute your programs to others, give *ASIC* a look. It's affordable, runs nicely on a floppy, and sports many features that full BASICs offer. It's hard to lose—and you might wind up with a brand new hobby.

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The Prince?

If *QuickBASIC* is the king of the BASIC market, Microsoft BASIC 7.1 has to be the prince. At $495, it lists at almost $400 more than *QuickBASIC,* but it's worth every dollar. For one thing, you get the manuals. You get two interactive, *QuickBASIC*-like programming environments: QBX, which is almost indistinguishable from *QuickBASIC,* and the Programmer's Workbench, an underdocumented but infinitely flexible system that's more than an editor and slightly less than an expert system. Programmer's Workbench also works with *Microsoft C* and is clearly a glimpse of the future of Microsoft programming environments.

BASIC 7.1 has support for OS/2, more options regarding program and data size, code optimization, and new additions to the language for currency (most computer languages, C and Pascal included, don't have good support for decimal math with many digits of precision). There's a text-mode user interface library with ultrafast screen updating, windows, buttons, data entry, and mouse handling. Intriguingly, the manual explains that it's designed to look like the Macintosh version of the language, and instructions are provided to port between versions. The graphics library is far deeper than *QuickBASIC*'s, notably offering *Windows*-compatible fonts that you can package with your program if the user for whom you're developing programs doesn't have them.

My favorite addition to BASIC 7.1 is the ISAM library. ISAM, which stands for Indexed Sequential Access Method, is a file-indexing method used by high-powered database programs; ISAMs offer unmatched speed and flexibility for large databases. While I haven't had a chance to test their assertions, the manuals throw around figures like 128 megabytes for a database and more indexes than a good application should ever need.

While the graphics and user interface libraries are add-ons, ISAM is built into the BASIC 7.1 language; several command line options and compiler directives are solely for ISAM. Even if you don't need things like OS/2 code generation or hacker-level tools like the Programmer's Workbench, the extras in BASIC 7.1 could save you a fortune in third-party libraries. Better still, third-party developers are now building on the foundations laid by BASIC 7.1.

Contenders

While Microsoft has just about sewn up the BASIC market, there are other BASICs. And they're good. In fact, they're very good.

Turbo Basic/PowerBASIC. A few years ago, Borland acquired a version of BASIC from ace programmer Bob Zale. Borland released it as *Turbo Basic,* but, unlike *Turbo C* and *Turbo Pascal, Turbo Basic* was unable to remain a serious contender.

I like *Turbo Basic.* It has a programming environment like the other Turbo products—awesome link speed and the most agile integrated editor around—but with a native-code compiler as the only option. While it compiles much faster than *QuickBASIC,* there's still a wait. The online help is good, but not as good as *QuickBASIC*'s. It's sorely lacking in examples and cross references, but it does the job.

My favorite addition to BASIC 7.1 is the ISAM library

The language was left untouched while *QuickBASIC* went through several brilliant revisions. Borland recently laid it quietly to rest and returned the rights to Zale, who has updated it and released it as *PowerBASIC* (Spectra Publishing).

PowerBASIC has some terrific language extensions like ARRAY SORT, ARRAY INSERT, and many incremental but wise improvements on string handling. I'd been wanting to write a program that displays a directory by extension, but I hadn't gotten around to it. C has a library routine for sorting, but access to DOS is spotty. *Turbo Pascal* has good access to DOS but no library routine for sorting. *PowerBASIC* gave me everything I needed. This is the most important criterion in selecting a language.

PowerBASIC is screamingly fast—quicker than its Turbo predecessor and close to *QuickBASIC* even on large programs, thanks to separate compilation via units. Units in *PowerBASIC* are less powerful than those in *Turbo Pascal* and Modula 2, but they do make separate compilation faster than with OBJ files.

PowerBASIC has updated help and also fits nicely on a floppy-only laptop system.

True BASIC. The rather tardy attempt by Kemeny and Kurtz, BASIC's Dartmouth-based originators, at cashing in on their creation is *True BASIC.* This language is closely based on ANSI BASIC. (America's standards organization has had a BASIC on its books for years, which may explain why *True BASIC* hasn't set the world on fire.) Core *True BASIC* runs on many machines including the Mac, Atari ST, and PC. Its main values are its portability and close adherence to the standard. It's a good choice if you're an engineer who wants to run the same program on many different machines.

Embedded BASICS

There are many versions of BASIC on the PC that come as support for another application and aren't sold as stand-alone languages.

Pick BASIC. As mentioned before, the native language of the Pick operating system is Pick BASIC. On the theory that database management is the main task of many computing systems, Dick Pick wrote his own operating system that used BASIC as its script language and user interface. The idea was sound but of limited application, and Pick has recently branched out into other operating systems, selling Pick as a database manager that can run under UNIX, PC-DOS, VMS, or whatever.

RBASIC. RBASIC is the language that comes with the muscle-bound database manager *R:BASE.* It's modeled after Pick BASIC, but *R:BASE* has been running under DOS a lot longer than Pick has. ⊡

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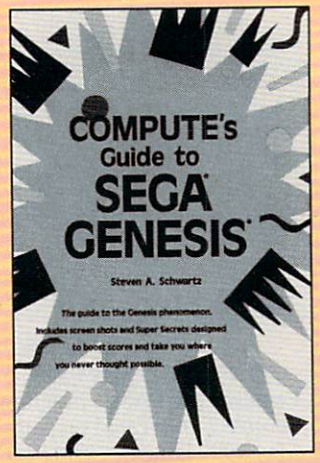

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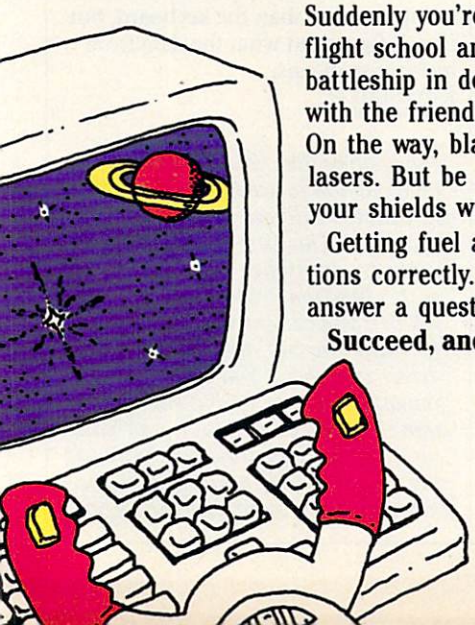

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FEEDBACK

QUESTIONS FROM OUR READERS

I entered the BASIC program *Randomize Timer* listed on page 6 in the May 1990 issue of *COMPUTE!'s PC Magazine*. I changed line 20 to reflect the number of word pairs in line 150, but when I run the program, I get *Subscript out of range.* Is there a fix for this program?

DANIEL WILSON
FAYETTEVILLE, NC

We retested the program below that was published in the issue you mentioned. You should check the number of words in line 150. The total number of words should be exactly double *the number you have listed in line 20. During our tests we only saw the error message you describe when the number of word pairs did not match the number assigned to the variable NW in line 20.*

```
10 REM Randomize Timer
20 NW=4:REM This number
   equals
   half the total number of
   words listed in line 150
30 DIM EN$(NW),SP$(NW)
40 FOR N = 1 TO NW
50 READ EN$(N),SP$(N)
60 NEXT:WC = 0:CLS
70 I = INT(RND(1)*NW)+1
80 IF WC = NW THEN
   PRINT"All
   the words in the list have been
   displayed.":END
90 IF T(I) = 1 THEN 70
100 PRINT"Spanish: ";SP$(I)
110 FOR JF = 1 to 4000:NEXT
120 PRINT"English: ";EN$(I)
130 PRINT:FOR JF = 1 TO 2000:
    NEXT
140 T(I) = 1:WC = WC + 1:
    GOTO 70
150 DATA dog,perro,cat,gato,door,
    porta,one,uno:REM There are
    twice as many words in this
    DATA statement as the
    number
    assigned to NW in line 20.
```

Keep Your Distance

I was thinking about buying a computer until I heard on the news about a draft report by the EPA on low-level electromagnetic fields generated by common appliances and power lines. The news show mentioned computers and said that IBM was working on the problem. Can you give me more information?

GORDON JOHNSON
NICE, CA

A number of recent studies have associated electromagnetic fields (EMFs) with an increased risk of cancer and leukemia. Most of these studies involve workers—such as electricians, electrical engineers, and telephone- and power-line technicians—who have spent the majority of their working lives in strong electromagnetic fields. A similar 1979 study in the American Journal of Epidemiology *found that children in the Denver area who lived near high-current electric-distribution wires had twice the expected cancer rate.*

Less reliable and more disputed studies suggest an increased risk of cataracts, birth defects, and miscarriages among workers who use video-display terminals (VDTs). With the EPA now acknowledging the possible harmful effects of EMFs, even casual computer users have become concerned. A number of manufacturers—including IBM, DEC, and Philips—are working on monitors that follow the stricter standards of Sweden and Canada. Fortunately, EMFs are sharply attenuated over short distances, so sitting at least an arm's length away from your computer's monitor is said to greatly decrease your exposure to its EMFs. Also, people at the side of the monitor or behind it may be subject to more radiation than the operator.

EZ DOeS It

I have a question about *EZDOS*, which appeared in the January 1988 issue of *COMPUTE!'s PC Magazine*. I have been using *EZDOS* since I received and installed it, but I have recently run into a problem with one of its features—the one that translates a hyphen (-) to an asterisk (*) and a semicolon (;) to a colon (:).

My wife and I run real estate appraisal software on our 286, and a new form and related software are referred to as *2-4*. I couldn't install and run the new software until I traced the problem to *EZDOS* and removed it from my AUTOEXEC.BAT file.

I tried loading *EZDOS* with the /A switch, but that doesn't suppress the translation process. Can someone tell me how to accomplish this so that I can continue to use the program?

GORDON L. MYERS
RENSSELAER, NY

EZDOS *automatically translates hyphens to asterisks and semicolons to colons for easier typing. To use the /A option that stops this translation, you first install* EZDOS *by entering EZDOS at the DOS prompt. Then at the* EZDOS *prompt, enter /A* command *to stop the translation process for that command. In your case, you would enter /A 2-4 to allow your application to use the hyphen.*

Mousing Around

I'm writing a *Turbo Pascal* program in which I would like to use my mouse as input rather than the keyboard, but I can't figure out what the data from my mouse means.

SCOTT STREET
SMYRNA, DE

We assume that you've already figured out how to use Borland's INTR function to call interrupt 33 hex (51 decimal). The first call you must make is to initialize the mouse driver. It's function 0, so all you do is set AX to 0 and call interrupt 33. (If AX is 0 after the call, there's no mouse driver installed.) You then need to make the mouse visible with function 1 (just set AX to 1 and call interrupt 33). Anytime you write to the screen, you'll need to hide the mouse before you update the screen

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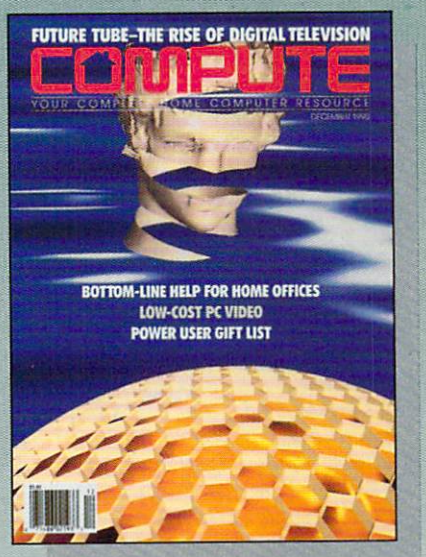

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and then show it once you've finished. To hide the mouse, use function 2.

Getting the position of the mouse and the button information is a bit trickier. Start by setting AX to 3 and calling interrupt 33. The information returned in BX is the button state. Bit 0 set (value 1) indicates that the left button is pressed. Bit 1 set (value 2) indicates the right button is pressed. The value in CX is the x*-coordinate. If you're in 80-column text mode, you'll have to divide CX by 8 to get the actual column. The value in DX is the* y*-coordinate. If you're in 80-column text mode, you'll have to divide this value by 8, also.*

Before you make the first interrupt 33 call, check to see if there's an interrupt vector. You have to do this because older versions of DOS have null vectors. If there's no mouse driver installed, your system will crash if you try to call interrupt 33. The mouse vector is located at 0000:00CC. If the four bytes at this location are 0, it's not safe to make any mouse-interrupt calls.

Password Protection

I would like to know how to create a password system that will go into action when I boot my computer.

WILL FONG
SCARBOROUGH, ONT., CANADA

COMPUTE *just released its* PC Productivity PowerPak, *which contains just such a program (among 37 other useful utilities).*

You could just as easily write a program in Microsoft QuickBASIC. *Try the following example, and tweak it to suit your needs.*

```
B$ = ""
WHILE success% = 0
   A$ = INKEY$
   IF A$ <> "" AND A$ <>
CHR$(13) THEN
      B$ = B$ + A$
      PRINT A$;
   ENDIF
   IF A$ = CHR$(13) THEN
      IF B$ = "PASSWORD"
THEN
         success% = 1
      ENDIF
      B$ = ""
      PRINT
   ENDIF
WEND
```

Replace "PASSWORD" *with your password in line 9. If you enter the word in all caps, then you must enter all caps when you type in the word after running the program. The cursor will appear on the line below the command line when you run the program. The program waits for you to enter the password. If the incorrect password is entered, the program continues to wait for the correct word. It's not sophisticated, but it works.*

Place the command to run your password program in your AUTOEXEC.BAT file. (It's a good idea to have a backup boot disk anytime you change your AUTOEXEC.BAT file.)

Where, Oh Where?

In the June 1990 issue of *COMPUTE!* magazine, you published an article called "Get a Job." In it you referred to a software program called *The Perfect Career,* designed by James Gonyea, president of the New England Center for Career Development.

I called Mindscape and was told that *The Perfect Career* has been terminated. Perhaps you could tell me how I might still be able to purchase the software.

SUSAN HORN
RYE BROOK, NY

A spokesperson for Mindscape informed us that The Perfect Career *is still available in IBM format on 5¼-inch disks only. The current price of the software is $39.95. To order the program, call (708) 480-1948.*

Lost in Space

With the 30th anniversary of manned space flight approaching next year, I'm wondering what sort of PC software is available that simulates Projects Mercury, Gemini, and Apollo and the space shuttle. Can you provide names and addresses of any companies that have such simulators?

ROBERT A. CURTIS
AKRON, OH

Space simulators have come a long way since the early versions. A couple of simulators currently available are Orbiter *($14.95 + $3.50 shipping and handling) and* Space M+A+X-Space Station Construction Simulator *($49.95, entertainment version, or $74.95, university version; plus $5.00 shipping and handling). For information on* Orbiter, *contact Spectrum Holobyte (2061 Challenger Drive, Suite 325, Alameda, California 94501; 415-522-3584), and for information on* Space M+A+X, *contact Final Frontier Software (43334 32nd Street West, Unit 42, Lancaster, California 93536; 805-943-5394).*

If you're interested in a listing of all the available space-oriented software, NASA offers an 88-page booklet titled Software for Aerospace Education. *You can request this booklet from the Educational Technology Branch, Educational Affairs Division, NASA Headquarters, Washington, D.C. 20546.*

The booklet contains detailed descriptions of the software, system requirements, and ordering information. It also contains listings of laser discs for use in space education.

For even closer interaction with the space program, NASA operates an online database service called NASA Spacelink, which contains space information updated daily. Complete instructions for use of Spacelink are included in the booklet.

Although space-flight simulations represented the bulk of early videogames, they were usually wildly unrealistic clashes among the stars between oddly shaped blips. The fact is that most realistic space flight isn't very visually appealing in a videogame.

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

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INTRODOS

TONY ROBERTS

One of DOS's notorious failures is its inability to move a file from one subdirectory to another. You must copy the file to the destination and then erase the original from the source subdirectory. Microsoft, aware of this deficiency, has included move options in its DOS 4.01 SHELL and in *Windows*.

Maybe future versions of DOS will have a true move command, but in the interim, there are workarounds. The most effective solution is to locate a move program, add it to your DOS subdirectory, and use it as if it were part of DOS.

Commercial software producers often include handy utilities as bonus programs. Make it a practice to examine all files on all disks whenever you buy new software. You may uncover some gems.

If you telecommunicate, investigate the utilities libraries of the bulletin boards or services you call for a public domain or shareware program that will automate file moving.

Another solution to the move dilemma is to create a batch file to do the copying and deleting for you. In simplest form, this batch file requires only two lines:

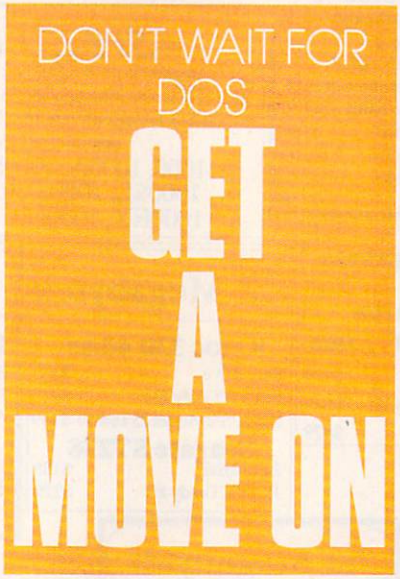
```
COPY %1 %2,
ERASE %1
```

This solution, however, opens the door for disaster. Specify an incorrect destination for the %2 parameter, and the files will not be copied properly. The second line, unaware of the problem, blindly erases all the source files.

MOVE.BAT builds in error trapping by making sure the proper number of parameters (two) are supplied and by verifying that the destination subdirectory is valid. Other problems remain to be solved, though. What happens if files of the same name already exist at the destination? How can the program make sure all files were copied safely before erasing the originals?

A commercially prepared move utility will anticipate these and other problems and will help you skirt trouble. It is possible, though, to do quite well with a self-constructed batch file. Just be sure to verify the results of each operation and have an undelete program handy in case you make a mistake.

Another of DOS's unflattering points is that it responds nastily when you use the TYPE command to view the contents of an EXE or COM file. How many times have you run across a program that you couldn't identify or that you didn't know how to use? If



only you could type the file, you could uncover some clues.

With DOS, you received a program called DEBUG that can help you out of this fix. DEBUG is primarily a program development tool, but serious programmers probably bypass DEBUG in favor of more powerful, easier-to-use utilities. Nevertheless, DEBUG provides a quick, inexpensive way to peek at program files.

To use DEBUG, type DEBUG *filename,* specifying the name of the file you want to examine. DEBUG provides you with a hyphen as a prompt. Press D and Enter, and the first 128 bytes of the file will be displayed in both hexadecimal and ASCII format. Don't worry about the hex numbers; just watch the ASCII area on the right side of the screen for anything that looks like English.

If nothing looks familiar, press D and Enter again to dump the next segment of the file. Continue the process until you uncover some clues. Although most of the program appears to be gibberish, you will find sections that contain decipherable information such as error messages, instructions, or copyright notices.

When hunting through a mystery file, watch for ASCII letters or commands that begin with slashes (/). These are often lists of acceptable command line parameters that can help you figure out how to run the program. If you find the parameter that triggers the program's HELP screen (if it has one), you're in luck.

When you've finished examining the file, press Q to return to DOS.

DOS has its shortcomings, but it does provide a good set of basic tools. With the programs available in DOS and a little batch programming, you can find a solution for most file-management problems. If you're constantly doing specialty work, however, go out and find the utility software you need to extend DOS's functions.

```
REM MOVE.BAT
echo off
if (%2)==( ) goto help
if not exist %2 \*.* goto nodest
dir %1 /w
echo These files will be moved to %2.
echo Press Ctrl C to cancel this
   operation or
pause
copy %1 %2
erase %1
goto end
:nodest
echo The desination subdirectory does
   not exist on current path.
goto end
:help
echo USAGE: MOVE filename
   destination
:end
```

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NEW YEAR'S RESOLUTION: MAKE WINDOWS WORK

Without a doubt, *Windows* 3.0 is *the* hot software of 1990. If trying 3.0 is your New Year's resolution, here are some tips to help you get started fast.

When you run *Windows* for the first time, you'll see Program Manager, a menu system that uses icons rather than program names.

In Program Manager, icons are placed in windows called *groups.* If you let *Windows'* setup program install applications for you, you'll probably have four groups available: Windows Applications, Non-Windows Applications, Main, and Accessories. You can add or delete groups, and you can add your own programs to a group. We'll add a *Windows* application to a group first, because that's simpler than adding a DOS application.

In the SYSTEM subdirectory automatically set up by *Windows,* you'll find a handy utility called SysEdit. This *Windows* application loads all your system files—the DOS files AUTOEXEC.BAT and CONFIG.SYS, and the *Windows* files WIN.INI and SYSTEM.INI—into four small windows ready for editing.

Windows' setup program doesn't automatically install SysEdit; Microsoft must not want everyone monkeying around with system information. We, however, are tinkerers, so let's get SysEdit on a group.

First, make your Main group active. Next, select File from the Program Manager menu bar and New from the pull-down menu. You'll see a dialog box that asks if this is a new group item or program item. SysEdit is a new program item, and since that's the default, simply click on OK.

The next dialog box asks you to provide a description (the name the program will have in the group) and the command line (the name of the program's executable file). For description, enter SysEdit, and for command line, type SYSEDIT.EXE (in upper- or lowercase). Click on OK, and you're done. SysEdit and its icon should appear on your Main group. To run it, double-click on the icon.

Installing DOS applications is more involved. A DOS application will run best if you create a Program Information File (PIF) for it. Let's create a PIF for GW-BASIC, DOS's BASIC interpreter. Make the Accessories group active and double-click on the PIF Editor icon.

When the editor appears, you'll see a dialog box with several fields already filled with defaults. The first field asks for the program's name. Supply the name with its COM, EXE, or BAT extension. For our example, you'd type GWBASIC.EXE (your interpreter's program name may differ).

The next field asks for the window title. This is the name *Windows* will use when the program is minimized to an icon. Type the word BASIC here. The Optional Parameters box includes any command line arguments or switches you'd like to supply. The last field asks for the startup directory. Type C:\DOS, substituting the path to your DOS directory if it's different.

If you're running *Windows* in 386-enhanced mode, click on the Advanced button. In the Other Options box, you can set a hot key for your application and disable any standard *Windows* hot keys if they conflict with your application's commands.

To specify a hot key for GW-BASIC, click in the Application Shortcut Key box and press the key combination you want to use. I suggest using a Ctrl-Alt plus a function key, for example Ctrl-Alt-F1.

Now save your PIF file with the name GWBASIC.PIF. To install GW-BASIC on a group, follow the same procedure you did with the *Windows* application SysEdit. In the Command Line box, type GWBASIC.PIF. Now, from any application running under *Windows,* you can press your hot key and be magically transported to GW-BASIC.

One of *Windows'* nicest features is that it can automatically load applications. Let's say, for example, that you want the File Manager automatically loaded on your desktop.

Double-click on SysEdit to load your configuration files and select WIN.INI. If you look on the second line, you'll see LOAD=. Simply type WINFILE after LOAD=, and you're in business. If you have another program—CALENDAR, for example—that you'd like to load automatically, type its program name on the same line, separated by a space.

If you have data files associated with applications (you can associate applications with the Associate selection from the File menu in the File Manager), you can simply put the name of the associated data file after LOAD=. When WIN.INI runs, it will load the program *and* data file.

To try this autoloading feature, create a text file with NOTEPAD (on the Accessories group), and save it with any name you choose. NOTEPAD automatically supplies the TXT extension, and *Windows* automatically associates TXT with NOTEPAD.

Now, in your WIN.INI file, enter the name of the text file on the LOAD= line after WINFILE. If your text file is NOTES.TXT, for example, your LOAD= line would look like this: LOAD=WINFILE NOTES.TXT. Now exit *Windows* and reboot for a little magic. ▫

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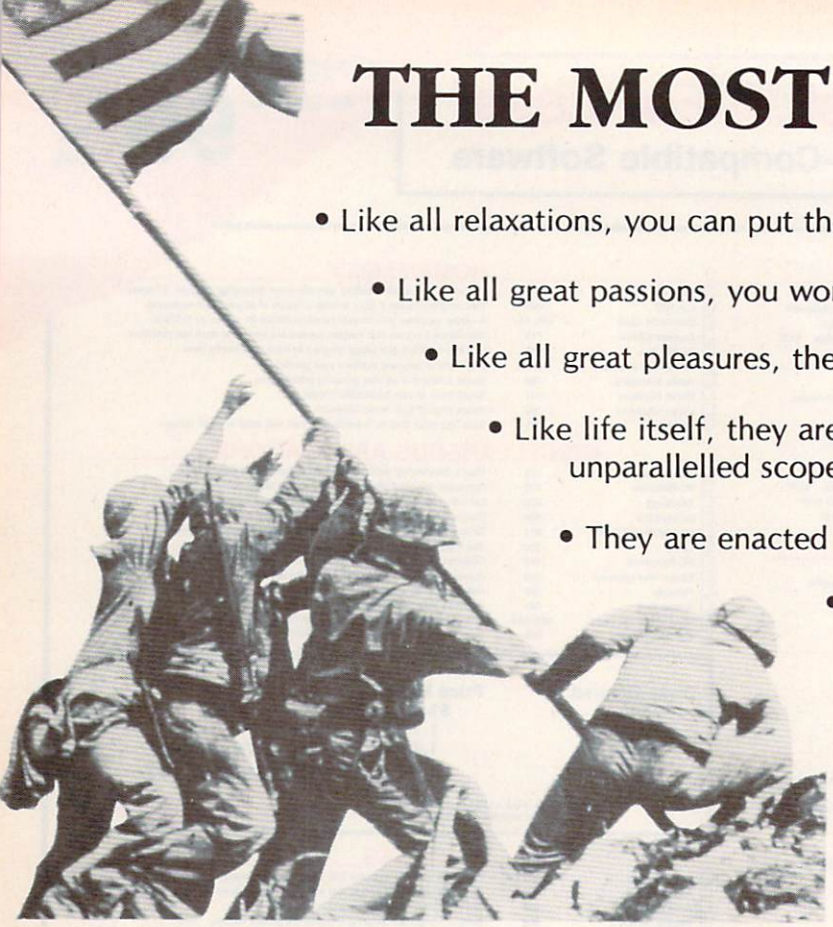

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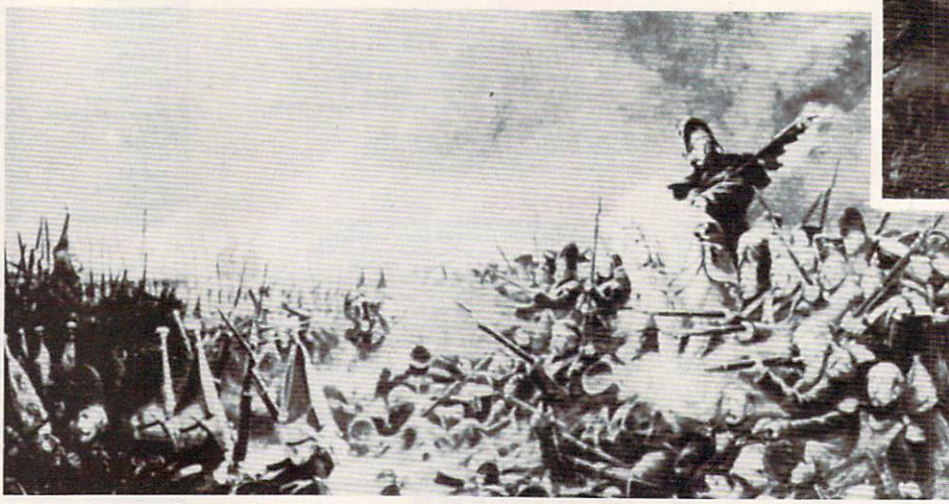
The Quebec Conference. From left to right, in the foreground: Mackenzie King, prime minister of Canada, Franklin Roosevelt and Winston Churchill.



It was a desperate plight in which the 14th Regiment of the Line found itself, the French square harshly pressed.

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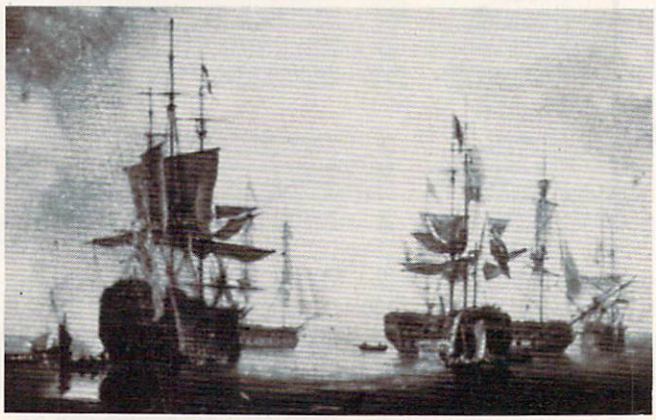

British ships of the line after Nelson's triumph at Aboukir Bay.

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

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

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

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(1 to 2)	*(1 to 2)*
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Strategic/Political Commander.....	Navy .....

☐ **MUSKETS & MULES**

Please number countries in order of preference: (1 to 3)

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Austrian .....
Russian .....
Prussian .....

C-2

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HOT TIPS

HINTS AND TIPS FROM OUR READERS

Although *Stack,* the command retrieval and key assignment program published in the March 1990 issue of *COMPUTE!'s PC Magazine,* is very useful, it has too many commands for my limited memory. Therefore, I created an ASCII text file called STACK.TXT that includes the list of instructions for *Stack* with my word processor. Then I assigned the command TYPE STACK.TXT to the F10 key. Now when I press F10, I get a screenful of instructions with the DOS prompt line at the bottom of the page.

This tip would work for any application or utility you use that offers a lot of options. Just create a text file with the commands and assign TYPE *filename* to one of the function keys.
George M. Myers
Hicksville, NY

Editor's note: If you don't have Stack, *you can still assign commands to the function keys using the ANSI codes. To assign TYPE TEST.TXT to the F10 key using these codes, you must first make sure that ANSI.SYS is installed. Add the line DEVICE=* drive: \path *ANSI.SYS to your CONFIG.SYS file.*

Use a text editor to create a batch file called F10KEY.BAT that includes the line ECHO Ctrl-V[0;68;"TYPE TEST.TXT";13p. (Ctrl-V[means that you should hold down the Ctrl key, then press V, then release the Ctrl key, and then press the left-bracket key.) Leave no spaces in the command.

To run the batch file, enter F10KEY at the DOS prompt. The batch file should be located in a directory included in your PATH statement, but the text file has to be located in the current directory unless you alter the command to include a complete path with TEST.TXT. After you've run the batch file, press the F10 key to make sure it works.

Saving Setup

Save your system setup now. Don't wait until your setup is wiped out by some misbehaving program. Sometimes, just the date and time are changed, but often the hard drive information is erased. If that happens, you can't boot from your hard drive. You have to enter the hard drive type, which can be confusing.

Run your setup program while your computer is behaving. Most systems use the F1 key to run the setup program. Watch the screen for a message that says *Press F1 to run setup . . .* when the computer boots.

Once the setup screen appears, write the information shown on a 3×5 card and put it with your system disk. Then the next time something happens to your setup program, you'll be ready with the information you need to restore your computer.
Caroline Hanlon
Greensboro, NC

The Hole Truth

If you shuffle 720K and 1.44MB disks between high-density drives on different computers, the following may help avoid confusion.

A friend sent me a document on a 3½-inch floppy. The high-density drive on my computer couldn't read it. The disk had been checked before mailing; it should have been OK. Several days later, two disks arrived from the same person: a 3½-inch disk and a 5¼-inch disk, each with the elusive document. I could read the 5¼-inch disk but not the 3½-inch disk, so it seemed unlikely that heat or magnetism was the culprit.

Another call to my friend provided the necessary clues. It turned out that his high-density drive doesn't look for a hole to identify high-density disks. He had typed FORMAT and used a double-density 720K 3½-inch disk, not a high-density disk, and his computer went ahead and formatted it for 1.44MB. My high-density drive, on the other hand, looks for the hole. When it didn't find one, the computer expected a 720K disk and wouldn't read the disk formatted at 1.44MB.

Use only high-density disks for a 1.44MB format, especially if your data is important. If you must format a double-density disk in your high-density drive, use the special parameters in your DOS manual. If you're in a pinch and need to read information on an incorrectly formatted disk, either use one of the special hole punchers for converting 3½-inch disks or find a high-density drive that doesn't look for the hole.
Mike Hudnall
Greensboro, NC

Blank It

Now you can print a blank line to the screen from your batch files no matter what version of DOS you use. I discovered that a blank line can be echoed to the screen using ANSI codes.

First install ANSI.SYS by adding the line DEVICE=*drive:* *path* \ ANSI.SYS to your CONFIG.SYS file. Once this line has been added to the CONFIG.SYS file, reboot your computer. Add the following line to your batch file:

ECHO Ctrl-V[Ctrl-H

If you can't enter Ctrl-H, try holding down the Alt key and pressing 8. Although a space appears in the example for readability, there must be no spaces between the ANSI codes and the ECHO command. Once you've entered the command, save the file and try it out.

Make sure you turn off ECHO before echoing any message to the screen. To keep the ECHO OFF command from being displayed, enter @ECHO OFF if you use DOS 3.3 or higher.
Victor Lan
Scarborough, Ont., Canada

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

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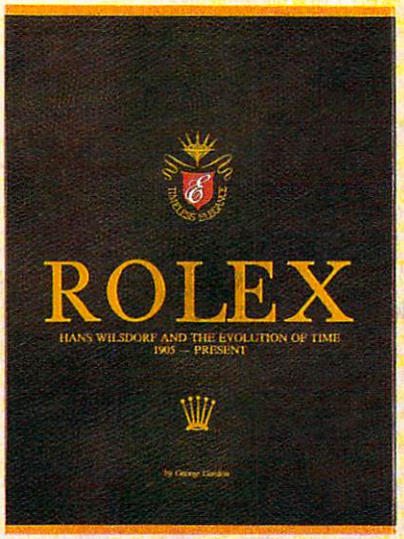

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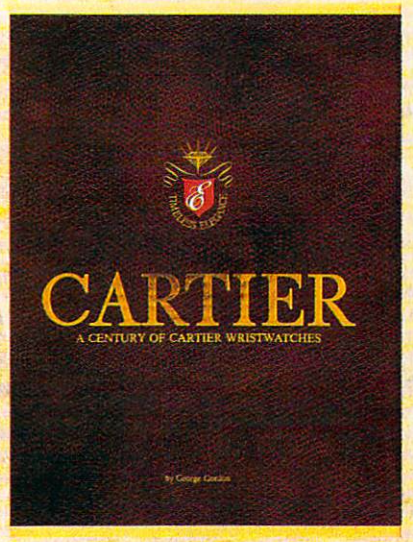

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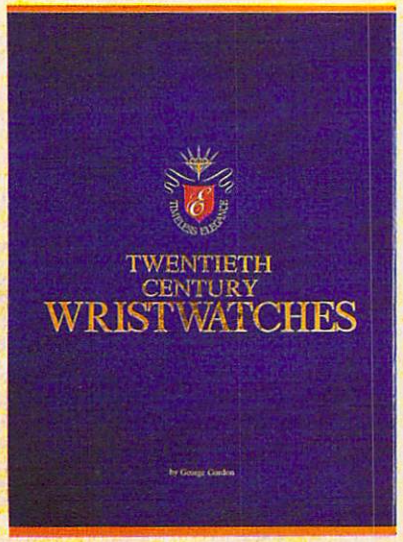

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INTERNATIONAL COLLECTORS OF TIME ASSOCIATION

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

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

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

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

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

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

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

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

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

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ONLINE

GEORGE CAMPBELL

If you've avoided subscribing to a commercial online service because of the high cost, recent developments at one major service will change your mind. General Electric's GEnie system has blasted away the normal online fees for many of its functions. For old and new GEnie users, time has literally stopped.

At the same time that the IBM/Sears Prodigy service is raising its monthly rates and adding surcharges for electronic mail, GEnie has eliminated charges for online time on over 100 new Star*Services. For a fee of only $4.95 per month, you can have unlimited GEnie access during nonprime hours to services like the *Grolier Encyclopedia,* online shopping, and travel reservations. Other free products include electronic mail, stock quotes, news and weather, plus online games.

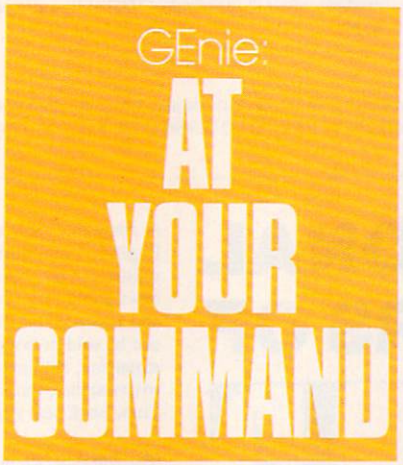
GEnie has even eliminated the traditional $29.95 sign-up fee, allowing you to sign up and test the system at no charge. Even the first month's fee will be refunded if you decide to cancel the service. To make online life as easy as possible, GEnie also offers a free communications package, *Aladdin,* which has tools to improve access to GEnie's products. You can download it directly while online.

Everything on GEnie isn't free, of course. Using roundtables for downloading software, accessing realtime conferences, or participating in the chat line will cost $6.00 per hour for users with 300–2400 baud modems. If you need these services, though, they're still a bargain. CompuServe, for example, charges $12.50 per hour for similar services.

If you have a modem and haven't yet tried out the vast resources of commercial online systems, this is a great opportunity. To get more information or to sign up, call GEnie's customer service at (800) 638-9636.

Although GEnie is a bargain, one of the benefits of CompuServe is its selection of shareware and freeware. Now that Microsoft's *Windows* 3.0 graphical user interface program has taken the PC world by storm, many users will be on the prowl for good *Windows* software.

Within days of *Windows'* release, the first shareware programs appeared on bulletin boards across the country. CompuServe led the way, with a special Microsoft-operated forum, just for *Windows.* To access it, enter GO MSWIN at any CompuServe prompt. At last count, there were over 1000 shareware and public domain programs for *Windows* available in that forum, and the number is growing quickly.



If you're not a CompuServe customer, don't despair. Most local and national BBSs offer many of these shareware and public domain programs. I've put together a list of some of the most popular *Windows* programs available online, with brief descriptions. Filenames are those used on CompuServe.

EYECON.ZIP—Just for fun, this program displays an icon with eyes that follow your cursor around the screen.

ICONDR.ZIP—Design and edit your own full-color icons for *Windows.* This is the most popular program in the *Windows* forum on CompuServe.

WNCLK2.ZIP—This program includes alarm options and stopwatch features, and it can beep on the hour.

ICONLI.ZIP—A collection of 330 predrawn icons for your *Program Manager* screen. Most popular programs have an icon in this file.

MAG111.ZIP—*Magic!* is a screen saver for *Windows* 3.0. It blanks the screen with an animated display when you're not working. It also features password protection.

MBW12.ZIP—*Mandelbrot for Windows* lets you view the famous Mandelbrot fractal image. The program includes scaling and zooming features.

ORG120.ZIP—Organize your notes in this diarylike personal information manager. Excellent searching tools and pages that turn like a real diary are special features.

PS.ZIP—*PaintShop* converts GIF graphical images into BMP or PCX formats, and vice versa. After conversion, you can edit images in *Paintbrush.*

PSFNT3.ZIP—This file contains all the screen fonts needed to display accurate depictions of PostScript fonts in *Windows* applications.

UC-20C.ZIP—*Unicom* 2.0 is a full-featured communications program for *Windows* 3.0. One of its most attactive and useful functions is its ability to download files while you work on other projects.

WINTR3.ZIP—A *Tetris*-like falling-block game for *Windows* 3.0. Be careful not to become too obsessed with this one.

WINX2.ZIP—*WinExit* lets you exit *Windows* with a single mouse click instead of the usual three.

XVTDRW.ZIP—*XVT Draw* is a full-featured, object-oriented drawing program for *Windows.* Use it like a simple CAD program. It even offers easy curve-generation tools.

ZM30.ZIP—*Zip Manager* lets you manage your archived files from within *Windows.* It can handle ZIP, ARC, and LZH file formats.

This list of programs is just the beginning. As more and more shareware authors move into programming for *Windows* 3.0, new programs appear almost daily. Try them out! ⊡

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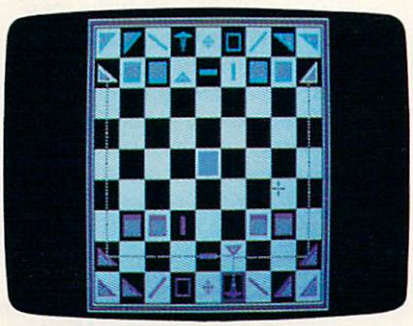

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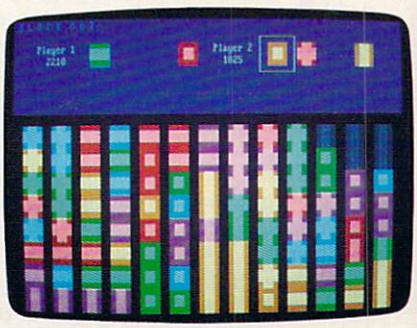

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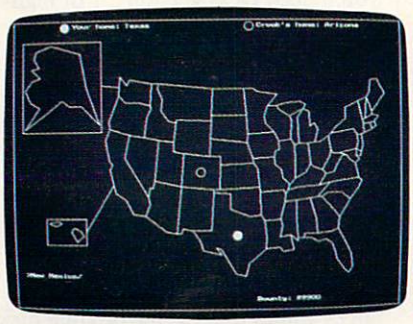

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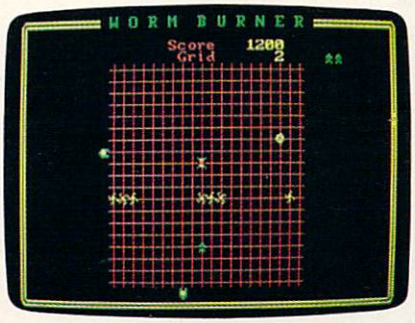

Wormburner

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QuikServe

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ON DISK

GEORGE CAMPBELL

This month's "On Disk" brings you a collection of programs ranging from a powerful programming language to three applications designed to increase your productivity at home or in the office. It's one of our best disks ever.

ASIC

The easy-to-learn BASIC programming language is the starting point for just about every programmer. If you use an IBM or compatible computer, a BASICA or GW-BASIC interpreter came with your copy of DOS. Unfortunately, programs written using these tools are slow and require line numbers. In addition, the programming editor included with BASICA and GW-BASIC leaves a lot to be desired.

Commercial BASIC compilers, like *QuickBASIC* or *Power BASIC*, are fast and have excellent full-screen editors. But they're expensive, and the programs they produce take up a lot of disk and memory space.

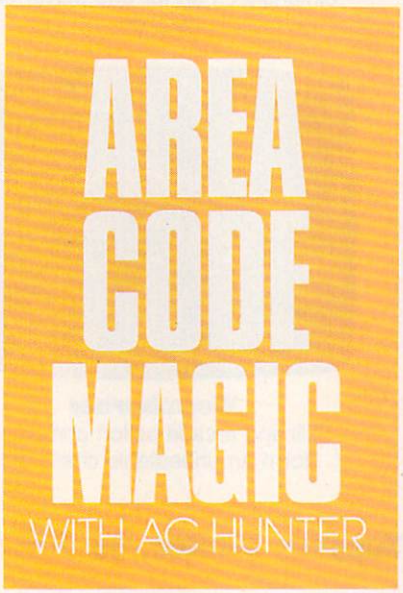
Enter *ASIC*. Written by North Carolina programmer David Visti, *ASIC* is a BASIC compiler that eliminates line numbers from your BASIC programs and produces tiny, lightning-fast, stand-alone programs. Like its commercial competitors, *ASIC* lets you create programs in a full-screen editor that you use just like a word processor. You can compile or run programs without ever leaving the editor.

ASIC includes more than 40 of the commands included in BASICA/GW-BASIC, leaving out just a few seldom-used commands. As *ASIC*'s author says, "It's almost BASIC." Once you've created a program using modern structured programming techniques, including labeled subroutines, *ASIC* compiles it into a COM file. If you make an error, *ASIC* automatically puts the cursor on the offending program line.

Best of all, your compiled programs are only a fraction of the size of *QuickBASIC* programs and run even faster. *ASIC* does have a couple of limitations: It can only calculate with whole numbers, and *ASIC* graphics programs use CGA resolutions. In most cases, however, these limitations won't be a problem.

ASIC needs an IBM or compatible computer with 512K of RAM, a hard disk or two floppy disk drives, and DOS 2.1 or higher. There's no registration fee for *ASIC* unless you use it commercially.

A special feature article by Tom Campbell in this issue of *COMPUTE* will introduce you to *ASIC* and walk you through some of *ASIC*'s features. *ASIC*'s excellent manual (which is included on the disk) will do the rest.



COMPUTECalc

If you're still using a hand-held calculator, you can put it in a drawer. *COMPUTECalc*, written by *COMPUTE*'s own Rick Leinecker, will make that pocket calculator obsolete.

COMPUTECalc is a five-function calculator for your PC. You can use it from the command line or as a memory-resident TSR program. Either way, it offers a host of features, including mouse support, a tapelike display, color screens you can alter, built-in memory functions, and more.

While you can use *COMPUTECalc* like any other DOS program, it works best when installed as a TSR. Anytime you need a calculator, just press Left Shift–Ctrl–F10. Then, enter calculations on the number pad or with your mouse. You can move the calculator, review the tape, or even insert the result of your calculation into your word processor or other application with a single keystroke.

COMPUTECalc is polite, too. You can remove it from memory if you wish or change the hot key. When the program pops up, it sets Num-Lock on, but when you quit, the keyboard returns to its original settings.

COMPUTECalc uses very little memory and will run on any monitor. You'll need DOS version 2.1 or higher. No registration fee is required for *COMPUTECalc*.

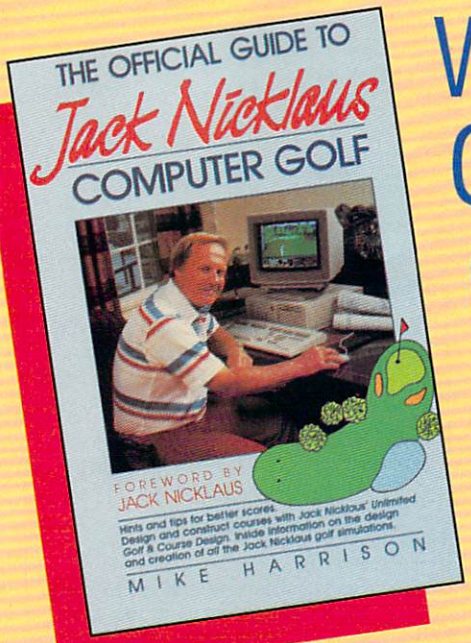
PolyCopy

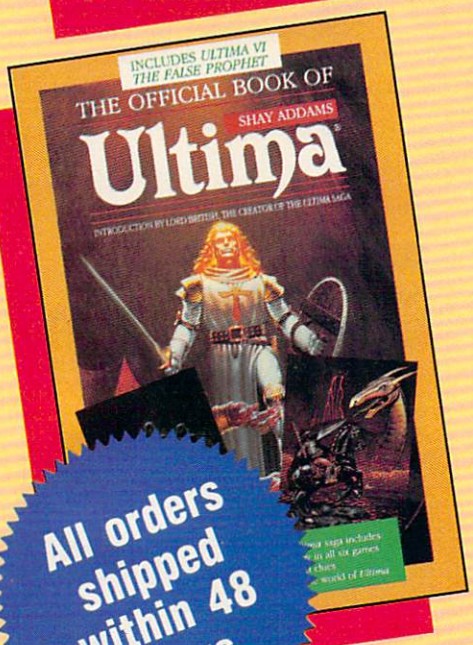
Your version of DOS includes the utility DISKCOPY, which lets you make copies of floppy disks. It's an important tool, but it's limited by your computer's memory. To copy large-format disks, you have to swap disks frequently. Also, DISKCOPY forces you to reinsert the original disk for each copy.

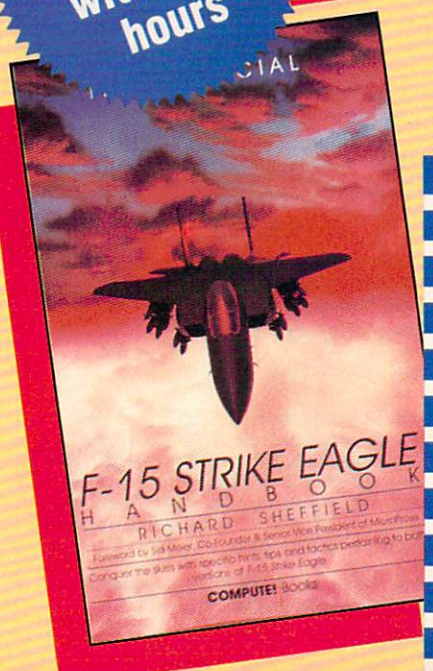
Joseph Albanese, a Virginia programmer, created *PolyCopy* to make copying disks easier. Unlike DISKCOPY, *PolyCopy* stores all the data from disks (even 1.44-megabyte ones) in memory and on your hard disk. You insert your original just once.

If you need more than one copy, *PolyCopy* prompts you to insert a new target disk. It's much faster than doing the same job with DISKCOPY. If a target disk is unformatted, *PolyCopy* automatically runs the DOS FORMAT command for you, simplifying the job even more.

The program requires 256K of free RAM, a hard disk, and DOS 3.1 or higher. *PolyCopy* is a shareware program with a $20 registration fee. When you register, you get the latest version, a printed manual, and two other file-management programs.







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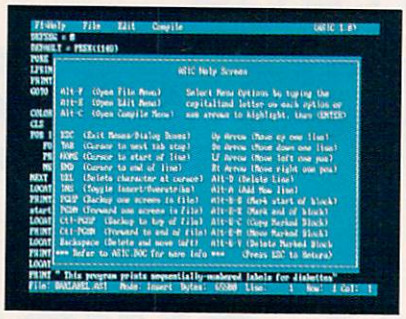
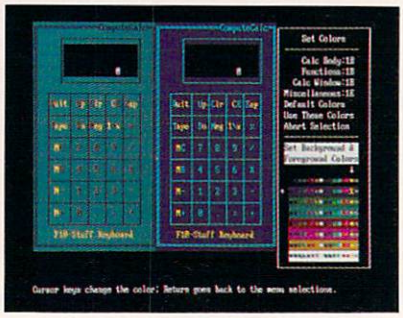
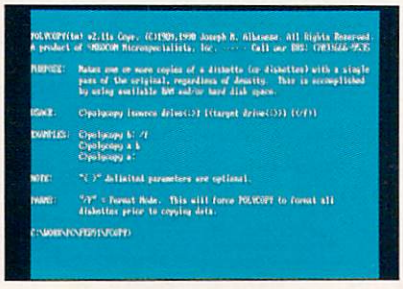


ASIC

AC Hunter



COMPUTECalc



PolyCopy

AC Hunter

If you've ever called a long-distance number only to discover that you've called too early or too late, you'll appreciate *AC Hunter*. Canadian programmer Tim Campbell (no relation) wrote a program to eliminate area code hassles.

Using *AC Hunter,* you can find an area code by typing in the name of a state, city, or country from either the DOS command line or within the easy-to-use program. You can also do the reverse, typing in an area code to discover just what region it serves.

If you know the city someone lives in, *AC Hunter* can help you find the phone number by showing you the correct area code. Then you just dial 1-*area code*-555-1212 to get the information operator.

You need 256K of RAM and DOS 2.1 or higher to run this utility. *AC Hunter* is a shareware program with a $15 registration fee. Registered users can even earn money by sharing their copies with other users.

A Few Good Programs

If you write public domain or shareware software, we'd like to consider your programs for a future *COMPUTE's PC Disk.* Utilities, application software, educational programs, and games are just some of the programs we use. Programs, complete with documentation, should be no larger than 120K in an archived format.

Your program can be written in any language, but it must be in EXE or COM format; we don't use uncompiled BASIC programs. Manuals should contain complete instructions for the program in ASCII text format.

If we use your submission, *COMPUTE* will pay you a fee for permission to publish it. Thousands of readers will have a chance to try out your program, and you'll be mentioned in the "On Disk" column. It's a great way to share your work with users and have some fun.

To submit a program, send an IBM-compatible disk containing the program with a letter describing the submission to George Campbell, On Disk Editor, 1472 Sixth Street, Los Osos, California 93402. Allow six to eight weeks for a response. If you want your disk returned, include a self-addressed, stamped disk mailer. ⊡

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64/128 VIEW

BRUCE BOWDEN

COMPUTE programmer Bruce Bowden contributes a guest editorial this month to introduce an outstanding program he's written that will add an exciting new dimension to the Gazette Disk.

Say hello to *COMPUTE*'s new *Gazette Operating System—GOS* for short. *GOS* is an all-machine-language GUI (Graphical User Interface) that makes its debut on this month's *Gazette Disk,* replacing the older BASIC disk menu program. With just the click of a fire button or the press of a key, you can use this powerful utility to run programs, read files, copy disks and files, and more.

Central to any GUI, including *GOS,* are a pointer, icons, and a set of windows with which the user interacts. The essential program, however, is centered around three different device services: monitor, disk drive, and printer. The monitor and printer options display information—directory, text, and so on—and the disk options handle drive selection, DOS commands, and the reading, writing, and duplicating of files.

The names of these devices appear on a menu bar at the top of the screen, while their icons—which are small pictorial representations of a monitor, disk drive, and printer—appear along the right side of the screen. Moving a pointer over any one of these causes the name and icon to light up. The pointer is controlled with a joystick plugged into port 2 or by the cursor keys. Pressing the fire button or Return key makes a window appear with appropriate menu options for that selection.

There are three types of windows. The first is used for information. Because of window size constraints, you may need to scroll the window up and down to view all its contents. The second type provides selections as well as scrolling—the disk directory window is a good example of this. The last window type is used for menus that offer further selections.

Both scrollable windows have three special controls: the trigger, up scroll-arrow, and down scroll-arrow . The trigger is a box at the upper left corner and is used to exit a window. To use the trigger, highlight it by moving the pointer over it and then press the fire button or Return key. The scroll-arrows move text up and down within a window. Use them in the same manner as the trigger.

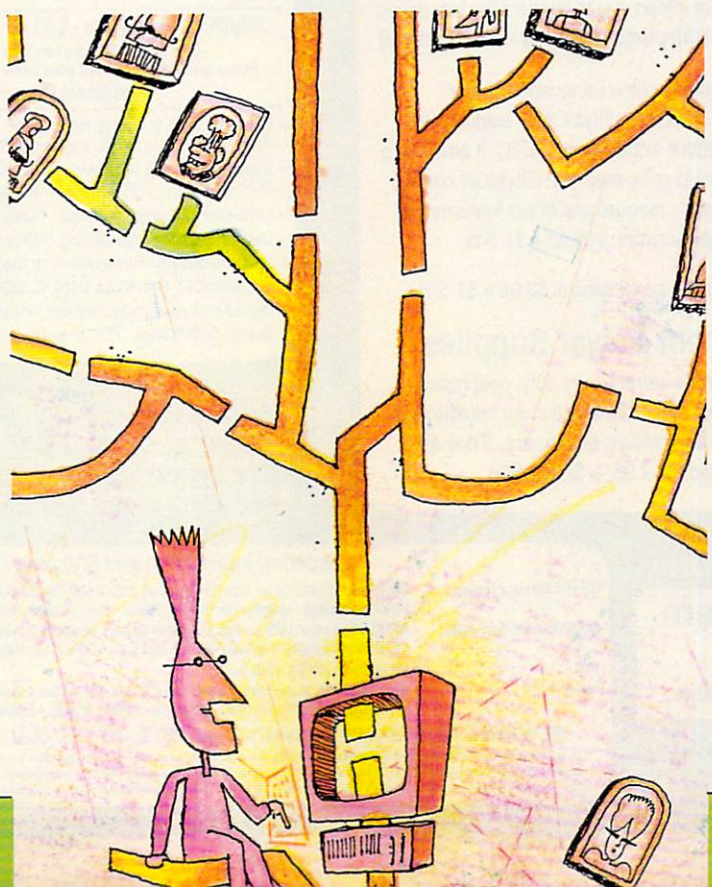
Several hot keys make the selection of options even faster. To get the pointer to a menu name or icon easily, press the key representing the first letter of the objective. These keys are M for monitor, P for printer, D for disk, and S for system options. Pressing the fire button or Return key with the pointer on any icon or menu-strip item activates the associated menu window. An additional hot key, T, places the pointer on the trigger button of any currently active window.

The disk directory window is activated by selecting it from the monitor menu. The name of the disk in the currently active drive is displayed at the top of the window, and filenames are enclosed within. Moving the cursor within the directory highlights the filenames, and a special corresponding symbol appears in the lower left corner of the screen. *GOS* disk functions are not limited to the *Gazette Disk,* but certain file symbols will not be available on other disks. Directory symbols for all disks include P for a program file, S for a sequential file, and ? for other file types.

Three additional file symbols are reserved for the *Gazette Disk.* They include a tennis shoe, a book, and COMPUTE's house-shaped logo. The tennis shoe means that the program is executable, the book means that the file is in *SpeedScript* format and can be read, and the COMPUTE house symbolizes a special utility that can be run from within the *GOS* environment.

To run, read, or load any file from the directory, highlight the filename and then press the fire button or Return key to lock in your selection. Then move the pointer to select the appropriate option.

GOS makes its debut on this month's disk, and we'd like to know what you think of it. What other capabilities should it have? ⊡



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- Supports all serial and JiffyDOS protocols, plus parallel interface for connection to RAMLink.
- Easy-to-use utilities allow backing up and copying files to and from 1541, 1571, or 1581 drives.
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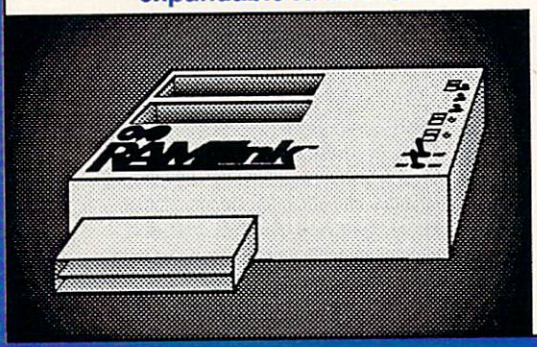

What is RAMLink?

RAMLink is a multi-purpose hardware interface designed to overcome the limitations of existing RAM expansion units (REUs). RAMLink delivers the performance and compatibility lacking in past REU's by incorporating CMD's proprietary RL-DOS and advanced features into a compact unit which allows most software to utilize Commodore 1700 series REU's, GEORAM, PPI's RAMDrive, and CMD's RAMCard as if it were a disk drive. Optional RAMCard installs internally and can be used alone or in combination with the storage of an external REU for a maximum capacity of 16 Megabytes.

- **Supports Commodore 1700, 1764, 1750, Berkeley Softworks GEORAM and PPI's RAMDrive.**
- **Optional RAMCard allows RAMLink to be used as a RAM Disk with or without a separate REU. User Expandable from 1 Mb to 16 Mb using standard SIMMs.**
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BOTH RAMLINK AND RAMDRIVE INCLUDE RL-DOS

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- Many other features, including CMD's exclusive device number SWAP functions.

WHICH ONE IS RIGHT FOR YOU?

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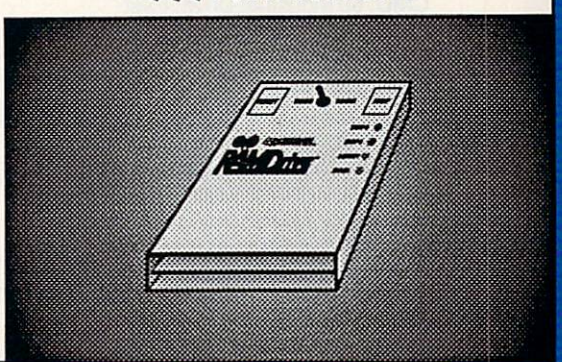

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NEWS & NOTES

Calling All Heroes

Konami (900 Deerfield Parkway, Buffalo Grove, Illinois 60089) has converted several of its most popular Nintendo titles for the 64/128. These games are especially designed to bring out the hero in all game players.

Castlevania ($29.95) brings goblins and demons to the computer. If you've got what it takes to be a night stalker, this horror-adventure game takes you armed with a stake through cavernous dungeons in search of Count Dracula. Watch out for bats and wolves along the way.

Double Dribble ($29.95) promises more fast breaks and slam dunks than you'll find this side of the NBA. Players can test their defenses, free throws, and full-court presses against a friend or go one-on-one with the computer.

Konami also invites players to take their pucks out of the freezer, put their sticks down, and put their dukes up. *Blades of Steel* ($29.95) integrates all the speed, checking, and bone-jarring action of pro hockey. Lead your team to victory, but watch out when tempers flare. You'll find this hockey game packs a wallop.

Draw Me

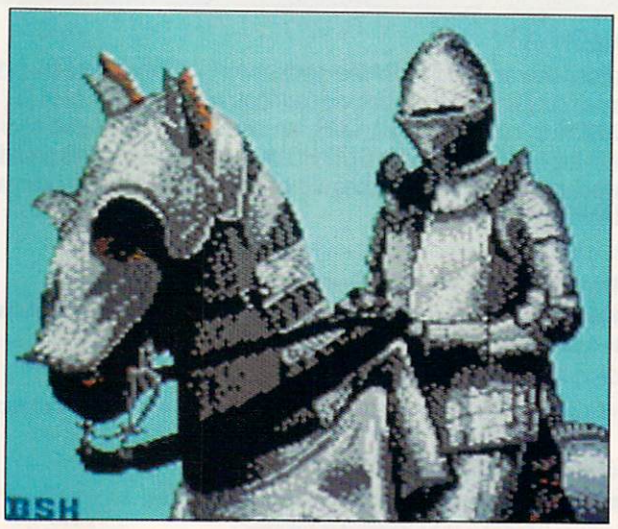
Let your 64 help you learn the fundamentals of composition and design. *Principles of Composition* ($34.95) uses graphics and sound effects to teach students about color, balance, rhythm, pattern, contrast, unity, gradation, harmony, and more.

This program from Art Instruction Software (P.O. Box 1352, Patchogue, New York 11772) combines a design test, a drawing program, and a report card to help students with their lessons. After students complete a project with the included paint program, they mail it back to the company, where it will be evaluated at no additional charge.

To the Swiftest

Tired of communicating with other computers at a poky 1,200 baud? Now there's SwiftLink-232 ($39.95 plus $4.50 shipping and handling). This cartridge from Dr. Evil Laboratories (distributed by CMD, 50 Industrial Drive, East Longview, Massachusetts 01028) can accelerate your 64 or 128 to interface with modems at 2,400; 4,800; 9,600; 19,200; or even 38,400 bps.

This cartridge, which plugs into the computer's expansion port, comes with several terminal programs and connects readily to any Hayes-compatible modem via an IBM AT–style DB-9 serial connector. It isn't designed to work with any modem that plugs directly into the 64's user port. Use SwiftLink with a null-modem cable to connect your computer directly with any IBM, Mac, or Amiga for superfast file transfers. A ten-foot shielded cable to connect the cartridge to a modem costs $10.00.



Knight

***Knight* by Brian Kissinger of Evansville, Indiana, is this disk's Picture of the Month.**

Welcome to "Gazette Gallery." Each month the *Gazette Disk* features a collection of the best 64/128 artwork submitted by our readers. We pay $50 for each piece of art we accept and an extra $50 for the one selected as Picture of the Month. Send your original artwork to Gazette Gallery, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. ▷

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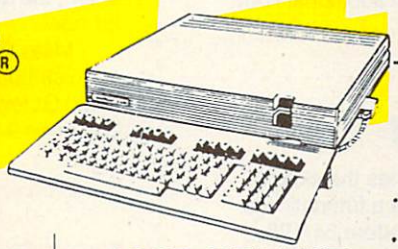

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SEE OUR AD IN THIS MONTH'S AMIGA SECTION OF THIS MAGAZINE FOR GREAT AMIGA SPECIAL VALUES

NEWS & NOTES

continued from page G-4

How About Four Megs of RAM?

Creative Micro Designs (P.O. Box 646, 50 Industrial Drive, East Longmeadow, Massachusetts 01028) has announced the release of RAMLink, a multiple-purpose cartridge that's mainly intended as a compatibility interface for current RAM expanders.

RAMLink incorporates a ROM-based RAM DOS (RL DOS) that allows Commodore 1700 series REUs or Berkeley Softworks GEORAM to be used as a ramdisk. This allows most commercial software to recognize RAMLink as if it were a disk drive. Since RL DOS does not use computer memory, a high level of compatibility with commercial software is realized.

RAMLink may also house one to four megs of additional memory by using an optional RAMCard. It contains its own power supply, which allows the contents of RAM to stay intact when the computer power is shut off. It can also be used with the CMD HD series of hard drives for faster disk access.

RAMLink's price is approximately $100. The optional RAMCard with one megabyte of RAM is approximately $180 with additional RAM about $100 per megabyte.

Rollin', Rollin', Rollin'

UBI Soft's new arcade-style game, *Skate Wars,* combines the skills of soccer with the excitement of rollerball and lands you in a futuristic ice stadium to do battle with either a friend or your Commodore 64/128.

To achieve victory, you must lead your team through obstacles and apply ruthless tactics to defeat your opponent. *Skate Wars* ($29.95) features a series of dangerous hazards including crevasses, ramps, jumps, disintegrators, pits, stone pillars, spiked balls, and other disastrous obstacles. To conquer your opponent, you must adopt dirty strategy. Flying kicks, pushes, and body slams help you survive and win.

Skate Wars from UBI Soft is distributed by Electronic Arts (1810 Gateway Drive, San Mateo, California 94404).

Blast Off With Buck Rogers

Buck Rogers makes his computer-game debut in Strategic Simulations' *Countdown to Doomsday* ($39.95). SSI recently signed a contract with TSR to produce a line of Buck Rogers computer products.

Countdown to Doomsday uses a specially enhanced version of the game system used in such AD & D Gold Box fantasy role-playing games as *Pool of Radiance* and *Secret of the Silver Blades.*

In *Countdown to Doomsday,* the powerful Russo-American Mercantile holds the solar system of the twenty-fifth century in an iron grip. You and Buck must lead members of the New Earth Organization to free the solar system of this tyranny. To help you on this dangerous mission, you'll need to assemble an interplanetary team of Rocketjocks, Warriors, Engineers, Rogues, and Medics.

SSI products are distributed by Electronic Arts (1820 Gateway Drive, San Mateo, California 94404).

The Prism of Whom?

Miles Computing has released an entertaining graphics quest called *Questmaster—The Prism of Heheutotol* ($34.95). As Terna, the last of the Tellasien race, you must complete a dangerous search for the fabled crystal prism.

This graphic adventure features more than 100 different screens and 30 animation sequences, a sophisticated parser, and timed events to make your quest more exciting and entertaining. Once you've acquired the prism, the quest is complete . . . for now.

Miles Computing products are distributed by Electronic Arts (1820 Gateway Drive, San Mateo, California 94404).

Let's Play Some Football

MicroLeague Sports (2201 Drummond Plaza, Newark, Delaware 19711-5711) has released *MicroLeague Football, the Coach's Challenge* ($29.95). This game features 20 professional football rosters with real NFL players and their statistics.

This is no arcade-style game. With *MicroLeague Football* you control offense and defense, winning or losing on your coaching abilities. Sports fans and stats buffs will appreciate the 3-D graphics, the midgame statistics, a Quick Play option that plays a game in approximately one minute, and an expert mode that allows you to call plays in numerical code, just like the pros. A General Manager/Owner disk and Season disks will also be available.

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Believe it or not, GEORAM's disk transfer rate is actually 35 times faster than the 1541, 1571, or 1581 disk drive! This means that screens redraw in a flash, and that your Commodore doesn't waste time spinning disks looking for data. GEORAM makes the GEOS family of programs faster and more powerful than ever. NOTE: GEORAM is designed for use ONLY in the GEOS environment—it cannot be used with non-GEOS software.

GEORAM (requires GEOS) 88604 $124.95

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The 1750 Clone offers 512K, and works with all software that is 1750 compatible (e.g., GEOS, Paperclip III, and Maverick). Furthermore, you can use it to create a RAM disk to store files or programs for lightning-fast access. (Unlike GEORAM, the 1750 Clone works with non-GEOS software. Some computers may require power supply.)

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64C Computer 54574 $129.95

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Both the Minimodem-C and C24 are completely Hayes compatible (not just partially compatible like the 1670 and some Avatex models) **and** 1670 compatible. This means they'll work with ALL communications software for the 64, 64C, and 128. Key features include seven status indicators, Busy Detect, DTR signal support, High Speed Detect Line, and Auto Answer/Auto Dial. Includes Multiterm 64 and 128 software so you can start communicating right away, plus a free trial hour on CompuServe! Full-year warranty.

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The Amiga versions of the Minimodems are equipped with a female connector to plug directly into the Amiga 500 or 2000. They need no external wall plug for power, and they use the Amiga's audio output for maximum fidelity.

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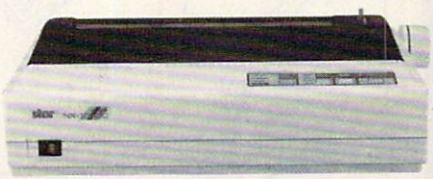

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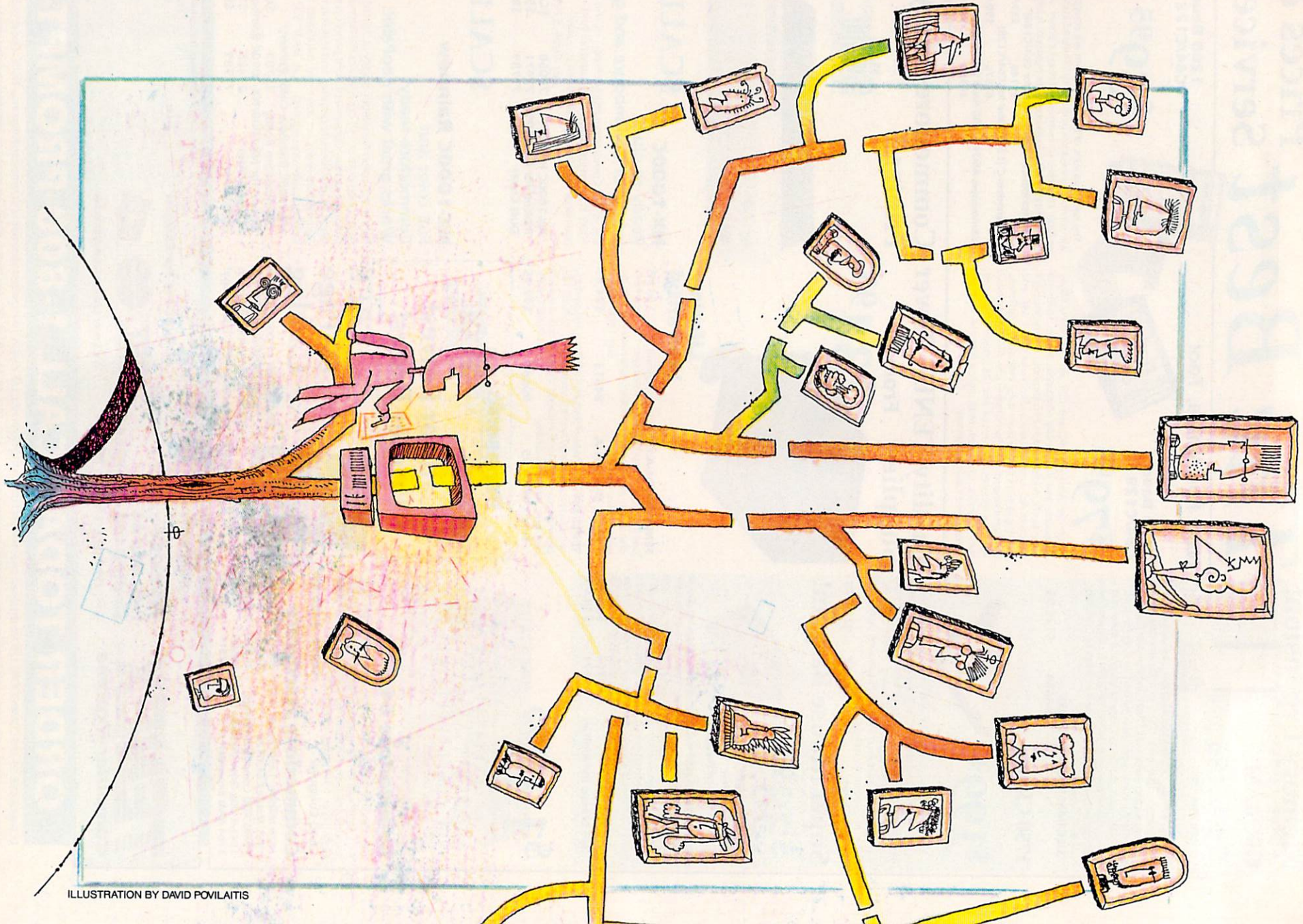

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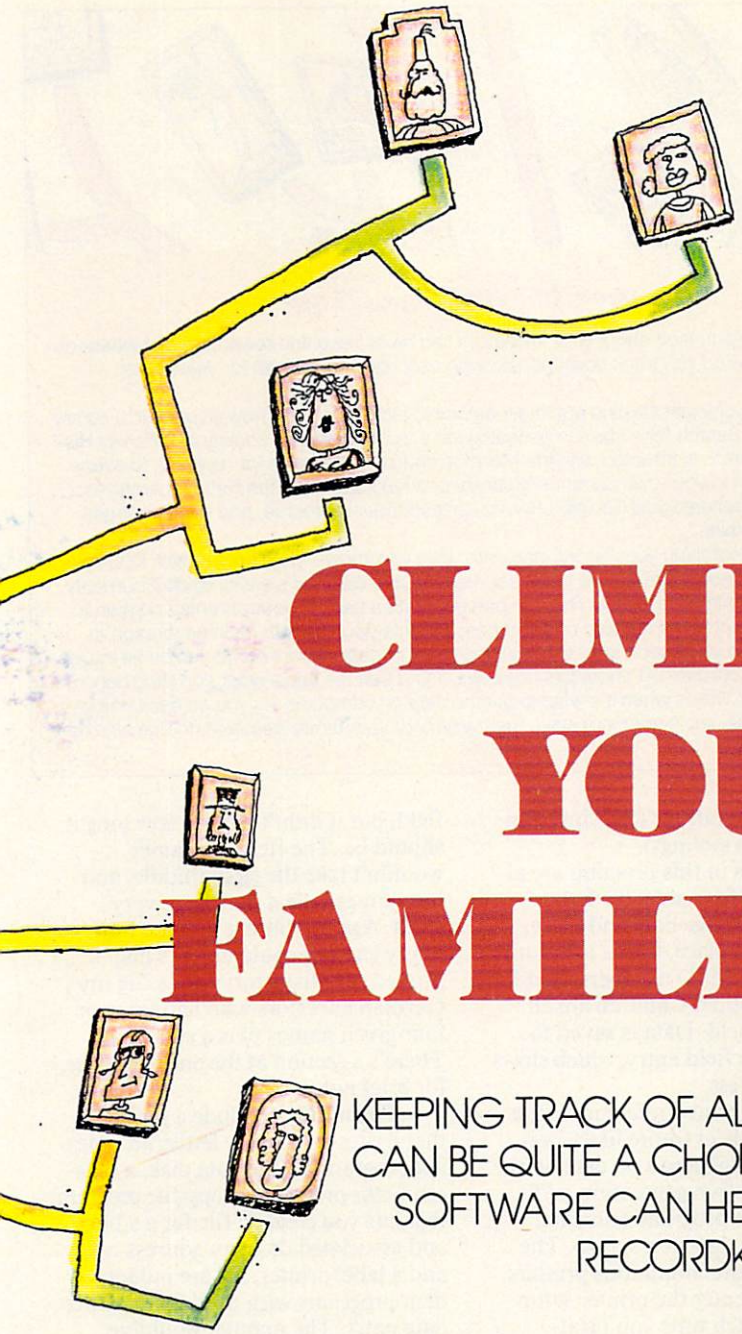


CLIMBING YOUR FAMILY TREE

KEEPING TRACK OF ALL YOUR ANCESTORS CAN BE QUITE A CHORE, BUT GENEALOGY SOFTWARE CAN HELP SIMPLIFY YOUR RECORDKEEPING

No telling whom you'll meet when you start climbing your family tree. Practically everyone has interesting, famous, or even infamous ancestors on one branch or another. Keeping track of all your relations can be quite a chore, but your 64 or 128 can help.

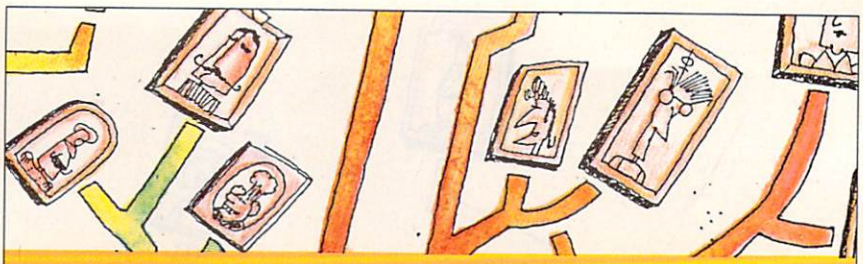
As you compile data for your family tree, you'll want to record all the pertinent names and dates you uncover so the information can be preserved and shared with other family members. Usually this information is kept on charts filled in by hand, but there are a number of computer programs available that can make this job more manageable. ▷

AUDREY COX VOGELPOHL

Being a specialty item, genealogy software is not normally found at your local computer or software store. It's usually purchased through the mail. Before buying, you'd be wise to do some browsing in magazines for genealogy advertisements or asking around to see what genealogy software others are using. Once you've found a couple of programs that prove interesting, you might see if the company offers a low-cost demonstration program or sample printouts of the charts the software should produce.

If you're looking to dabble in genealogy, you'll want an easy program that will help you organize your data, print some basic charts, and teach you what to look for. I didn't say *how* to search; that's an entirely different story. (See "Tree Climbing Made Easy.") An experienced genealogist, however, may look for other program features, such as the types of charts and the ability to note sources.

In this article, we'll look at four different genealogy programs for the 64 or 128. I won't be able to tell you which program is best for you, but I can guide you on how to select genealogy software and what you should look for. My viewpoint is nontechnical, coming from the perspective of a genealogist rather than a computer expert. As a genealogist I look for software that lets me enter data in the same format that I use in my manual genealogy. I look for printouts that include necessary information in a readable and familiar format.



Tree Climbing Made Easy

Uncovering information about your ancestors can be exciting and rewarding, but where do you start? How do you track down people who may have been dead for years, even centuries?

I'd tell anyone just starting out in genealogy to look for a good how-to book in a library or bookstore. Search for a class in genealogy at a local genealogy society or a Family History Center, which is affiliated with the Mormon church but is open for research to everyone. Pay a visit to your own community library or a field branch of the National Archives. The National Genealogical Society offers a correspondence course, and some colleges also have courses.

When researching your family, start with what you know—data on yourself. Don't start without some knowledge of how to list sources for your data—it's easier to do it correctly at the start than to redo it later. Then go one generation back to your parents and then to your grandparents. The number of direct descendants doubles with each generation as you go back, so you'll soon start accumulating a lot of data: Save information on all the siblings and their children. At about this point, you'll find that the paperwork and filing become overwhelming. This is when it's wise to put the data on computer. As you go back one generation at a time, you'll gradually solve the mystery of your family tree, and no one else has one exactly like it.

Family

Family ($34.95), from PFA, is software for printing a family group sheet and a five-generation pedigree chart. A family group sheet includes the names of a husband and wife and any children they may have. Marriage dates, birth dates, and death dates should also be included. There may also be information about each spouse's parents. A pedigree chart lists this information for several generations. With *Family,* data is entered using all capital letters. Since I normally type using both upper- and lowercase letters, I found having to use all capitals awkward and very slow. It also took away my personal method of differentiating surnames—typing them in all capitals.

When printing a pedigree chart with *Family,* you need to decide whom to designate as number 1, because ID number 1 is then assigned to that person. If you are a woman, it could be you or even your newborn granddaughter. You should be familiar enough with genealogy numbering systems to know that females are assigned odd numbers. Each data disk holds nine generations (512 direct ancestors, but no siblings).

The fields in this program are already defined for name, birth date and place, marriage date and place, death date and place, burial locations, occupations, and ID numbers used for father and mother. Children are all listed in one field. Data is saved to disk after each field entry, which slows down the process.

You may print a reference list, a family group sheet (more like a person's chart since there's no data on the spouse), and a five-generation pedigree chart. The program prints the chart with any data you supply. The program supports numerous printers, but you must enter the printer setup instructions each time you print.

PED C and FGS

Byteware puts out a package called *PED C and FGS* ($39.95) that consists of several genealogy programs plus a utility. *PED C* prints pedigree charts, and *FGS* is for family group sheets. You can't enter the data once and have both programs use it. It must be entered for each program. You can't switch from one program to another without exiting and reloading the program, even to get an included utility program.

Besides the basic information, fields are available for baptism, church affiliation, military service, other relatives, former spouses, and all the information on each child. I kept getting a *field too long* message when I entered data in the occupation field, but it didn't tell me how long it should be. The field for names wouldn't take the first, middle, and last names unless they were very short. Again, nothing told me how many letters I could enter. This proved unsatisfactory for listing my German ancestors who had three or four given names plus a surname. There's a section at the end, however, for brief notes.

The utilities include a program that writes an inquiry letter, an indexing program for the data disk, a date-estimator program, a copy-file program that lets you create a file for a sibling and associated data, an address list, and a label printer. All are independent programs with need for separate data entry. The manual would've been easier to follow if instructions had been given separately for each program, instead of jumping back and forth with explanations.

Arbor-Aide

Software Solutions publishes a program called *Arbor-Aide* ($34.95). Data is saved to a separate Family Disk that can store information on 255 direct-line ancestors (eight generations), the spouse of number 1, and up to 344 nondirect spouses, children, and children's spouses. An unlimited number of data disks can be created, and they can be backed up.

Again, you must know the standard direct-line ancestor numbering system for eight generations and give your ancestors the specific number as represented by the chart position. The

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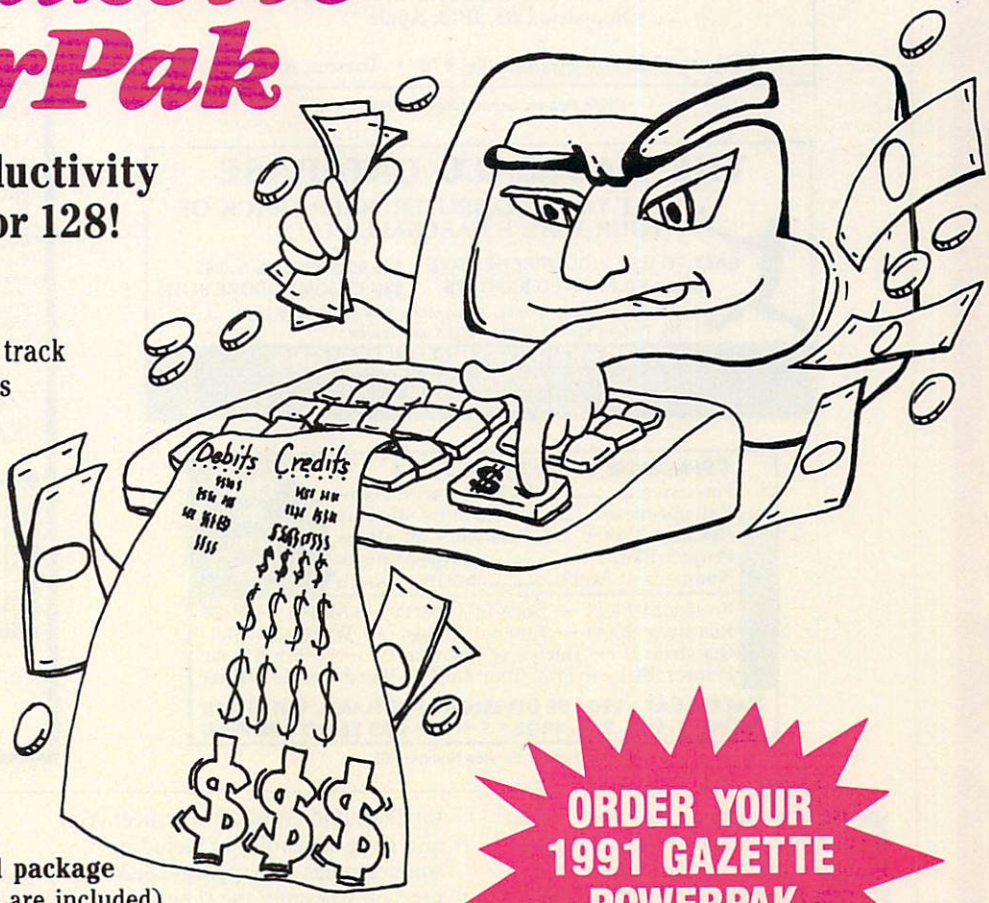

GemCalc 64 & 128—A complete, powerful, user-friendly spreadsheet with **all the features you'd expect in an expensive commercial package** (separate 64 and 128 versions are included). Most commands can be performed with a *single* keypress!

Memo Card—Unleashes the power of a full-blown database without the fuss! **Nothing's easier**—it's a truly simple computerized address file. Just type in your data on any one of the index cards. Need to edit? Just use the standard Commodore editing keys. Finished? Just save the data to floppy. What could be easier?

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spouse of number 1 must be given the ID number of 256. All nondirect spouses, children, and children's spouses must be given IDs between 257 and 597, and the numbers don't correspond to relationships. ID numbers 598 and 599 must be given to the father and mother of the spouse of number 1 (ID number 256).

Arbor-Aide provides appropriate prompts when disks should be swapped. It also provides setup charts to list cities and churches with three-letter codes. These codes are used in edit mode, and when the chart is printed, they'll translate to the full city or church information. The manual instructs you to enter dates in a certain manner (ddmmyy), you have to enter the city and church three-letter codes in lowercase, religions are given a one-letter code, and the number of children must be in two digits (02, 08, 11). There are fields for occupations, military affiliations, sources, and notes.

Each data disk has ID numbers from 1 to 599. The disks cannot be linked automatically for long ancestor charts. Even though a data disk can store information on eight generations, you can only print a five-generation ancestor chart.

Arbor-Aide produces a number of charts, including the standard ancestor chart and family group sheet. You also have the choice of including sources/notes on a separate disk. You need only to enter the ID number of the ancestor you wish to be in position 1, and the chart is printed with each of the ancestors positioned appropriately. You may choose to have surnames printed in capital letters or in upper- and lowercase. An alphabetical list of each data disk can also be generated and printed. The ability to search for a name in your data instead of a number is another useful feature.

Family Roots

Family Roots ($225) from Quinsept is among the more advanced genealogy programs for Commodore machines. Besides a program for the 64, the software is also available in a 128 version. In 128 mode the program makes use of the function keys, which can be programmed for quick entry of repetitive information, such as place names or surnames.

You enter or edit information about individuals and then link them to others by using their ID numbers. You may assign the numbers or let the computer do the assigning. Data fields for each person are established by name, birth date and place, death date and place, current address, father, mother, number of marriages, each marriage there's room to list the spouse, marriage date and place, and marital status. For each child, you enter the appropriate ID number. I particularly like the way the records complement those of spouses, children, and parents. For instance, if I enter the 13 children of one ancestor, the program automatically places the same information in the record of the other parent and puts the parents on the corresponding field for each child.

There are up to nine fields that can be defined for your own information. You could include such information as military service, medical records, burial date and place, occupation, religion, your own numbering system, godparents, and so on. Any field in the program can be footnoted, which is nice for including the source of some data.

Once data is entered and stored, it can be used in any of the programs to make lists, charts, group sheets, person sheets, and much more. There's no limit to the number of people that can be entered, nor to the length and format of information. You can use an unlimited number of data disks. You can use up to four disk drives, in any combination of 1541, 1571, or 1581.

In the descendants chart, which is great for sharing data with others in

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the same family, you have the choice of whether to include information on spouses. You can print standard four- and five-generation pedigree charts and have them linked and numbered automatically. You can select free-form charts that print generations to fit the width of your paper, and you have the choice of which personal information to include in the charts, person sheets, and group sheets.

Printer information is determined once and then saved in a printer file. Printing can be done on various widths from labels and 3 × 5 cards to 15-inch-wide paper, with fonts and pitches determined by your printer. For further convenience, you can print data to disk and then incorporate it into your word processor.

Family Roots costs considerably more than the others mentioned in this article, but it will probably fit the needs of a more experienced genealogist. It's designed so the genealogist can use it in a way that's already comfortable and personal. It contains many more features than I've been able to describe here.

If the full program is more than you need, limited versions of *Family Roots* are available. If you start with one of the smaller versions of the program and decide later to upgrade to another *Family Roots* package, you won't have to retype your data. It can be imported to the new program. If you change to another brand of computer, you also have the capability of transferring your genealogy data from 64 to 128 format—and even to MS-DOS.

Family Roots users share their ideas and uses of the genealogy program through a nonassociated support group, Quinsept Users Group Newsletter. New items and product information of general interest are announced in a bimonthly newsletter. Many users share utility programs that they have created and ways of using and sharing *Family Roots* data.

All of the above programs were designed by programmers who also are genealogists. Before you enter generations of data, however, it's best to check out any program with a short test. When you first try a program, enter only 40–50 names with data, and then print out a few charts to see how the program fits your style of keeping information.

In all honesty, I didn't get any of these programs up and running the first time without some assistance and/or rereading of the manual. With a little care, though, I'm sure you'll find your 64 or 128 can be a tremendous aid when it comes to managing your family's data. Good luck, and great searching as you climb your family tree meeting new ancestors. ⊡

For more information about the products mentioned, contact the publishers listed here.

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Audrey Cox Vogelpohl is an administrative secretary at Rainier Beach High School in Seattle, Washington. She's a member of the National Genealogical Society, Seattle Genealogical Society, Seattle Genealogical Society Computer Interest Group, and several other regional organizations. She answers genealogical questions on QuantumLink, where her handle is AudreyV.

GAZETTE READERSHIP SURVEY

What do you like most about Gazette? What don't you like? We want it to be as useful and interesting as possible and to provide you with the coverage you want. Please take a minute to fill out and mail us this questionnaire. (Photocopies are fine.) Some questions may require more than one answer.

Mail questionnaires to Gazette Readership Survey, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

1. Which computer(s) do you own/use regularly at home?
☐ 64 ☐ 128 ☐ Amiga ☐ IBM/compatible
☐ Macintosh
At work? ☐ 64 ☐ 128 ☐ Amiga ☐ IBM/compatible
☐ Macintosh

2. How long have you owned your 64/128?
_____ years _____ months

3. How many hours per week do you use your computer?
_____

4. Do you plan to buy another computer this year?
☐ Yes ☐ No **If so, what kind?** _____

5. Do you use an online service? ☐ Yes ☐ No
If so, which one? _____
How many hours per month? _____

6. Which of the following peripherals do you own or use with your computer?
☐ Dot-matrix printer
☐ Letter-quality printer
☐ Modem
☐ Memory expansion
☐ Joystick
☐ Mouse
☐ Other (specify) _____

7. What topic would you like for Gazette to cover in an upcoming issue? _____
_____

8. How do you get *COMPUTE?*
☐ Newsstand
☐ Subscription
☐ Subscription to *COMPUTE* and *Gazette Disk*
☐ Friend
☐ Other

9. What is your total household income?
☐ <$20,000 ☐ $20,000–$30,000 ☐ $30,001–$50,000
☐ $50,001–$75,000 ☐ $75,001–$100,000 ☐ >$100,000

10. Do you purchase hardware/software by mail order?
☐ Yes ☐ No
If so, how many times per year? _____

11. Do ads in Gazette significantly influence your buying decisions? ☐ Yes ☐ No

12. Are you satisfied with the *Gazette Disk?* ☐ Yes ☐ No
How could we improve it? _____
_____

13. Would new 64/128 disk products at affordable prices interest you? ☐ Yes ☐ No

14. Do you use programs published in Gazette?
☐ Yes ☐ No
If so, how do you obtain them?
☐ Type them in
☐ *Gazette Disk*
☐ Other

15. What types of programs would you like to see in Gazette? _____
_____

16. Do you belong to a user group? ☐ Yes ☐ No

17. How do you feel about our new magazine format?
☐ Like it
☐ Don't like it
☐ Undecided

18. Which columns do you read regularly?
☐ 64/128 View
☐ News & Notes
☐ Feedback
☐ Beginner BASIC
☐ Programmer's Page
☐ Machine Language
☐ Features
☐ Type-in programs

19. Would you like to see more GEOS pages?
☐ Yes ☐ No ☐ Undecided

20. How do you use your computer? Use additional paper if necessary. _____
_____
_____
_____
_____
_____

FEEDBACK

EDITORS AND READERS

In Support of Faster Chips

I am writing in response to a letter by John H. Colvin (October 1990), who wanted more speed from his 64. John pointed out that there are internal enhancement chips for the Apple II line of computers that allowed those computers to operate as fast as 10 MHz.

Since the Apple uses the same family of microprocessors as the 64/128, these chips could also be made for our computers. Installed as internal modifications, they would not tie up the overworked expansion slot as does the Schnedler Turbo Master. They could also be designed to work with RAM expansion units and the forthcoming RAMlink from Creative Micro Designs.

Representatives at Schnedler and CMD said they felt that Commodore owners were not interested in a faster processing speed that would require them to open their computers, thus voiding the warranty, and spend as much as the upgrade would cost. As an owner of JiffyDOS and a CMD HD-40 hard drive, I have no qualms about opening my computer or spending cash. The very existence of Schnedler's Turbo Master shows that there is an interest in faster processing speeds. Perhaps if more users such as John and I showed an interest, we could convince companies to support our computer. If anyone would like to have more information about the Apple chips or to try to convince these companies to support us, please contact me.

JOE TOM COLLINS
1545 ARCHER RD., APT. 5F
BRONX, NY 10462

Grounded

I recently lost my *F-15 Strike Eagle* user's manual that contained information about the controls and how to switch between different weapons. It also contained the access code to the game, which I can't remember. I would especially appreciate it if you could send me some information about the game, especially the code.

CEM KIBAR
PAPAKURA, NEW ZEALAND

We contacted Kathy Gilmore, a spokesperson for MicroProse, the company that publishes F-15 Strike Eagle. *She said MicroProse would be happy to replace your manual if you would send her your disk to prove it's an original MicroProse product and not a copy. The company's address is 120 Lakefront Drive, Hunt Valley, Maryland 21030.*

Who's the Real Artist?

I am sorry to burst your bubble, but that Picture of the Month, *Natalie,* in the November issue of "Gazette Gallery" came with every *Doodle* disk ever made. Now if Wayne Schmidt is the original artist, he deserves the $50. If not, he cheated you out of the money. Someone at the new *COMPUTE* needs to do a little more research on this one.

STEVE KNIGHT
WHITEHOUSE, TX

You may have seen Natalie *before, Steve, but our copy of* Doodle *doesn't have her picture on it. When we first started "Gazette Gallery," we contacted several talented artists and asked for submissions. Wayne Schmidt, who is indeed the artist who created* Natalie *and numerous other pieces of art for various software products, gave us permission to use her picture. By the way, since his picture was selected as Picture of the Month, Mr. Schmidt received $100. Other pictures that appear on disk are paid $50. We use several pictures each month, and we encourage submissions.*

Mail-Order Mixup

I have just finished reading your article Mail-Order Maze (October 1990) and have just one complaint. You stated that you must supply a street address to mail-order firms because UPS will not deliver to a post office box address. Please allow me to share some little-known facts about this. UPS will not deliver to a post office box in large population centers but will deliver to box holders in isolated rural areas and towns of small population.

I have had a lot of trouble from companies that refuse to do business with me due to this misunderstanding of UPS policy. I have even been accused of attempted mail fraud when I try to explain this to some firms. In all fairness, some companies—including Computer Direct, Tenex, Lyco, and Software Discounters of America—are capable of listening to reason. Please share this with your readers.

THOMAS TEJEDA
FORT STANTON, NM

When we checked with UPS, a spokesperson said that UPS is not allowed by law to make deliveries at a mailbox or any other U.S. Mail location. UPS will make deliveries in rural areas if the local driver happens knows where the post office box holder actually lives. In other cases, UPS recommends including your telephone number with an order and asking that it be included on the shipping label. When the parcel arrives in your town, the local UPS office will then call you and request delivery instructions.

Where's the Group?

I can't find anybody in my area who has a 64 and uses it as a primary computer. If any Gazette readers have a 64 and live around Tuskaloosa, Alabama, please let me know.

BRANDON PIERCE
1520 57TH AVE. E
TUSCALOOSA, AL 35404

We checked our user group records but were unable to find one listed for your city, Brandon. If you don't have any luck, you may want to contact the group mentioned in this next letter.

I live on an island with 73,000 people that doesn't have a Commodore user group. So last year I joined a group that does everything by mail. It has about 200 members worldwide and

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publishes a bimonthly newsletter. Twice a year it mails a membership list that contains addresses and biographies. Members are encouraged to find others with similar computing interests and to correspond. This group is perfect for those who don't have access to a user group or who cannot attend meetings in person.

For more information contact Jean Nance, Meeting 64/128 Users Through the Mail, Rt. 1, Box 151, St. Joseph, Illinois 61873.

BRIAN P. VAUGHAN
ALAMEDA, CA

Relative Files

I own a 64 and a 1541 disk drive. I have pretty well mastered programming and using sequential files, but I have been unable to program a relative file from the instructions as stated in the 1541 user's guide. Could you give me some help?

EUGENE R. CARSON
HEMLOCK, MI

Here are a couple of short programs that should get you started with relative files. The first program creates a relative file and then asks for a filename and a record length. If you're creating a mailing list, for example, make sure your record length contains enough spaces for each name and address. Type 99999 when you're ready to quit.

The second program reads relative files. When you run it, supply the filename that you created earlier. It will retrieve the records you saved by their record numbers. These programs can be easily modified for your personal requirements.

```
SB 100 OPEN15,8,15
RF 110 PRINT"REL. FILENAME":IN
       PUT N$
XF 120 OPEN 1,8,2,N$
AS 130 INPUT"RECORD#";R
JB 140 IF R=99999 THEN CLOSE 1
       :END
CB 150 RH%=R/256:RL=R-RH%*256
QS 160 PRINT#15,"P"+CHR$(2)+CH
       R$(RL)+CHR$(RH%)+CHR$(1)
JQ 170 INPUT#1,R$:PRINT R$
RS 180 GOTO 130
```

```
SB 100 OPEN15,8,15
RF 110 PRINT"REL. FILENAME":IN
       PUT N$
XG 120 PRINT"RECORD LENGTH":IN
       PUT L
AB 130 OPEN 1,8,2,N$+",L,"+CHR
       $(L+1)
QS 140 INPUT"RECORD#";R
QA 150 IF R=99999 THEN CLOSE 1
       :END
SC 160 RH%=R/256:RL=R-RH%*256
SG 170 PRINT"RECORD":INPUT R$
GQ 180 R$=LEFT$(R$,L)
KA 190 PRINT#15,"P"+CHR$(2)+CH
       R$(RL)+CHR$(RH%)+CHR$(1
       )
ES 200 PRINT#1,R$
HX 210 GOTO 140
```

No Tune-Up Needed

I have a 128D and spend about two hours every day on it. I could afford a 16-bit machine, but recently when I went computer shopping for an upgrade, I decided to buy another 128D. I found it's all the computer I really need. I gave my old computer to my son, but before I did, I took it into a computer repair shop for a tune-up. I am proud to say that the shop called and said my old 128D didn't need anything done to it. It was working just fine. That's after four years and an average of two hours per day usage. With that kind of reliability, who needs anything else?

I would like to thank you for continuing your support of Commodore products. I am looking forward to receiving my new subscription of *COMPUTE*, as I have confidence that the new change will be a quality and lasting cornerstone of your publication. I will continue to buy *COMPUTE* as long as the pages that are important to me are printed within your covers.

MICHAEL GILLETTE
CARPENTERSVILLE, IL

Not the Green Frog

Most of my programming is done in Fortran, C, and Pascal on an IBM, and then I upload to a VAX mini for compiling and debugging. I use a shareware package that uses the Kermit transmission protocol to upload to the VAX. I was wondering if there is any such software for the 64 that would allow me to use the Kermit protocol? This way I could use the editor on a word processor to type in my programs and upload a text file to the VAX.

RHODY R. HOLTHAUS
GLEN BURNIE, MD

Kermit is an advanced file-transfer protocol developed at Columbia University that guarantees that data will be transferred correctly over telephone lines. Kermit supports a batch mode that permits multiple file transfer without the user's intervening. We published a telecommunications program called KTerm *(December 1989) that uses this transmission protocol. Back issues of the magazine and the disk are available for $6.00 and $11.95 respectively, or you may purchase both for $12.95 through our Greensboro office.*

Help Doesn't Help

I have a Final Cartridge III for my 64 and find it very useful. In fact, it's almost always in my expansion port. The BASIC extender, however, has a mysterious HELP command that is not mentioned in the instruction book and when executed doesn't seem to have any effect. Do you know anything about it?

DAVID RICHARDS
NIDDRIE, VIC.
AUSTRALIA

It's a mysterious command, David. It's mentioned on the cartridge's package and listed as an option on the desktop's pull-down menu but nowhere else. Art Hunkins, who reviewed the product (January 1990), says Replace is another mysterious and spurious command that's mentioned but does not actually appear on the cartridge. Presumably it's a search-and-replace feature that he would've liked to have seen. Hunkins checked with the U.S. distributors of this Dutch import, and they feel these commands were planned in the upgrade from version II but were never implemented.

No Notification

When *COMPUTE!'s Gazette* stopped publishing last summer, it came as a complete shock. I thought I would have to go buy that "other" magazine. I'm glad that I'll still be able to monitor the Commodore market while stationed here in Europe. Why weren't *Gazette* readers informed about the merger with *COMPUTE* before the last issue hit the newsstands?

STEVEN L. WILKEY
U.S. ARMY, EUROPE

When General Media purchased COMPUTE Publications, we weren't sure what changes were in store for our four computer magazines. The new format was still in the planning stages after the final issue of the old Gazette *(June 1990)*

FEEDBACK

went to the printers. As plans developed, subscribers were informed in July of the impending changes; we sent them a letter of explanation and a copy of OMNI *magazine, another General Media publication. There was no way, unfortunately, for us to notify readers who buy the magazine from newsstands.*

How About Those Kits?

I've been trying to find out why I can't save, copy, or format any disk. I get a lot of 21 and 22 read errors, and it's very hard to track them down to one error. If it's a head alignment problem, have any of your readers had success with any of the alignment kits that I see advertised?

JAMES TILLMAN
CALUMET PARK, IL

If your drive can load some programs, a directory, or anything at all, then its electronic components are probably operating satisfactorily. This often indicates a head alignment problem. Alignment should also be suspected if you have problems formatting a disk, loading commercial software, or loading a program that was saved to disk on someone else's disk drive. We've heard mixed reports about the disk drive alignment kits that are on the market. One Commodore repair person we contacted said he sees a lot of drives that have been knocked further out of alignment by owners who try to align them with such kits. He says nothing beats an oscilloscope for aligning disk drives, but it's a piece of equipment not often found around the house.

If you have a question, comment, or problem, we want to hear from you. Send your letters to Gazette Feedback, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. ⊡

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D'IVERSIONS

F R E D D ' I G N A Z I O

COMPUTER CHIPS: CITIES OF SILICON

Years ago I saw a picture of a computer chip, an enlarged image of a computer's RAM (Random Access Memory). I was so inspired by its likeness to an aerial photograph of a city that I wrote a book called *Katie and the Computer* (Creative Computing Press, 1979). The heroine of the book, Katie, shrinks down to microscopic size and falls through the picture screen of the computer, somewhat like Alice falling through her family's looking glass.

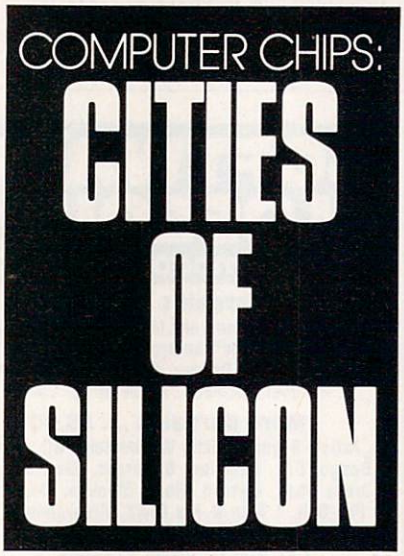
Katie, like Alice, discovers a kind of wonderland on the other side of the computer looking glass. It is the world of Cybernia, where city streets take the place of computer circuits and Flower Painters perform the functions of a graphics paint program. Katie and her friend the Colonel (the computer's operating system) narrowly escape the clutches of a giant program bug which ambushes them and tries to snare them with his bubblegum lasso.

Katie fetches the Flower Painters by parachuting (direct-access style) onto the uppermost balcony of RAM Tower. They take a bus to an open-air stadium (the TV picture tube) filled with cheering crowds. They watch as three ancient pirates' cannons (the electron guns) blast glowing paint—red, green, and blue—to burst into beautiful, exploding flowers splattered across the nighttime sky. Katie returns home from Cybernia by bravely crawling into one of the cannons and being fired into the heavens.

The chip that inspired me was the old Motorola 68000 CPU. Motorola has released several newer, more complex versions of the chip, including the 68010, 68020, 68030, and 68040. Intel, Motorola's competitor, has also kept pace with the 8086, 80186, 80286, 80386, and 80486.

The advances have been prodigious. Intel, Motorola, and other chip makers can now fit over a million transistors on a single chip. Under a microscope one of these chips resembles a beautiful city, constructed out of gleaming silicon. With a little imagination you can see wide boulevards, tree-lined avenues, parks, squares, railroad yards, subways, factories, even circus parades!

The Wall Street Journal reported recently on a new AT & T chip. The chip is described as revolutionary because (1) it will allow a computer to manipulate full-motion video, human speech and high-fidelity sound, and realistic three-dimensional animations as easily as today's computers juggle numbers and words; (2) it will work on all major brands of personal computers, including Commodore, IBM, and Apple; and (3) it'll be cheap.



The computer of the 1990s may combine a computer, TV, VCR, laser disc player, encyclopedia, and stereo. Add a fax machine, photocopier, and telephone; and you can see why competition to build the first multimedia computer is heating up.

The first player in this field is Commodore. Its CDTV features a computer, CD player, and electronic book that you read on the screen. The CDTV is also rumored to be a fantastic game machine with graphics superior to those of many arcade games.

The hearts of these new multimedia computers of the 1990s are the laser storage devices (videodiscs, compact discs, CD-ROM) and complex new multimedia chips. These chips, like the one from AT & T, are known as digital signal processors (DSPs). DSPs promise to create a wonderland of intelligent multimedia devices that will be cheap enough to pop up in everyone's living room, classroom, car, or bedroom.

This is just the beginning. It will not be long before entire computers can be built on a device that can perch on the head of a pin.

What? You can't type on a computer that small? Who needs to type? Computers that small need only the smallest electrical signal to kick them into gear. You don't place a pinhead computer on a desktop; you wear it! It becomes an intelligent tooth filling that plays soothing music to put you to sleep at night, smart jewelry that remembers credit card numbers and phone numbers and helps you study for tests, and bionic clothing that tells you when it needs to be washed.

Artificial-intelligence scientists can't wait for these new computer chips. They plan to build entire cities of silicon on chips smaller than a ladybug. The cities will be just like real cities with garment, financial, jewelry, and shopping districts. One neighborhood will be made up of electronic musicians who generate synthesized music, speech, and sound effects.

Another neighborhood will house the artists who create dazzling 3-D graphics and animations. Down the street will be the accountants and clerks who are whizzes at filing and printing huge gobs of information. Writers and authors will have their own neighborhood. The "brains" who run the whole chip will probably live in a downtown neighborhood.

Computer cities of the future may be as rich, as complex, and as fascinating as real cities for human beings. But what happens if computer cities become too much like real cities with gangs, the Mafia, drug dealers, and homeless people moving in? Is the same future in store for miniature cities made of silicon? ⊡

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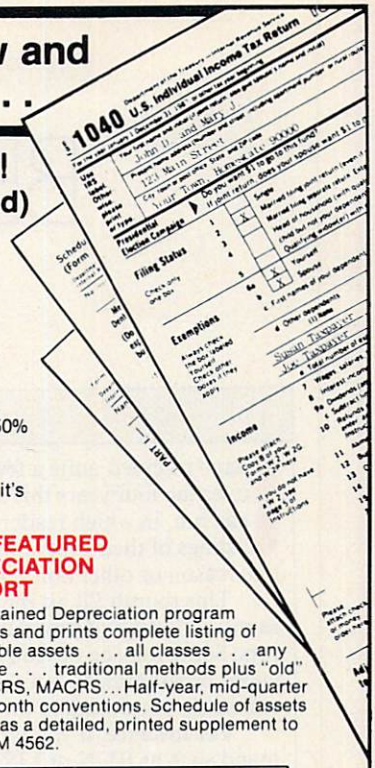

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BEGINNER BASIC

LARRY COTTON

I have received quite a few letters over the four years this column has run, in which readers include listings of their programs that for one reason or other don't work.

This month I'll hit the high spots in my collection of programming errors. Some may be obvious to experienced programmers, but they can be extremely perplexing to the novice.

For instance, if you type a command such as RUN or LIST with no program in the computer's memory where BASIC programs are normally stored, nothing happens. Obvious, perhaps, but make sure a program is in memory before trying to run or list it.

Two other areas where trouble pops up are with the simple PRINT and GOTO statements. PRINT must have something following it in quotation marks, a variable that the computer recognizes and allows, or nothing at all, in which case the computer prints a blank line. You can't use a numeric variable name which contains a preassigned keyword; TOTAL=5 won't work because it contains the keyword TO.

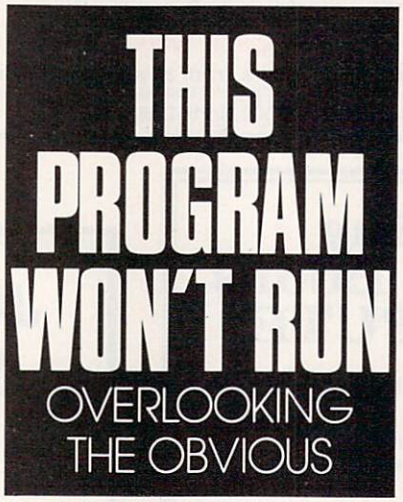
PRINT also can get fouled up with the arcane symbols which Commodore uses to represent cursor movements, screen clearing, colors, and so forth. Sometimes it's easier to use READ X in a data statement and then use PRINT CHR$(X) to see the results.

GOTO should be avoided as much as possible because of the often hopelessly tangled code that results. If you were to send me a program for analysis that contains several unconditional GOTOs, I'd probably get lost and not be of much help. Another sometimes overlooked fact: If a program line referred to in a GOTO or GOSUB isn't there, GOTO and GOSUB won't work.

Blank and/or Stuck Screens

When programming, beginners occasionally press the Clear/Home key by accident. The screen goes blank, and the programmer thinks he or she has lost the program. However, it's very much alive and well in the computer's memory. Type LIST and press the Return key. Voilà!

Programs (usually unfinished ones) often get stuck in infinite loops or ignore keyboard presses. The best way to circumvent these problems is to save the program to disk just before running it. That way, if something goes amiss (and it usually does), you haven't lost a half-night's work.



Sometimes you can't even tell when a program's stuck in a loop because the monitor's screen or speaker doesn't reveal any clues. Try pressing the Run/Stop key. If that doesn't work, hold down Run/Stop and hit (don't just press) Restore. If that doesn't work, press your reset button.

On the 64, you'll have to make or buy your own reset button; the 128 has one. It resets the computer's memory to warm start, and with the aid of a BASIC utility, you may be able to resurrect what would've become a lost program if you had shut off the power completely.

Errors in Syntax

The computer is a perfectionist. When it encounters anything it doesn't recognize, it invariably brings the program to a screeching halt and prints ?SYNTAX ERROR (in whatever line the error occurred). Syntax errors run the gamut from typing a 0 when you meant to type the letter *O* to entering an extra parenthesis in a math program line.

Another common source of error in BASIC programs is caused by overzealous crunching of too many statements into one IF-THEN line. Here's an example:

```
100 IF T=5 THEN PRINT
    "COWABUNGA!": GOSUB 300
```

Do you ever want to GOSUB 300 if T is not 5? If you do, GOSUB 300 needs to go on another line:

```
100 IF T=5 THEN PRINT
    "COWABUNGA!"
110 GOSUB 300
```

READ and DATA are probably the most error-prone keywords in BASIC—and the hardest to diagnose. Again, don't overlook the obvious. When errors occur in reading data, the error message refers to the line that does the reading, even though the error is probably in the data itself. Here are several examples that contain various errors.

```
10 READ A,B,C,D,E,
20 DATA 5,6,4,3.8

10 FOR T=1 TO 5
20 READ Z
30 NEXT
40 DATA 4,5,6,7

10 READ A,B,C$
20 DATA 5,6,7

10 READ A$,B$,C
20 DATA XYLOPHONE, NOSE
FLUTE, TUBA

10 READ NAME$
20 JIM
```

The first error is a period instead of a comma between the 3 and 8. The second example contains only four

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items of data, but line 10 is trying to read five. The third data item in the third example will be interpreted as a string; the 7 cannot be manipulated mathematically.

The opposite case appears in the fourth example; line 10 is expecting a number (C) as its third piece of data, but instead it gets a string (TUBA). Can you determine what's wrong with the last example?

The "Without" Errors

NEXT WITHOUT FOR and RETURN WITHOUT GOSUB errors occur when only one keyword is found from a pair of keywords that are normally used together. For every FOR there must be a NEXT; for every GOSUB there must be a RETURN.

In a FOR-NEXT loop, seven items are mandatory:

1. The word *FOR*
2. A counter (any valid numeric variable)
3. An equal sign
4. A starting value for the counter (any valid numeric expression)
5. The word *TO*
6. The ending value for the counter (any valid numeric expression)
7. The word *NEXT*

Here's a simple time-delay loop that uses all seven items:

```
100 FOR T=1 TO 2000: NEXT
```

By the way, even though IF and THEN are used together, there's no such error message as THEN WITHOUT IF; you'll just get a ?SYNTAX ERROR in whatever line the error occurred.

Numeric and String Variables

Can you find anything wrong in these three lines?

```
10 GET S$: IF S$=" " THEN
   GOSUB 200
20 GET S: IF S=" " THEN GOSUB
200
200 RETURN
```

In line 20, GET S causes the computer to look at the keyboard to see if a number has been entered. No matter what it finds, the phrase IF S=" " will elicit the infamous TYPE MISMATCH ERROR. The problem is that S represents a numeric variable, and the double quotes indicate a null string. We must change " " to 0 in line 20. And this isn't foolproof, by any means.

A similar error happens with INPUT. INPUT A expects the user to enter a number. If the user types a letter and presses Return, the computer responds with the very user-unfriendly ?REDO FROM START error.

If you have a burning question of general interest involving BASIC programming, drop me a line in care of COMPUTE. I'll be glad to discuss it in a future column. ⊡

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Take a minute to tell us what you like most about Gazette. We also want to know what you don't like. What subjects would you like to see us cover? We want the magazine to be as useful and interesting as possible and to provide you with the coverage you want. Please take a minute to fill out and mail us the questionnaire that appears elsewhere in this section. We'll tabulate the results and use them to help us produce the magazine you want. If you don't want to tear out the questionnaire, a photocopy will be fine.

MACHINE LANGUAGE

JIM BUTTERFIELD

SCHEDULING MULTIPLE TASKS

When a computer does several independent jobs at the same time, it often uses a *scheduler* program to allocate processor time. To demonstrate this, we will drop three Commodore 64 sprites from the top of the screen at varying rates. A more elaborate system might vary the *x* and *y* rates according to the forces acting on the objects, but the principles would be the same.

For each object, we will construct a two-byte table. The table starts at address $035D and contains three two-byte entries, one for each object. The first byte keeps track of the time for the next movement to occur; this byte will be updated with each movement. The second byte will tell the rate at which the object should move. This value would not normally change.

When the time in the first byte matches the time in the lowest byte of the 64's jiffy clock, the scheduler will move the object. The jiffy clock is at addresses $A0–$A2 in the 64. The low byte is at $A2. As each object's time arrives, that object will move, and its action time will be set ahead.

The second byte tells how many jiffies will elapse between movements of the object. Object 1 has a value of 5 in its second byte, so it will move every five jiffies (12 movements per second). The second object has a value of 6, so it will travel slightly slower.

When an object's action time arrives, as signaled in the first byte, it will be moved; then the time will be set ahead by adding in the value contained in the second byte.

The code won't let an object stop. The maximum value possible in the second byte is 127, or just over two seconds between movements.

Does jiffy time $FF come before or after $02? That's like asking whether ten o'clock comes before or after three o'clock. The answer is both; but in practical terms, $FF comes before $02, ten before three. The conventional computer test (which number is smaller?) doesn't work. We must use a modulo compare; this is achieved by following the compare instruction with a BPL or BMI.

We will set up a loop to go through the table. In order to use the X register as the loop index, we must first initialize it to 0.

```
033C  LDX  #$00
```

The table starts at $035D, so we may check our action time against the low byte of the jiffy clock at $A2. If we are past time, we'll hop ahead to $034D and do the work. The X register advances in steps of two to keep pace with the two-byte table entries. If the table were more complex, the X register would increase by larger amounts.

```
033E  LDA  $035D,X
0341  CMP  $A2
0343  BMI  $034D
```

If the table entry doesn't call for action, we'll bump X by 2 and try again. If we pass the end of the table, reset X to the start.

```
0345  INX
0346  INX
0347  CPX  #$06
0349  BNE  $033E
034B  BEQ  $033C
```

If an object's time has come, jump to the code at $034D. Register X will contain 0, 2, or 4. The action time is still at address $035D,X. First increase its value by the contents of the second byte at $035E,X.

```
034D  CLC
034E  LDA  $035D,X
0351  ADC  $035E,X
0354  STA  $035D,X
```

The *y* coordinates of sprites are spaced at two-byte intervals, starting at address $D001. Since our X register moves in two-byte steps, we can bump the sprite's position directly.

```
0357  INC  $D001,X
```

If a sprite's *y* position rolls over to 0, the program ends. If not, we return to the scheduling table.

```
035A  BNE  $033C
035C  RTS
```

Here is the table schedule:

```
035D  00 05
035F  00 06
0361  00 0A
```

The BASIC program will poke the program in place and run it.

```
10 DATA 162, 0, 189, 93, 3, 197
20 DATA 162, 48, 8, 232, 232
30 DATA 224, 6, 208, 243, 240
40 DATA 239, 24, 189, 93, 3
50 DATA 125, 94, 3, 157, 93, 3
60 DATA 254, 1, 208, 208, 224
70 DATA 96, 0, 5, 0, 6, 0, 10
60 FOR J=828 TO 866
80 READ X
90 T=T+X
100 POKE J,X
110 NEXT J
120 IF T<>4282 THEN STOP
130 FOR J = 704 TO 766
140 POKE J,0
150 NEXT J
160 FOR J=704 TO 720 STEP 3
170 POKE J,255
180 NEXT J
190 FOR J=0 TO 2
200 POKE 53248+J*2,J*30+40
210 POKE 53249+J*2,50
220 POKE 53287+J,1
230 POKE 2040+J,11
240 NEXT J
250 POKE 53269,7
260 SYS 828
270 POKE 53269,0
```

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PROGRAMMER'S PAGE

RANDY THOMPSON

My 64 is in its box right now, but not because I've abandoned it for an Amiga or some other computer (my Amiga is in its box, too). No, it's because I'm moving across the country.

Actually, I'm not quite sure exactly where my computer is, other than that it's in a box in a moving van somewhere between North Carolina and Washington state. Quite an unsettling thought.

It's difficult for me to be without a computer. I can't program, I can't play *Crossroads* (one of my all-time favorite computer games), and it makes writing this column extremely difficult. It's hard to remember the last time I actually had to compose something using a pen and paper, but I'll survive.

So what does all this have to do with programming? Nothing, except that I can't do any. Therefore, I won't be presenting any code this month. I'll be back on track next month, assuming my 64 arrives unharmed.

I've had a lot of time to think about what my next programming project will be, however. I've also had a lot of time to consider exactly what makes a good program. (Moving all the way across the country via automobile allows your mind plenty of time to dwell on such matters.) And as any programmer knows, coming up with a good original idea can be the most difficult step in developing software.

The best ideas are the products of necessity: You see a need for a program, and so you write one that fills that need. Take BASIC renumbering utilities, for example. Can you imagine writing a long BASIC program without one? I'll bet the first renumbering utility was written by a very frustrated hacker who simply ran out of line numbers late one night. Chances are, if you need the program, so does someone else.

Other good sources of programming ideas are different computer systems. If you can, play around with some other brands of computers and see what your 64 or 128 lacks in comparison. This is one of the best ways to discover how you can enhance your computer. Just look at how much the Macintosh contributed to the development of GEOS. Program ideas don't have to be original to be good.

Of course, such cross-computer comparisons can go in both directions. There are several 64 programs that would be great on other platforms. I'd love to see an Amiga version of *Crossroads,* for example, and there's already a quite useful version of *SpeedScript* available for MS-DOS machines (even if I do say so myself, since I wrote it).

You must be careful when porting programs from one computer to another, however. If you're planning on distributing the software, you must take into account the program's copyright status. You can't legally sell a version of *Tetris* for Brand X computer without first obtaining permission from Spectrum Holobyte. The courts don't look too kindly on that type of behavior. Of course, that doesn't mean you can't get inspiration from such programs; just don't copy them outright unless you have written permission to do so or unless you're writing the program for your own personal use only.

Computer magazines have always helped me discover new ideas. I look at the lists of new software releases, and, in the case of a magazine such as *COMUTE!'s Gazette* or *Run,* I look at what new programs are offered as type-ins. Reading about other programs allows me to consider alternatives. A disk utility, for example, may allow you to sort your files alphabetically within the disk's directory but not to arrange the files in any other order. This might inspire me to write my own utility that not only sorts directories alphabetically, but by file type, by file size, or in an arbitrary order that the user chooses.

Sometimes the title of a program suggests the program does one thing when it really does something else entirely. Many times, this implied purpose is far superior to the program's actual function. If you were to take the implied idea and mold it, you might come up with a really good piece of software—and all because of a slight misunderstanding.

Although I can't claim personal success with programs conceived of while unconscious, I have known people who derive some of their best inspirations from dreams. For example, the entire concept for Rhett Anderson and David Hensley's highly entertaining game *Basketball Sam & Ed* (*COMPUTE!'s Gazette,* July 1987) came from a dream Rhett had one summer night. Crazy as it may seem, it might be a good idea to keep a notebook by your bed so you can jot down your dreams before they fade from your memory. I've even heard of people who keep tape recorders on their nightstands for just this purpose.

Now that I've traveled almost 3000 miles thinking about what I'm going to do once I get my computer back, I can't say that I'm suffering from a lack of programming ideas. The problem now is finding enough time to develop them all. Of course, I'd still like readers to send me their best programming tips. I'm still waiting for the moving company to deliver my computer and the rest of my belongings. The last I heard, the moving truck was experiencing mechanical difficulties somewhere in southern California. I guess there are worse places it could be.

I wonder where my computer is? ⊡

GEOFFREY SPARKS

ULTRAGRAPH

DESIGN AND EDIT CHARACTERS, BLOCKS, AND SCREENS WITH THIS GRAPHIC TOOL FOR THE 64

Use *Ultragraph* to create and display a vast range of screen images. This integrated set of utilities is a powerful tool for computer artists and programmers.

Ultragraph comes in two parts. The first consists of a powerful and comprehensive character editor, block editor, and screen creator. Use these to give free reign to your imagination and creativity.

The character editor allows for the quick and easy creation of custom characters in multicolor mode. These can then be used in the block editor to create the basic building units of *Ultragraph*. The editor lets you define up to 251 custom characters to be used in 255 blocks. Each screen in turn is comprised of 40 blocks chosen from the 255-block set. This form of data compression is frequently used in commercial games, where multiple levels demand the most economical form of memory usage possible. Because the character and block editors are both onscreen simultaneously, it's a simple process to build up complex block patterns and pictures. Then you fit the blocks together to form full screens. You can use the blocks to create abstract or realistic designs.

The second part of *Ultragraph* is a short machine language module called *Runtime*. Use this module to display and screen with a single POKE to location 253 and a SYS call to 4175.

Because of the efficient way that *Ultragraph* stores its data, up to 186 screens can be held in memory at one time, while still leaving more than 36K free for BASIC programs. Since locations 49152–53247 are also free for machine language routines, this leaves a total of 40K of free RAM.

The adventurous game designer could create landscapes 12 screens wide × 15 screens deep, or perhaps 31 levels with 6 screens per level. To call up and move around in any of these screens, you need only a POKE and a SYS call.

Ultragraph is written entirely in machine language. Enter the program with *MLX*, our machine language entry program; see "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: C000
Ending address: CFFF

When you've finished typing the data, be sure to save a copy to disk before exiting *MLX*.

To load *Ultragraph*, type Load *"filename"*, 8, 1. Then type NEW, press Return, and type SYS 49152 to start. Press any key to exit the title screen.

The Editor

When you first enter *Ultragraph*, you're in the character- and block-edit mode. Use the f2, f4, f6, and f8 keys to select your choice of colors.

A joystick plugged into port 1 gives you control of the cursor, which will be in the upper left corner of the displayed character set. Move the cursor around and press the fire button. With each press of the button, the character under the cursor becomes the current character and appears below in the character-edit grid.

To exit the letter set and move to the character grid, press N. The cursor will appear in the edit grid. You can now change this letter as you desire. The fire button will change the color pattern under the cursor to your chosen color. Colors can be selected from the palette to the right of the grid with the f1, f3, f5, and f7 keys.

To change the selection of colors in the palette, use the f2, f4, f6, and f8 keys. Hold down the key to cycle through the available colors. Note that the top color in the palette is the block color and can be different for each block. The other three colors are screen colors and must be common to all blocks on one screen. The same block may therefore have different colors on different screens. To set screen colors, use the color-changing keys until you have the desired palette; then switch to screen mode with the minus key and press Inst/Del.

Having created your character, you need to put it into a block. Press M to move the cursor into the block grid. Use the fire button again to place your custom character anywhere within the block. You can use this system to build your own custom characters and link them together within the block. This way you can build complex and detailed patterns and pictures.

Please note that characters numbered 252, 253, 254, and 255 are reserved for the palette and grid display. Changing them will result in a distorted display and is not advised. As a matter of convenience, character 0 and block 0 should be set to all spaces.

To help you create with *Ultragraph*, here's a description of the operative commands on the editor screen. Most of these command keys come in pairs for toggling forward and backward.

Q/W These keys cycle up and down through the character set. The currently selected character will be displayed in the grid with its number on the bottom line.

A/S These keys cycle through the blocks. Again the number will be displayed at the bottom to help you keep track of where you are.

Z/X These keys cycle through the screens. The screen number will be

increased or decreased, and the result displayed on the status line at the bottom. When you flip to screen mode, the currently selected screen will be displayed.

f1–f7 The unshifted function keys select the current drawing color from the chosen palette. Note that the colors are in the same order, top to bottom, as the function keys.

f2–f8 The shifted function keys will cycle through the available colors, changing the display as you go.

O/P The O key will memorize the current block. If you move to a new block number, the block design can then be recalled with the P key.

@/* The @ symbol stores the currently selected block palette, and the * key restores it. These are most useful when setting up a group of blocks that will be used on the same screen.

Return The Return key can be used in the block-edit grid to select the character under the cursor as the current character. This can be helpful if you need to make small editing changes and have trouble finding the right character in the upper letter set.

The Return key is also active in the screen-edit mode. When you position the large cursor over a selected block and press Return, that block will become the current block for painting purposes. This is convenient, as it reduces the amount of shifting between edit modes.

B The B key puts the cursor in the letter set for letter selection.

N The N key puts the cursor in the character grid for character editing.

M The M key puts the cursor in the block grid for block editing.

+/− These keys are used to shift between the character- and block-edit mode and the screen-edit mode. Pressing - puts you in screen mode, where the currently selected block can be inserted at the cursor position with the fire button. The + key takes you back to the character screen.

Note that when you switch to a new screen, if you wish to force your block colors to be the current screen colors, press Inst/Del. If you don't press Inst/Del and the screen colors differ from the block colors, you'll find your block has changed appearance when you return to the character editor.

Shift-E A shifted *E* returns you to BASIC. Make sure you've saved your data before doing this, as it is not recoverable.

Shift- = Pressing Shift and the equal sign cycles through the border colors. If you use the Inst/Del key to preserve your choice, the selected border color will be stored along with other screen data.

Shift-D A shifted *D* saves data to disk. You're given the option of saving character, block, or screen data singly or all three sets of data. Data is saved with the same filename each time (using the @0:Save with Replace option), and this cannot be altered because the *Runtime* package will look for these filenames when it sets up.

Shift-L Use a shifted *L* to load data. Data can be loaded singly or as a group.

The *Runtime* Module

The second part of *Ultragraph, Runtime,* is a short machine language program that loads data and displays selected screens. The three sets of data you defined with the editor must be on the same disk as the *Runtime* program.

Runtime is written entirely in machine language. Enter it using *MLX* also. When *MLX* prompts you, respond with the values given below.

Starting address: 1000
Ending address: 128F

Load *Runtime* by typing Load *"filename"*, 8, 1. Make sure the disk containing your graphics data is in the disk drive and then begin the program with SYS 4096. *Ultragraph* stores its custom character set from addresses 2048 to 4096, and the *Runtime* program starts at 4096, so the start of BASIC must be reset. The start of BASIC will be reset for you at 4864 ($1300 hex) by putting the value 0 at 43 and 19 at 44. A NEW command is then performed to reset BASIC pointers, and the program falls through to the loading routine that force-loads your graphics data into its *Runtime* locations.

If you wish to start BASIC at a different address, poke the low-byte/high-byte address into 43 and 44 and perform a NEW. Data alone can be entered with SYS 4166. This option can be used to skip the BASIC reset routine or load in even more disks of data as your program progresses.

Please note that *Ultragraph* data is force-loaded into different addresses from those where it was saved. The load addresses are given at the end of this article. When you have reset BASIC and loaded your data, *Ultragraph* is ready for use. Poke the screen number you desire into location 253 ($FD hex), and call it by typing SYS 4175. Your chosen screen should instantly appear.

The following short program will give you a continuous slide show of your creations. Y is the highest screen number you wish to display.

```
10 REM ULTRAGRAPH SLIDE SHOW
20 X=0
30 POKE 253, X:SYS 4175
40 REM DELAY LOOP
50 FOR J=1 TO 2000:NEXT
60 X=X+1:IF X=Y THEN X=0
70 GOTO 30
```

Please note that the range of legal values to poke into 253 is 0–186. Negative numbers and numbers greater than 255 will crash your program. *Ultragraph* stores up to 186 custom-designed screens. Poking numbers higher than this into address 253 will simply return garbage screens and should be avoided. For a longer delay, increase the value of J in line 50.

Ultragraph stores its graphics data in the RAM under BASIC and Kernal ROM. When this data is accessed by the *Runtime* program, BASIC and the Kernal are switched out. They are switched back on when the screen is complete. Unfortunately, as a consequence any BASIC extensions or alterations that copy BASIC into RAM will be erased by the graphics data.

Character data is loaded in at 2048, block data under BASIC at 41472, and the screen data at 57344. *Ultragraph* was written entirely using COMPUTE's *Bassem* assembler. Machine language programmers should note that the *Runtime* program seems quite compatible with *Bassem* as long

as the symbol table is set to use memory away from $A000–$BFFF, as graphics data is stored there.

Ultragraph Command Summary

Q/W	Cycles through character set.
A/S	Cycles through blocks.
Z/X	Cycles through screens.
f1–f7	Selects drawing color.
f2–f8	Cycles through colors.
O/P	Memorizes and recalls the current block.
@/*	Stores and restores selected block palette.
Return	To select current character or current block.
B	To select letter.
N	Character editing.
M	Block editing.
+/-	Toggle between character- and block-edit mode and screen-edit mode.
Shift-E	Return to BASIC.
Shift- =	Border colors.
Shift-D	Save data.
Shift-L	Load data.

ULTRAGRAPH

```
C000:20 96 CF 78 A9 7F 8D 0D 2C
C008:DC A9 01 8D 1A D0 A9 C0 83
C010:8D 15 03 A9 AC 8D 14 03 5F
C018:A9 00 8D 12 D0 AD 11 D0 71
C020:09 80 8D 11 D0 AD 11 D0 39
C028:29 EF 8D 11 D0 AD 16 D0 37
C030:09 10 8D 16 D0 A9 93 20 C1
C038:D2 FF 78 A9 00 8D BB C9 44
C040:8D B9 CC 8D B8 CC 8D ED 6B
C048:C7 8D EE C7 8D 99 CA 8D 61
C050:7A CC 20 52 C1 20 CC C2 56
C058:20 81 C1 78 20 9D C2 20 27
C060:BF C3 20 6A C4 A9 00 8D B7
C068:20 D0 8D FE CF 8D D1 C5 ED
C070:8D D0 C5 AD 10 D0 29 FE 95
C078:8D 10 D0 A9 33 8D 53 C5 B5
C080:A9 38 8D 55 C5 A9 66 8D 1B
C088:54 C5 A9 30 8D 56 C5 A9 D8
C090:01 8D FF CF 58 A2 00 A0 E0
C098:00 E8 D0 FD C8 D0 FA AD 7B
C0A0:11 D0 09 10 8D 11 D0 4C 9F
C0A8:A7 C0 00 00 AD 19 D0 29 CA
C0B0:01 8D 19 D0 78 AD 11 D0 B3
C0B8:29 7F 8D 11 D0 A9 EA 8D 02
C0C0:12 D0 A9 2B 8D 14 03 A9 D3
C0C8:C7 8D 15 03 20 C4 C1 20 1C
C0D0:87 EA 20 BC C9 20 E2 C9 FE
C0D8:AD BB C9 F0 14 20 52 CA F8
C0E0:20 B9 CB AD 16 D0 09 10 4B
C0E8:8D 16 D0 20 28 CD 4C 4B 2F
C0F0:C1 AD AA C0 8D 21 D0 AD 60
C0F8:16 D0 09 10 8D 16 D0 AD EF
C100:AB C0 D0 2D EE AB C0 20 3E
C108:87 EA 20 7A CD 20 D0 C1 08
C110:20 5C C2 20 57 C5 20 B6 DD
C118:C3 20 9C C9 20 0B CD 20 9E
C120:E5 C2 20 B2 C4 20 87 C7 F3
C128:20 C2 C7 20 6E C8 4C 4B E1
C130:C1 A9 00 8D AB C0 20 C3 3C
C138:C8 20 5B C9 20 B2 C4 20 A5
C140:D0 C1 20 01 C9 20 AA C9 9E
C148:20 27 C9 58 68 A8 68 AA C5
C150:68 40 20 0C CA A9 04 85 67
C158:FC A9 04 85 FB A9 00 AA CE
C160:A8 8A 91 FB E8 F0 19 C8 D2
C168:C0 20 D0 F5 48 18 A9 28 EB
C170:65 FB 85 FB A9 00 65 FC 2B
C178:85 FC A0 00 68 4C 61 C1 0B
C180:60 A9 D0 85 FC A9 00 85 25
C188:FB A9 08 85 FE A9 00 85 F1
C190:FD A0 00 78 A5 01 29 33 79
C198:85 01 B1 FB 91 FD E6 FB 63
C1A0:A5 FB C9 00 D0 02 E6 FC 88
C1A8:E6 FD A5 FD C9 00 D0 02 A5
C1B0:E6 FE A5 FB C9 00 D0 E2 AE
C1B8:A5 FC C9 D8 D0 DC A5 01 5B
C1C0:09 04 85 01 AD 18 D0 29 23
C1C8:F0 09 02 8D 18 D0 58 60 35
C1D0:20 66 C2 AD 65 C2 F0 01 4A
C1D8:60 A9 14 8D 65 C2 A5 CB 9F
C1E0:C9 40 D0 01 60 A5 F5 C9 D2
C1E8:C2 F0 01 60 A5 CB C9 04 24
C1F0:F0 29 C9 05 F0 21 C9 06 66
C1F8:F0 19 C9 03 F0 11 C9 35 39
C200:F0 09 C9 0E F0 01 60 4C F2
C208:E2 FC 60 EE 20 D0 60 EE 2D
C210:21 D0 60 EE 22 D0 60 EE 59
C218:23 D0 60 EE 86 02 A9 D8 C6
C220:85 FC A9 00 85 FB A0 00 3A
C228:AD 86 02 29 0F 8D 86 02 B6
C230:C9 08 B0 09 18 AD 86 02 C9
C238:69 08 8D 86 02 AD 86 02 64
C240:91 FB E6 FB D0 F7 E6 FC 5B
C248:A5 FC C9 DB D0 EF A2 00 62
C250:AD 86 02 9D 00 DB E8 E0 8A
C258:0A D0 F5 60 AD 65 C2 F0 55
C260:03 CE 65 C2 60 00 A5 CB 0E
C268:C9 03 F0 2A C9 04 F0 14 A8
C270:C9 05 F0 16 C9 06 F0 18 FB
C278:C9 01 F0 01 60 20 24 C6 E3
C280:20 98 C6 60 A9 FF 8D 9C 20
C288:C2 60 A9 FE 8D 9C C2 60 71
C290:A9 FD 8D 9C C2 60 A9 FC CD
C298:8D 9C C2 60 FF A9 0F 85 B4
C2A0:FC A9 E0 85 FB A0 00 A9 8F
C2A8:00 91 FB C8 C0 08 D0 F9 60
C2B0:A9 55 91 FB C8 C0 10 D0 8C
C2B8:F7 A9 AA 91 FB C8 C0 18 AF
C2C0:D0 F9 A9 FF 91 FB C8 C0 31
C2C8:20 D0 F9 60 A9 FF 8D F0 31
C2D0:05 8D F1 05 A9 FE 8D 40 6F
C2D8:06 8D 41 06 A9 FD 8D 90 3E
C2E0:06 8D 91 06 60 AD FF CF E8
C2E8:CD FE CF D0 01 60 AD FE FF
C2F0:CF 85 FC A9 08 85 FB 18 60
C2F8:A9 00 A2 08 6A 66 FB 90 9D
C300:03 18 65 FC CA 10 F5 85 93
C308:FC 18 A9 00 65 FB 8D FD 7D
C310:CF A9 08 65 FC 8D FC CF 29
C318:AD FE CF 8D FF CF A9 E3 7F
C320:8D FB CF A9 05 8D FA CF 26
C328:A0 00 A2 00 AD FD CF 85 DE
C330:FB AD FC CF 85 FC B1 FB 3D
C338:8D F8 CF 8C F9 CF A0 08 DF
C340:AD FB CF 85 FB AD FA CF 4C
C348:85 FC AD F8 CF 29 03 20 60
C350:9A C3 91 FB E8 88 91 FB 90
C358:E8 88 4E F8 CF 4E F8 CF 49
C360:C0 00 D0 DC E0 40 D0 01 DA
C368:60 AC F9 CF C8 C0 08 D0 B1
C370:01 60 AD FD CF 85 FB AD 60
C378:FC CF 85 FC B1 FB 8D F8 84
C380:CF 8C F9 CF 18 AD FB CF 8E
C388:69 28 8D FB CF AD FA CF 3B
C390:69 00 8D FA CF A0 08 4C 8B
C398:40 C3 C9 00 F0 0C C9 01 B6
C3A0:F0 0B C9 02 F0 0A C9 03 03
C3A8:F0 09 A9 FC 60 A9 FD 60 F5
C3B0:A9 FE 60 A9 FF 60 A5 CB 0C
C3B8:F0 01 60 EE FE CF 60 A9 95
C3C0:00 AA 9D 00 10 E8 E0 C0 4D
C3C8:D0 F8 A2 00 BD FB C3 C9 7A
C3D0:CC F0 07 9D 40 03 E8 4C E1
C3D8:CC C3 A2 00 BD 12 C4 C9 95
C3E0:CC F0 07 9D 80 03 E8 4C F3
C3E8:DC C3 A2 00 BD 2A C4 C9 0E
C3F0:CC F0 07 9D C0 03 E8 4C 06
C3F8:EC C3 60 FF 00 00 81 00 F6
C400:00 81 00 00 81 00 00 81 77
C408:00 00 81 00 00 81 00 00 C7
C410:FF CC FF FF 00 80 01 00 D0
C418:80 01 00 80 01 00 80 01 34
C420:00 80 01 00 80 01 00 FF F1
C428:FF CC FF FF F0 80 00 10 7E
C430:80 00 10 80 00 10 80 00 45
C438:10 80 00 10 80 00 10 80 8F
C440:00 10 80 00 10 80 00 10 70
C448:80 00 10 80 00 10 80 00 5D
C450:10 80 00 10 80 00 10 80 A7
C458:00 10 80 00 10 80 00 10 88
C460:80 00 10 80 00 10 FF FF 74
C468:F0 CC A9 07 8D 15 D0 A9 4F
C470:0D 8D F8 07 A9 0E 8D F9 0E
C478:07 A9 0F 8D FA 23 A9 98 FA
C480:8D 02 D0 A9 C2 8D 03 D0 29
C488:A9 18 8D 04 D0 A9 32 8D FD
C490:05 D0 A9 32 8D 01 D0 A9 E4
C498:38 8D 00 D0 A9 04 8D 17 3E
C4A0:D0 8D 1D D0 A9 01 8D 27 3A
C4A8:D0 8D 28 D0 8D 29 D0 60 23
C4B0:EA 04 CE B1 C4 F0 01 60 F1
C4B8:A9 04 8D B1 C4 AD 00 DC 9E
C4C0:8D B0 C4 4E B0 C4 B0 03 B7
C4C8:20 EC C4 4E B0 C4 B0 03 18
C4D0:20 FB C4 4E B0 C4 B0 03 E3
C4D8:20 0A C5 4E B0 C4 B0 03 8F
C4E0:20 2F C5 4E B0 C4 B0 03 E0
C4E8:20 4F C5 60 AD 01 D0 CD F5
C4F0:53 C5 90 06 38 E9 08 8D 0F
C4F8:01 D0 60 AD 01 D0 CD 54 59
C500:C5 B0 06 18 69 08 8D 01 64
C508:D0 60 AD 00 D0 CD 55 C5 F7
C510:F0 17 38 E9 08 8D 00 D0 C6
C518:20 16 C6 AD D0 C5 F0 09 75
C520:AD 00 D0 38 E9 08 8D 00 AA
C528:D0 2C 10 D0 D0 E4 60 AD BE
C530:00 D0 CD 56 C5 F0 17 18 47
C538:69 08 8D 00 D0 20 08 C6 0A
C540:AD D0 C5 F0 09 AD 00 D0 6E
C548:18 69 08 8D 00 D0 60 20 38
C550:8B C6 60 33 66 38 30 A5 AC
C558:CB C9 1C F0 09 C9 27 F0 7D
C560:39 C9 24 F0 6D 60 A9 32 01
C568:8D 01 D0 A9 33 8D 53 C5 EB
C570:A9 38 8D 00 D0 A9 38 8D BB
C578:55 C5 A9 66 8D 54 C5 A9 AE
C580:30 8D 56 C5 A9 0D 8D F8 44
C588:07 A9 00 8D D0 C5 8D D1 65
C590:C5 AD 10 D0 29 FE 8D 10 E9
C598:D0 60 A9 01 8D D0 C5 A9 CE
C5A0:00 8D D1 C5 AD 10 D0 29 9E
C5A8:FE 8D 10 D0 A9 92 8D 01 D9
C5B0:D0 A9 93 8D 53 C5 A9 38 97
C5B8:8D 00 D0 A9 38 8D 55 C5 28
C5C0:A9 C8 8D 54 C5 A9 68 8D 7D
C5C8:56 C5 A9 0E 8D F8 07 60 C5
C5D0:00 00 A9 01 8D D1 C5 A9 8A
C5D8:00 8D D0 C5 AD 10 D0 29 B6
C5E0:FE 8D 10 D0 A9 9A 8D 01 32
C5E8:D0 A9 9B 8D 53 C5 A9 F0 89
C5F0:8D 00 D0 A9 F0 8D 55 C5 26
C5F8:A9 B6 8D 54 C5 A9 10 8D 80
C600:56 C5 A9 0D 8D F8 07 60 EE
C608:AD 00 D0 D0 08 AD 10 D0 7B
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PROGRAMS

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C618:D0 10 FA AD 10 D0 29 FE 61
C620:8D 10 D0 60 AD 01 D0 38 E3
C628:E9 32 85 FC A9 05 85 FD 22
C630:18 A9 00 A2 08 6A 66 FC 12
C638:90 03 18 65 FD CA 10 F5 59
C640:85 FD A9 00 18 65 FC 85 1B
C648:FC A9 04 65 FD 85 FD AD 45
C650:00 D0 85 FB AD 10 D0 29 FA
C658:01 F0 07 18 A5 FB 69 18 0D
C660:85 FB A5 FB 38 E9 18 85 43
C668:FB 46 FB 46 FB 46 FB AD 08
C670:10 D0 29 01 F0 07 A9 1D 83
C678:18 65 FB 85 FB 18 A5 FB CA
C680:65 FC 85 FC A9 00 65 FD 96
C688:85 FD 60 20 24 C6 AD D1 CF
C690:C5 D0 0D AD D0 C5 D0 10 01
C698:A0 00 B1 FC 8D FE CF 60 E4
C6A0:A0 00 AD FF CF 91 FC 60 53
C6A8:A0 00 AD 9C C2 91 FC C8 25
C6B0:91 FC 20 B9 C6 60 20 D0 AE
C6B8:C1 A9 E3 85 FB A9 05 85 7C
C6C0:FC A0 00 A2 00 8C F9 CF 15
C6C8:AD FE CF 8D F8 CF 0E F8 DB
C6D0:CF 0E F8 CF B1 FB 20 13 B6
C6D8:C7 18 6D F8 CF 8D F8 CF 04
C6E0:C8 C8 C0 0A D0 E8 AD FD 41
C6E8:CF 85 FD AD FC CF 85 FE 8B
C6F0:AC F9 CF AD F8 CF 91 FD 50
C6F8:C8 C0 08 F0 15 A5 FB 18 7A
C700:69 28 85 FB A5 FC 69 00 B2
C708:85 FC 8C F9 CF A0 00 4C 18
C710:CE C6 60 C9 FC F0 0B C9 EC
C718:FD F0 0A C9 FE F0 09 A9 38
C720:03 60 A9 00 60 A9 01 60 8A
C728:A9 02 60 78 AD 19 D0 29 3D
C730:01 8D 19 D0 A9 C0 8D 15 54
C738:03 A9 AC 8D 14 03 A9 00 22
C740:8D 12 D0 AD BB C9 D0 30 E6
C748:AD 21 D0 8D AA C0 A9 00 95
C750:8D 21 D0 AD 18 D0 29 F0 2B
C758:09 04 8D 18 D0 AD 16 D0 DA
C760:29 EF 8D 16 D0 A2 00 A9 4E
C768:01 9D C0 DB 48 A9 20 9D 7C
C770:98 07 68 E8 E0 28 D0 EF E2
C778:AD 11 D0 09 80 8D 11 D0 FA
C780:58 68 A8 68 AA 68 40 A2 0C
C788:00 BD 95 C7 9D C0 07 E8 9D
C790:E0 28 D0 F5 60 20 03 08 A5
C798:01 12 01 03 14 05 12 3A 90
C7A0:20 20 20 20 20 20 02 0C DF
C7A8:0F 03 0B 3A 20 20 20 20 67
C7B0:20 20 13 03 12 05 05 0E A7
C7B8:3A 20 20 20 20 20 20 20 55
C7C0:20 20 AD FF CF 8D 53 C8 42
C7C8:20 EF C7 A2 0C 20 58 C8 E1
C7D0:AD ED C7 8D 53 C8 20 EF 72
C7D8:C7 A2 18 20 58 C8 AD EE 2A
C7E0:C7 8D 53 C8 20 EF C7 A2 A1
C7E8:25 20 58 C8 60 00 00 A0 4E
C7F0:30 8C 54 C8 8C 55 C8 8C AA
C7F8:56 C8 C9 C8 90 11 A9 32 F9
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C808:C8 8D 53 C8 4C 29 C8 C9 BA
C810:64 90 16 A9 31 8D 54 C8 86
C818:38 AD 53 C8 E9 64 8D 53 77
C820:C8 4C 29 C8 A9 30 8D 54 58
C828:C8 AD 53 C8 A2 00 38 E9 EF
C830:0A 90 0F E8 48 38 AD 53 2D
C838:C8 E9 0A 8D 53 C8 68 4C 9D
C840:2E C8 8A 18 69 30 8D 55 6A
C848:C8 AD 53 C8 18 69 30 8D F4
C850:56 C8 60 00 30 30 30 60 4E
C858:AD 54 C8 9D C0 07 E8 AD 6A
C860:55 C8 9D C0 07 E8 AD 56 1C
C868:C8 9D C0 07 60 0A CE 6D 84
C870:C8 F0 01 60 A9 0A 8D 6D C6
C878:C8 A5 CB C9 3E D0 04 EE 1A
C880:FE CF 60 C9 09 D0 04 CE 90
C888:FE CF 60 C9 0A D0 04 EE C0
C890:ED C7 60 C9 0D D0 04 CE 36
C898:ED C7 60 C9 0C D0 10 EE 6E
C8A0:EE C7 AD EE C7 C9 BA 90 AB
C8A8:05 A9 00 8D EE C7 60 C9 21
C8B0:17 D0 0F CE EE C7 AD EE B1
C8B8:C7 C9 FF D0 05 A9 BA 8D 7F
C8C0:EE C7 60 AD ED C7 85 FD 3A
C8C8:A9 1A 85 FE 20 D2 C8 4C 80
C8D0:E5 C8 18 A9 00 A2 08 6A 2A
C8D8:66 FD 90 03 18 65 FE CA 7E
C8E0:10 F5 85 FE 60 A9 00 18 5A
C8E8:65 FD 85 FD A9 28 65 FE F4
C8F0:85 FE A5 FD 8D FD C8 A5 35
C8F8:FE 8D FE C8 60 00 00 00 DC
C900:00 A5 CB C9 26 F0 05 C9 DB
C908:29 F0 0E 60 AD FD C8 8D B8
C910:FF C8 AD FE C8 8D 00 C9 C1
C918:60 AD FF C8 85 FD AD 00 53
C920:C9 85 FE 20 65 C9 60 AD 9C
C928:FD C8 85 FD AD FE C8 85 FD
C930:FE A2 00 A0 00 BD 23 06 39
C938:91 FD E8 C8 EE 5A C9 AD DF
C940:5A C9 C9 05 D0 EF A9 00 96
C948:8D 5A C9 8A 18 69 23 AA 72
C950:C0 19 D0 E1 AD 86 02 91 DF
C958:FD 60 00 AD FD C8 85 FD F9
C960:AD FE C8 85 FE A9 00 8D 28
C968:5A C9 AA A8 B1 FD 9D 23 5F
C970:06 E8 C8 EE 5A C9 AD 5A F8
C978:C9 C9 05 D0 EF A9 00 8D C4
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C988:19 D0 E1 B1 FD CD 86 02 6A
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C998:60 00 00 00 A5 CB C9 2E 7A
C9A0:F0 01 60 AD 86 02 8D 9B C6
C9A8:C9 60 A5 CB C9 31 F0 01 A0
C9B0:60 AD 9B C9 8D 86 02 20 9A
C9B8:1E C2 60 00 A5 CB C9 28 30
C9C0:F0 05 C9 2B F0 16 60 A9 44
C9C8:00 8D BB C9 20 A7 CB AD B8
C9D0:F7 CF 8D ED C7 20 1E C2 A2
C9D8:20 B0 CB 60 A9 01 8D BB 50
C9E0:C9 60 AD BB C9 F0 10 AD C2
C9E8:18 D0 29 0F 09 81 8D 18 54
C9F0:D0 A9 04 8D 15 D0 60 A9 07
C9F8:03 8D 15 D0 AD 18 D0 29 B9
CA00:0F 09 10 8D 18 D0 A9 01 92
CA08:8D 99 CA 60 20 3A CA A9 53
CA10:04 85 FC A9 00 85 FB A9 FA
CA18:17 85 FE A9 FF 85 FD A0 C7
CA20:00 A9 FC A9 FC 91 FB E6 67
CA28:FB D0 02 E6 FC A5 FB C5 DA
CA30:FD D0 F0 A5 FC C5 FE D0 3F
CA38:EA 60 A9 20 85 FC A9 00 06
CA40:85 FB A9 24 85 FE A9 00 8A
CA48:85 FD A2 00 A0 00 20 23 DC
CA50:CA 60 AD 99 CA C9 01 D0 03
CA58:3F AD ED C7 8D F7 CF AD CC
CA60:EE C7 85 FD A9 2C 85 FE F7
CA68:20 D2 C8 A9 00 18 65 FD 9F
CA70:85 FD A9 50 65 FE 85 FE B3
CA78:A5 FD 8D 9A CA A5 FE 8D 34
CA80:9B CA 8D BB CC AD 9A CA 21
CA88:8D BA CC A9 00 8D 99 CA FB
CA90:20 E7 CC A0 00 20 9D CA 5A
CA98:60 01 00 00 00 A9 00 8D D2
CAA0:16 CB 20 A7 CB A9 00 8D 45
CAA8:12 CB A9 20 8D 13 CB 4C 0E
CAB0:19 CB AD 9A CA 85 FB AD 37
CAB8:9B CA 85 FC B1 FB 8D 9C 84
CAC0:CA 60 AD 9C CA 85 FE A9 67
CAC8:1A 85 FD 20 D2 C8 A9 00 9B
CAD0:18 65 FD 85 FD A9 28 65 30
CAD8:FE 85 FE 60 A0 00 A2 00 7F
CAE0:78 B1 FD 91 FB 20 93 CB 4B
CAE8:C8 C0 05 D0 F3 E8 A0 00 45
CAF0:E0 05 F0 23 18 A5 FD 69 45
CAF8:05 85 FD A9 00 65 FE 85 E5
CB00:FE 18 A5 FB 69 28 85 FB 84
CB08:A9 00 65 FC 85 FC 4C E0 8A
CB10:CA 00 00 00 00 00 00 58 65
CB18:60 20 B2 CA 20 C2 CA 20 AC
CB20:8A CB 20 7F CB 20 DC CA 4F
CB28:EE 16 CB AD 16 CB 4A B0 36
CB30:27 4A B0 24 4A B0 21 AD 4B
CB38:16 CB C9 28 F0 34 18 A5 B7
CB40:FB 69 05 8D 12 CB A5 FC B1
CB48:69 00 8D 13 CB EE 9A CA 91
CB50:D0 03 EE 9B CA 4C 19 CB 2E
CB58:38 A5 FB E9 9B 8D 12 CB 96
CB60:A5 FC E9 00 8D 13 CB EE 86
CB68:9A CA D0 03 EE 9B CA 4C 12
CB70:19 CB 20 B0 CB 60 AD 11 E2
CB78:D0 09 10 8D 11 D0 60 AD CF
CB80:12 CB 85 FB AD 13 CB 85 5B
CB88:FC 60 A0 19 B1 FD 8D 92 8F
CB90:CB 60 00 18 A5 FC 69 B8 54
CB98:85 FC AD 92 CB 91 FB 38 E5
CBA0:A5 FC E9 B8 85 FC 60 AD A1
CBA8:11 D0 29 EF 8D 11 D0 60 D3
CBB0:AD 11 D0 09 10 8D 11 D0 B7
CBB8:60 20 BE CB 60 01 CE BD 7F
CBC0:CB F0 01 60 A9 05 8D BD DA
CBC8:CB AD 00 DC 8D B0 C4 4E 86
CBD0:B0 C4 B0 03 4C F8 CB 4E 64
CBD8:B0 C4 B0 03 4C 12 CC 4E D2
CBE0:B0 C4 B0 03 4C 2C CC 4E 43
CBE8:B0 C4 B0 03 4C 53 CC 4E E7
CBF0:B0 C4 B0 03 4C 7B CC 60 A2
CBF8:A9 32 CD 05 D0 F0 12 AD 18
CC00:B8 CC 38 E9 08 8D B8 CC 83
CC08:AD 05 D0 38 E9 28 8D 05 67
CC10:D0 60 A9 D2 CD 05 D0 F0 A1
CC18:12 AD B8 CC 18 69 08 8D 0E
CC20:B8 CC AD 05 D0 18 69 28 31
CC28:8D 05 D0 60 A9 18 CD 04 37
CC30:D0 F0 1F 38 AD 7A CC E9 B0
CC38:05 8D 7A CC CE B9 CC AD 78
CC40:04 D0 38 E9 28 8D 04 D0 06
CC48:B0 08 AD 10 D0 29 FB 8D A3
CC50:10 D0 60 A9 30 CD 04 D0 5E
CC58:F0 1F 18 AD 7A CC 69 05 EE
CC60:8D 7A CC EE B9 CC AD 04 48
CC68:D0 18 69 28 8D 04 D0 90 CE
CC70:08 AD 10 D0 09 04 8D 10 0C
CC78:D0 60 00 AD ED C7 8D 9C B3
CC80:CA AD 05 D0 38 E9 32 85 EB
CC88:FD A9 05 85 FE 20 D2 C8 6B
CC90:A9 00 18 65 FD 85 FB A9 FF
CC98:20 65 FE 85 FC AD 7A CC 34
CCA0:18 65 FB 85 FB A9 00 65 63
CCA8:FC 85 FC 20 C2 CA 20 8A CF
CCB0:CB 20 DC CA 20 BC CC 60 6E
CCB8:00 00 00 00 AD BA CC 85 C9
CCC0:FB AD BB CC 85 FC 18 AD 06
CCC8:B8 CC 6D B9 CC 18 65 FB C8
CCD0:85 FB A5 FC 69 00 85 FC 04
CCD8:A0 00 A5 CB C9 01 D0 01 29
CCE0:60 AD ED C7 91 FB 60 AD 3B
CCE8:BA CC 85 FB AD BB CC 85 FE
CCF0:FC A0 28 B1 FB 8D 22 D0 7C
CCF8:C8 B1 FB 8D 23 D0 C8 B1 5B
CD00:FB 8D 20 D0 C8 B1 FB 8D A0
CD08:21 D0 60 AD 22 D0 8D 24 E2
CD10:CD AD 23 D0 8D 25 CD AD B9
CD18:20 D0 8D 26 CD AD 21 D0 44
CD20:8D 27 CD 60 00 00 00 00 0C
CD28:A5 CB F0 05 C9 01 F0 1D 49
CD30:60 AD 24 CD 8D 22 D0 AD 0D
CD38:25 CD 8D 23 D0 AD 26 CD 15
CD40:8D 20 D0 AD 27 CD 8D 21 4C
CD48:D0 20 56 CD 60 20 BC CC C5
CD50:B1 FB 8D ED C7 60 AD BA 2A
CD58:CC 85 FB AD BB CC 85 FC 2F
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CD60:A0 28 AD 22 D0 91 FB C8 BB
CD68:AD 23 D0 91 FB C8 AD 20 55
CD70:D0 91 FB C8 AD 21 D0 91 0A
CD78:FB 60 A5 F5 C9 C2 F0 01 7A
CD80:60 A5 CB C9 12 F0 0D C9 04
CD88:2A F0 01 60 A9 01 8D 82 8A
CD90:CE 4C 99 CD A9 00 8D 82 A1
CD98:CE 78 AD 15 D0 8D 6F CF 2C
CDA0:A9 00 8D 15 D0 AD 18 D0 52
CDA8:8D 81 CE A9 94 8D 18 D0 BB
CDB0:AD 16 D0 8D 83 CE 29 EF 35
CDB8:8D 16 D0 A9 24 8D 88 02 BF
CDC0:A9 00 8D 1A D0 A2 FF E8 7E
CDC8:BD 0B CE F0 06 20 CA F1 27
CDD0:4C C7 CD 20 71 CF 20 87 D2
CDD8:EA A5 CB C9 04 F0 13 C9 3D
CDE0:05 F0 15 C9 06 F0 17 C9 66
CDE8:03 F0 19 C9 3C D0 E7 4C 43
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CE30:41 43 54 45 52 53 2E 0D 67
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CE48:11 46 35 20 46 4F 52 20 DC
CE50:53 43 52 45 45 4E 53 2E 3F
CE58:0D 11 46 37 20 46 4F 52 08
CE60:20 41 4C 4C 20 44 41 54 95
CE68:41 2E 0D 11 53 50 41 43 86
CE70:45 42 41 52 20 54 4F 20 9F
CE78:51 55 49 54 2E 0D 11 11 5B
CE80:00 00 00 00 A9 01 A2 08 BC
CE88:A0 01 20 BA FF AD 0A CE FF
CE90:C9 01 F0 0B C9 02 F0 0E 68
CE98:A2 1B A0 CF 4C AD CE A2 B8
CEA0:03 A0 CF 4C AD CE A2 0F A3
CEA8:A0 CF 4C AD CE A9 0C 20 44
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CEC0:0A CE C9 01 D0 12 A2 00 74
CEC8:A0 10 A9 08 85 FC A9 00 E3
CED0:85 FB A9 FB 20 D8 FF 60 E9
CED8:AD 0A CE C9 02 D0 12 A9 67
CEE0:00 85 FB A9 28 85 FC A2 ED
CEE8:00 A0 42 A9 FB 20 D8 FF A3
CEF0:60 A9 00 85 FB A9 50 85 2E
CEF8:FC A2 00 A0 70 A9 FB 20 0A
CF00:D8 FF 60 40 30 3A 43 48 55
CF08:41 52 2E 44 41 54 41 40 05
CF10:30 3A 42 4C 4F 4B 2E 44 AB
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CF20:52 45 2E 44 41 54 41 A9 CB
CF28:01 8D 0A CE 20 84 CE 60 EA
CF30:A9 02 8D 0A CE 20 84 CE 46
CF38:60 A9 03 8D 0A CE 20 84 FB
CF40:CE 60 20 27 CF 20 30 CF 05
CF48:20 39 CF 60 60 AD 81 CE D1
CF50:8D 18 D0 A9 04 8D 88 02 DA
CF58:78 A9 01 8D 1A D0 AD 6F 76
CF60:CF 8D 15 D0 AD 86 02 8D 14
CF68:70 CF 20 76 CF 58 60 00 40
CF70:00 A9 01 8D 70 CF AD 82 14
CF78:CE D0 08 A2 04 A0 04 20 A9
CF80:8B CF 60 A2 09 A0 04 20 03
CF88:8B CF 60 AD 70 CF 9D FF C6
CF90:D7 CA 88 D0 F9 60 A9 00 91
CF98:8D 21 D0 8D 20 D0 A9 93 65
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CFA8:F0 07 20 D2 FF E8 4C A5 95
CFB0:CF A5 CB C9 40 F0 FA 60 D3
CFB8:1D 1D 1E 20 20 20 20 20 D5
CFC0:20 20 20 20 20 DA 20 55 80
CFC8:4C 54 52 41 47 52 41 50 58
CFD0:48 20 DA 0D 11 11 11 20 D7
CFD8:20 20 20 43 4F 50 59 52 89
CFE0:49 47 48 54 20 47 45 4F 3D
CFE8:46 46 52 45 59 20 53 50 1E
CFF0:41 52 4B 53 20 31 39 39 D5
CFF8:30 2E 00 00 00 00 00 00 3C
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RUNTIME

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1000:A9 00 85 2B A9 13 85 2C 29
1008:A9 00 8D 00 13 8D FF 12 8F
1010:A9 93 20 D2 FF A2 00 A9 4F
1018:0D 8D 77 02 8D 78 02 A9 2D
1020:02 85 C6 A2 00 BD 34 10 15
1028:C9 00 F0 07 20 D2 FF E8 F0
1030:4C 25 10 60 11 11 4E 45 76
1038:57 0D 11 11 53 59 53 20 41
1040:34 31 36 36 13 00 20 FD C7
1048:11 A9 93 20 D2 FF 60 78 9F
1050:20 C2 11 AD 16 D0 09 10 44
1058:8D 16 D0 AD 18 D0 29 F0 01
1060:09 02 8D 18 D0 78 A5 01 6D
1068:8D 72 10 A9 35 85 01 4C 96
1070:86 10 00 18 A9 00 A2 08 F3
1078:6A 66 FD 90 03 18 65 FE 72
1080:CA 10 F5 85 FE 60 A9 2C 1A
1088:85 FE 20 73 10 A9 00 18 A5
1090:65 FD 85 FD A9 E0 65 FE 0E
1098:85 FE A5 FD 8D B6 10 A5 DC
10A0:FE 8D B7 10 8D B9 10 AD BC
10A8:B6 10 8D BA 10 20 D9 11 4B
10B0:A0 00 4C BB 10 60 00 00 68
10B8:00 00 00 A9 00 8D 34 11 23
10C0:20 C2 11 A9 00 8D 30 11 06
10C8:A9 04 8D 31 11 4C 36 11 BA
10D0:AD B6 10 85 FB AD B7 10 E5
10D8:85 FC B1 FB 8D B8 10 60 C0
10E0:AD B8 10 85 FE A9 1A 85 B8
10E8:FD 20 73 10 A9 00 18 65 62
10F0:FD 85 FD A9 A2 65 FE 85 F9
10F8:FE 60 A0 00 A2 00 78 B1 7C
1100:FD 91 FB 20 AE 11 C8 C0 13
1108:05 D0 F3 E8 A0 00 E0 05 B9
1110:F0 23 18 A5 FD 69 05 85 F5
1118:FD A9 00 65 FE 85 FE 18 1E
1120:A5 FB 69 28 85 FB A9 00 33
1128:65 FC 85 FC 4C FE 10 00 3B
1130:00 00 00 00 00 60 20 D0 E4
1138:10 20 E0 10 20 A5 11 20 61
1140:9A 11 20 FA 10 EE 34 11 5D
1148:AD 34 11 4A B0 27 4A B0 7C
1150:24 4A B0 21 AD 34 11 C9 69
1158:28 F0 34 18 A5 FB 69 05 C7
1160:8D 30 11 A5 FC 69 00 8D EC
1168:31 11 EE B6 10 D0 03 EE 69
1170:B7 10 4C 36 11 38 A5 FB 10
1178:E9 9B 8D 30 11 A5 FC E9 2E
1180:00 8D 31 11 EE B6 10 D0 80
1188:03 EE B7 10 4C 36 11 78 B5
1190:AD 72 10 85 01 20 CB 11 B1
1198:58 60 AD 30 11 85 FB AD FB
11A0:31 11 85 FC 60 A0 19 B1 89
11A8:FD 8D AD 11 60 00 18 A5 CC
11B0:FC 69 D4 85 FC AD AD 11 A9
11B8:91 FB 38 A5 FC E9 D4 85 C2
11C0:FC 60 AD 11 D0 29 EF 8D D8
11C8:11 D0 60 A2 00 CA D0 FD A8
11D0:AD 11 D0 09 10 8D 11 D0 62
11D8:60 AD BA 10 85 FB AD B9 20
11E0:10 85 FC A0 28 B1 FB 8D A3
11E8:22 D0 C8 B1 FB 8D 23 D0 B1
11F0:C8 B1 FB 8D 20 D0 C8 B1 C3
11F8:FB 8D 21 D0 60 A9 01 A2 FB
1200:08 A0 00 20 BA FF A9 6B E6
1208:8D 86 12 A9 12 8D 87 12 59
1210:A9 E0 8D 88 12 A9 09 20 E4
1218:55 12 A9 01 A2 08 A0 00 27
1220:20 BA FF A9 74 8D 86 12 96
1228:A9 12 8D 87 12 A9 08 8D A4
1230:88 12 A9 09 20 55 12 A9 07
1238:01 A2 08 A0 00 20 BA FF 86
1240:A9 7D 8D 86 12 A9 12 8D 9B
1248:87 12 A9 A2 8D 88 12 A9 70
1250:09 20 55 12 60 AE 86 12 A9
1258:AC 87 12 20 BD FF A9 00 3A
1260:85 0A A2 00 AC 88 12 20 E9
1268:D5 FF 60 53 43 52 45 2E D4
1270:44 41 54 41 43 48 41 52 B5
1278:2E 44 41 54 41 42 4C 4F 2D
1280:4B 2E 44 41 54 41 00 00 1A
1288:00 00 00 00 00 00 00 00 AC
```

ONLY ON DISK

There's something new on the *Gazette Disk*. In addition to the type-in programs found in each issue of the magazine, we offer additional features and programs every month on the *Gazette Disk*.

Check out the original 64 and 128 artwork on display in "Gazette Gallery," and look for our bonus programs as well. These programs and their instructions appear only on disk. Here's a description of this month's bonus programs.

MEASUREMENT 128

William P. Wright

Everybody knows that there are 5280 feet in a mile, but how many feet are there in a nautical mile? There are two pints in a quart, and four quarts equal a gallon, but how may gills and minims are there in a pin? This measurement conversion program for the 128 has the answers.

Measurement 128 offers more than ten screens filled with more than 200 different units. There are length and distance, volume and capacity, and surface and area conversions. There are dry, liquid, shipping, and apothecary fluid measurement conversions; avoirdupois and metric weight and measure conversions; time, temperature, circular, and angular measurement conversions—all at your fingertips. You enter the known unit, and the program automatically converts it to all equivalent values.

CALENDAR

Richard A. Rardin

Calendar is a desk accessory for GEOS that lets you record important dates and times and then displays them quickly and easily. Because of a production problem with the March 1990 *Gazette Disk*, many people had trouble getting *Calendar* to run, so we're offering this outstanding program again on disk. Since *Calendar* is a desk accessory, it doesn't matter whether you're working on the deskTop, creating a work of art in *geoPaint*, or formatting a newsletter in *geoPublish*; it's always available.

PROGRAMS

JESUS MENDOZA ESCALONA

VIRUS 64

STOP A VIRUS FROM DESTROYING YOUR DISK DIRECTORY

The 8-bit Commodore world, comparatively safe and comfortable until now, is being attacked by a complaint common to other computers: a virus. What used to be a PC or Amiga problem now threatens the 64.

This pesky virus resides on your disk between tracks 18 and 25, eating the directory data stored there. Your mission is to destroy the invader before it destroys your directory and makes your disk unreadable.

Getting Started

Virus 64 is written entirely in machine language, so you must use *MLX* to type it in; see "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: C000
Ending address: CBC7

When you've finished typing, be sure to save the program before you exit *MLX*.

When you're ready to play, plug a joystick into port 2 and type LOAD-*"filename"*,8,1 and press Return. *Filename* should be the name that you used to save the program. After the program loads, type SYS 49152 to run it.

To fight the attacking virus, you'll be reduced in size and deposited on track 25 of a spinning disk. Press your fire button to start, and keep it depressed as you fire at the attacking virus cells. This virus is growing, and its individual cells attack relentlessly. Keep firing, but maneuver out of the virus's way as the disk spins. If a cell touches you, you'll be dissolved.

Don't think you can rest after you've cleared one track. The virus is spreading to other tracks of your disk. As you destroy cells, they're added to your score.

Take care though—the virus on succeeding tracks is faster, but its cells are fewer in number. Good luck, and try to make it to track 18.

VIRUS 64

```
C000:A9 37 85 01 78 A9 7F 8D DB
C008:0D DC A9 01 8D 1A D0 A9 AC
C010:09 85 02 AD 62 CB 8D 12 02
C018:D0 A9 C5 8D 15 03 A9 E8 EE
C020:8D 14 03 A9 00 85 94 A9 51
C028:30 85 95 A9 00 85 9E A9 6D
C030:D0 85 9F A9 00 85 FB A9 C1
C038:34 85 FC A5 01 29 FB 85 59
C040:01 A2 04 A0 00 A9 00 91 AD
C048:FB B1 9E 91 94 C8 D0 F5 80
C050:E6 95 E6 9F E6 FC CA D0 13
C058:EC A5 01 09 04 85 01 A9 4C
C060:1D 8D 18 D0 20 F1 C1 20 50
C068:37 C4 A9 A0 8D E7 07 A9 B9
C070:00 8D E7 DB 8D 21 D0 8D 30
C078:20 D0 A2 07 A0 00 A9 00 5B
C080:99 08 31 A9 FF 99 00 35 2D
C088:C8 CA 10 F2 88 99 08 31 3E
C090:A2 D0 BD DF C8 9D 00 34 3E
C098:CA D0 F7 A0 00 A2 1F A9 2F
C0A0:00 85 94 A9 E0 85 95 B1 AA
C0A8:94 91 94 C8 D0 F9 E6 95 C9
C0B0:CA 10 F4 A9 19 8D F7 E8 AC
C0B8:A9 0C 8D 04 E9 A9 F0 8D 69
C0C0:05 E9 A9 CA 8D FF E8 A9 09
C0C8:EF 8D 08 E9 A9 D8 8D 0D 1E
C0D0:E9 A9 17 8D D3 E9 8D 00 CE
C0D8:EA A2 18 A0 0C B9 55 CB 43
C0E0:9D F0 EC CA 88 10 F6 A9 D3
C0E8:87 85 EC A2 03 A9 EA 9D 89
C0F0:D8 E9 CA 10 FA A2 7F BD D2
C0F8:6F CA 9D 80 21 9D 00 22 42
C100:9D 80 22 9D 00 23 9D 80 D8
C108:23 9D 00 24 CA 10 E8 A2 D1
C110:3F BD 2F CA 9D 00 21 9D 02
C118:40 21 CA 10 F4 58 A9 37 F1
C120:85 01 A2 7F BD AF C9 9D D0
C128:80 20 CA 10 F7 86 03 20 4E
C130:97 E0 A5 8D F0 F9 29 3F 46
C138:A6 03 9D 80 24 C6 03 D0 9E
C140:EE A2 FF 8E 1C D0 86 B2 B0
C148:E8 8E 26 D0 8E 17 D0 8E B6
C150:1D D0 86 B3 86 A9 86 0E 98
C158:86 B6 86 AB E8 8E 15 D0 D4
C160:A9 07 8D 25 D0 85 A4 CA 2F
C168:BD BD CB 9D F8 07 8A 9D 24
C170:27 D0 A9 00 9D 34 03 9D 52
C178:52 03 A9 01 95 05 E8 E0 9E
C180:08 D0 E5 A9 91 8D 00 D0 27
C188:A9 D2 8D 01 D0 A9 00 8D 12
C190:28 D0 A9 35 85 01 20 DC 32
C198:C5 A9 14 8D 11 D0 20 F7 C8
C1A0:C4 20 37 C4 C6 05 D0 0B B8
C1A8:C6 06 D0 07 A9 07 85 06 16
C1B0:20 0B C2 C6 07 D0 0B C6 24
C1B8:08 D0 07 A9 02 85 08 20 46
C1C0:22 C2 C6 09 D0 12 A4 A9 31
C1C8:B9 B5 CB 85 09 C6 0A D0 B0
C1D0:07 A9 08 85 0A 20 08 C3 40
C1D8:C6 0C D0 07 A9 3C 85 0C A2
C1E0:20 43 C2 C6 0B D0 BD A9 CA
C1E8:64 85 0B 20 8A C2 4C A4 FF
C1F0:C1 A9 85 A0 C6 85 94 84 74
C1F8:95 A0 00 B1 94 F0 0B 20 29
C200:D2 FF C8 D0 F6 E6 95 4C DF
C208:FB C1 60 20 EA E8 A2 18 62
C210:A0 02 A9 01 8D 86 02 AD E3
C218:12 D0 99 E0 05 C8 CA 10 0D
C220:F6 60 A2 01 A0 00 BD 08 26
C228:31 99 08 31 E8 C8 C0 07 B3
C230:D0 F4 A9 00 99 08 31 C6 A6
C238:A4 10 07 84 A4 A9 FF 99 A2
C240:08 31 60 AD 00 DC C9 7B 7F
C248:F0 04 C9 6B D0 0C AD 00 49
C250:D0 C9 5A 90 17 CE 00 D0 C9
C258:D0 12 C9 77 F0 04 C9 67 0E
C260:D0 0A AD 00 D0 C9 FC B0 DE
C268:03 EE 00 D0 A5 0D D0 19 54
C270:A5 0E D0 15 AD 1E D0 29 68
C278:01 F0 0E AD 15 D0 29 FD 93
C280:8D 15 D0 A9 FF 85 B3 85 C9
C288:0D 60 A5 B3 F0 01 60 A5 8E
C290:0D D0 42 AD 15 D0 29 02 34
C298:D0 1A AD 00 DC 29 10 D0 3F
C2A0:33 AD 15 D0 09 02 8D 15 5B
C2A8:D0 AD 00 D0 8D 02 D0 A9 CE
C2B0:C9 8D 03 D0 AD 03 D0 C9 D0
C2B8:96 90 0C 38 E9 8C 8D 01 50
C2C0:D4 CE 03 D0 4C B3 C3 AD 38
C2C8:15 D0 29 FD 8D 15 D0 A9 1E
C2D0:00 8D 01 D4 60 CE C2 04 EE
C2D8:AD C2 04 C9 30 D0 06 20 F3
C2E0:FC C2 4C AA C4 A2 00 86 01
C2E8:0D E8 8E 15 D0 A0 7F B9 14
C2F0:AF C9 99 80 20 88 10 F7 37
C2F8:E8 8E 27 D0 A9 00 8D 0F FF
C300:D4 8D 08 D4 AD 1E D0 60 8B
C308:A2 05 86 A7 AD 15 D0 85 56
C310:A8 85 A5 18 06 A8 B0 46 FD
C318:AE 12 D0 BD 80 24 6D 12 F2
C320:D0 29 0B A8 B9 8D CB AA 8C
C328:B9 99 CB A4 A7 99 3E 03 D9
C330:98 18 0A 69 04 A8 8A 99 53
C338:00 D0 C8 A9 82 99 00 D0 F2
C340:A4 A7 AD 12 D0 AA BD 80 08
C348:24 29 03 F0 F5 99 48 03 45
C350:A5 A5 19 A7 CB 85 A5 A9 1B
C358:00 99 34 03 F0 49 A5 A7 9C
C360:A8 18 0A 69 04 AA B9 34 8C
C368:03 30 1F 18 BD 00 D0 D9 4C
C370:3E 03 90 10 B9 3E 03 9D 55
C378:00 D0 B9 34 03 09 FF 99 84
C380:34 03 30 09 FE 00 D0 4C 5F
C388:8D C3 DE 00 D0 E8 BD 00 49
C390:D0 79 48 03 C9 FD 90 0C 8B
C398:A9 FF 59 A7 CB 25 A5 85 5E
C3A0:A5 4C A7 C3 9D 00 D0 C6 94
```

```
C3A8:A7 30 03 4C 13 C3 A5 A5 CD
C3B0:8D 15 D0 AD 15 D0 85 A8 D8
C3B8:29 02 D0 01 60 A2 05 86 9D
C3C0:AB 18 06 A8 90 6C A5 AB 9C
C3C8:0A 18 69 04 A8 38 AD 02 4C
C3D0:D0 F9 00 D0 B0 07 38 B9 18
C3D8:00 D0 ED 02 D0 C9 0A B0 E4
C3E0:51 C8 38 B9 00 D0 ED 03 08
C3E8:D0 B0 07 38 AD 03 D0 F9 7E
C3F0:00 D0 C9 13 B0 3C AD 15 FD
C3F8:D0 29 FD 8D 15 D0 A9 00 0B
C400:8D 01 D4 A6 AB BD 52 03 91
C408:D0 2C FE 52 03 A6 B2 30 52
C410:10 A9 FF 5D A7 CB 2D 15 BD
C418:D0 8D 15 D0 A9 00 9D 52 F7
C420:03 A4 AB 84 B2 98 C8 64
C428:84 B4 A8 A9 FF 85 0E 4C 4F
C430:51 C5 C6 AB 10 8B 60 A9 80
C438:6C 85 94 A9 04 85 95 A9 91
C440:6C 85 9E A9 D8 85 9F A2 8E
C448:00 A0 00 BD EF CA F0 15 77
C450:C9 39 90 03 38 E9 40 91 CA
C458:94 A9 0D 91 9E C8 E8 E0 1C
C460:29 D0 E8 F0 13 18 A5 94 B7
C468:69 50 85 94 85 9E 90 04 80
C470:E6 95 E6 9F E8 4C 49 C4 79
C478:A9 00 85 94 A9 04 85 95 CE
C480:A9 00 85 9E A9 D8 85 9F D4
C488:A2 0B A0 1A A9 21 91 94 65
C490:A9 02 91 9E 88 10 F5 A5 A1
C498:94 18 69 28 85 94 85 9E 4A
C4A0:90 04 E6 95 E6 9F CA 10 05
C4A8:E1 60 A2 08 BD 28 CB 38 6E
C4B0:E9 40 9D D2 04 A9 05 9D 8E
C4B8:D2 D8 CA 10 EF A9 60 8D B0
C4C0:2F C4 20 98 C5 A9 4C 8D 9B
C4C8:2F C4 4C F2 C4 A2 11 BD 64
C4D0:31 CB BD 31 CB 38 E9 40 04
C4D8:9D A5 04 BD 43 CB 38 E9 9A
C4E0:40 9D F5 04 A9 05 9D A5 33
C4E8:D8 9D F5 D8 CA 10 E0 20 0B
C4F0:98 C5 68 68 4C 1E C1 A9 D3
C4F8:60 8D D8 C1 20 A4 C1 AD 12
C500:00 DC 29 10 D0 F6 A9 C6 65
C508:8D D8 C1 A0 FF 84 0B A0 9B
C510:00 84 0D C8 8C 15 D0 C8 0E
C518:8C 27 D0 20 D1 C5 AD AD 7E
C520:CB 85 A6 A9 11 8D 04 D4 FD
C528:8D 0B D4 A9 8F 8D 05 D4 04
C530:8D 0C D4 8D 13 D4 A9 FF 38
C538:8D 06 D4 8D 0D D4 A9 21 AF
C540:8D 12 D4 A9 FD 8D 14 D4 6F
C548:A9 0F 8D 18 D4 AD 1E D0 0A
C550:60 A2 05 BD 72 04 79 48 10
C558:03 9D 72 04 BD 72 04 C9 E4
C560:3A 90 0A E9 3A 09 30 9D 01
C568:72 04 FE 71 04 CA 10 EC 7D
C570:C6 A6 D0 5C A9 FF 85 B6 F7
C578:E6 A9 A4 A9 C0 08 D0 03 DB
C580:4C CD C4 B9 AD CB 85 A6 28
C588:98 0A A8 B9 18 CB 8D 12 B0
C590:05 C8 B9 18 CB 8D 13 05 49
C598:A0 05 84 AB AD 15 D0 29 8D
C5A0:FC 85 A8 A2 05 A9 00 9D B7
C5A8:52 03 CA 10 FA 86 B2 A9 79
C5B0:60 8D 70 C5 18 06 A8 90 F4
C5B8:09 20 03 C4 A5 0E 85 B6 A4
C5C0:D0 FA C6 AB 10 EE A9 C6 5D
C5C8:8D 70 C5 A9 01 8D 15 D0 C3
C5D0:60 A2 18 A9 00 9D 00 D4 1E
C5D8:CA 10 FA 60 A2 18 BD 74 98
C5E0:CB 9D 00 D4 CA 10 F7 60 ED
C5E8:AD 19 D0 8D 19 D0 29 01 E3
C5F0:D0 03 4C BC FE C6 02 10 22
C5F8:04 A9 08 85 02 A6 02 BD B6
C600:6B CB 8D 21 D0 A5 B6 8D 12
C608:20 D0 F0 02 C6 B6 C6 04 BA
C610:D0 11 A9 96 85 04 A0 07 6D
C618:B9 F8 07 49 01 99 F8 07 9D
C620:88 10 F5 A5 B3 F0 27 A8 67
C628:E9 FF 8D 01 D4 98 E9 88 D1
C630:8D 0F D4 B9 80 24 A8 A9 0E
C638:00 99 80 20 99 C0 20 EE 3D
C640:27 D0 C6 B3 D0 08 A9 00 A3
C648:8D 0F D4 8D 01 D4 A5 0E 88
C650:F0 2A E9 FA 8D 08 D4 8A 8E
C658:A6 B4 FE 27 D0 AA C6 0E 85
C660:D0 1A A4 B2 A9 FF 85 B2 A7
C668:59 A7 CB 2D 15 D0 8D 15 F4
C670:D0 A9 00 8D 08 D4 99 52 C2
C678:03 AD 1E D0 BD 62 CB 8D 60
C680:12 D0 4C BC FE 93 11 11 1A
C688:11 11 11 11 11 11 11 11 16
C690:11 11 08 8E 12 90 40 41 69
C698:92 05 20 20 20 20 20 20 98
C6A0:20 20 20 20 20 20 20 20 2E
C6A8:20 20 20 20 20 20 20 20 36
C6B0:20 20 20 12 90 52 20 20 A9
C6B8:20 20 20 20 20 20 20 20 46
C6C0:20 20 12 20 20 42 43 92 CD
C6C8:05 20 20 20 20 20 20 20 C8
C6D0:20 20 20 20 20 20 20 20 5E
C6D8:20 20 20 20 20 20 20 20 66
C6E0:20 12 90 52 20 20 20 20 1C
C6E8:20 20 20 20 20 20 20 12 68
C6F0:20 20 20 44 45 92 05 20 7D
C6F8:20 20 20 20 20 20 20 20 86
C700:20 20 20 20 20 20 20 20 8F
C708:20 20 20 20 20 20 20 12 89
C710:90 52 20 20 20 20 20 20 64
C718:20 20 20 20 12 20 20 20 37
C720:20 20 46 92 05 20 20 20 C2
C728:20 20 20 20 20 20 20 20 B7
C730:20 20 20 20 20 20 20 20 BF
C738:20 20 20 20 20 12 90 52 A2
C740:20 20 20 20 20 20 20 20 CF
C748:20 12 20 20 20 20 20 20 54
C750:47 92 05 20 20 20 20 20 AC
C758:20 20 20 20 20 20 20 20 E7
C760:20 20 20 20 20 20 20 20 EF
C768:20 20 20 12 90 52 20 20 63
C770:20 20 20 20 20 20 12 20 E3
C778:20 20 20 20 20 48 49 92 6D
C780:05 20 20 20 20 20 20 20 82
C788:20 20 20 20 20 20 20 20 18
C790:20 20 20 20 20 20 20 20 20
C798:20 12 90 52 20 20 20 20 D5
C7A0:20 20 20 12 20 20 20 20 4F
C7A8:20 20 20 4A 4B 92 05 20 C7
C7B0:20 20 20 20 20 20 20 20 40
C7B8:20 20 20 20 20 20 20 20 48
C7C0:20 20 20 20 20 20 20 12 42
C7C8:90 53 20 20 20 20 20 20 5D
C7D0:12 20 20 20 20 20 20 20 59
C7D8:20 4C 92 05 20 20 20 20 10
C7E0:20 20 20 20 20 20 20 20 70
C7E8:20 20 20 20 20 20 20 20 78
C7F0:20 20 20 20 12 90 54 20 3A
C7F8:20 20 20 20 20 12 20 20 50
C800:20 20 20 20 20 20 4D 92 5E
C808:05 20 20 20 20 20 20 20 0C
C810:20 20 20 20 20 20 20 20 A1
C818:20 20 20 20 20 20 20 20 A9
C820:20 12 90 55 20 20 20 20 8F
C828:20 20 12 20 20 20 20 20 F7
C830:20 20 20 4E 92 05 20 20 CB
C838:20 20 20 20 20 20 20 20 C9
C840:20 20 20 20 20 20 20 20 D1
C848:20 20 20 20 20 20 12 90 2E
C850:56 20 20 20 20 20 20 12 EE
C858:20 20 20 20 20 20 20 20 E9
C860:4F 92 05 20 20 20 20 20 C2
C868:20 20 20 20 20 20 20 20 F9
C870:20 20 20 20 20 20 20 20 02
C878:20 20 20 12 90 57 20 20 89
C880:20 20 20 20 12 20 20 20 A1
C888:20 20 20 20 20 50 92 05 A4
C890:20 20 20 20 20 20 20 20 22
C898:20 20 20 20 20 20 20 20 2A
C8A0:20 20 20 20 20 20 20 20 32
C8A8:12 90 58 20 20 20 20 20 56
C8B0:20 12 20 20 20 20 20 20 BE
C8B8:20 51 92 05 20 20 20 20 33
C8C0:20 20 20 20 20 20 20 20 52
C8C8:20 20 20 20 20 20 20 20 5A
C8D0:20 20 20 20 12 90 59 20 26
C8D8:20 20 20 20 20 92 00 C0 94
C8E0:F0 FC FF FF FF FF F0 00 2A
C8E8:00 00 00 C0 F0 FC FF 80 82
C8F0:C0 F0 F8 FE FF FF FF 00 2E
C8F8:00 00 00 00 00 80 E0 F8 47
C900:FC FF FF FF FF FF FF 00 12
C908:00 00 80 E0 F0 FC FF 80 B5
C910:C0 E0 F0 F8 FC FE FF 80 4E
C918:C0 E0 F0 F0 F8 FC FE FE 2A
C920:FF FF FF FF FF FF FF 00 B3
C928:00 80 C0 E0 E0 F0 F8 F8 B7
C930:FC FE FE FF FF FF FF 00 E1
C938:00 00 00 00 80 80 C0 C0 14
C940:C0 E0 E0 E0 F0 F0 F8 F8 CC
C948:F8 F8 F8 FC FC FC FC FC 58
C950:FC FC FC FC FC FC FC FC E3
C958:FC FC F8 F8 F8 F0 F0 F0 B6
C960:F0 F0 E0 E0 C0 80 80 FF DB
C968:FE FC F8 F0 E0 C0 80 7F 73
C970:3F 1F 0F 07 03 01 00 FF D9
C978:7F 7F 3F 3F 1F 1F 0F 0F 2A
C980:0F 07 07 07 03 03 03 03 DB
C988:01 01 01 01 01 01 01 01 1C
C990:01 01 01 01 01 01 03 03 2A
C998:03 03 03 07 07 07 0F 0F C0
C9A0:0F 1F 1F 3F 3F 7F FF 00 53
C9A8:01 01 03 07 0F 1F 7F 00 C1
C9B0:00 50 00 FD 50 03 57 50 C5
C9B8:17 67 50 5D A9 D4 76 ED 0D
C9C0:74 75 EF 74 DF AB DC DA 73
C9C8:AA 9C DA AA 5C D9 99 9C F8
C9D0:D6 9A 9C DA 9A 9C FA 56 4B
C9D8:9C F9 55 9C DA 5E 9C 1A 51
C9E0:CE B0 1A CE B0 35 CD 70 9E
C9E8:35 CF F0 3F C0 00 00 14 37
C9F0:00 00 15 FC 00 17 57 00 02
C9F8:17 67 50 5D A9 D4 75 EE 4C
CA00:74 77 ED 74 DF AB 9C DA 74
CA08:AA 9C D6 AA 9C D9 99 9C BB
CA10:EA 9A 5C EA 9A 9C DA 56 4F
CA18:BC D9 55 9C DA D6 9C 3A 9C
CA20:CE 90 3A CD 70 35 CD 70 C9
CA28:3F CD 70 00 0F F0 00 00 1B
CA30:82 00 02 08 00 00 82 00 CC
CA38:02 08 00 00 82 00 01 04 EA
CA40:00 00 41 00 01 04 00 00 16
CA48:00 00 00 00 00 00 00 00 DD
CA50:00 00 00 00 00 00 00 00 E5
CA58:00 00 00 00 00 00 00 00 ED
CA60:00 00 00 00 00 00 00 00 F5
CA68:00 00 00 00 00 00 00 00 FD
CA70:CC F0 03 BB AC 03 AA AC 38
CA78:0C EA B0 3B AA AC EA AA 21
CA80:B0 E9 ED B0 E9 65 C0 7A 92
CA88:AB 05 5E AA D5 5E AA B4 DD
CA90:7A 56 B0 39 FD B0 0D A9 19
CA98:C0 3A 56 C0 EA AA B0 3A 91
CAA0:AA C0 3A AB 00 EB FA C0 24
CAA8:EC 0E C0 30 03 00 00 00 6B
CAB0:FF 00 0F AA C0 3A AA C0 D7
CAB8:3E AB 00 03 AA F0 3E AA C8
CAC0:AC 7A AA B0 5E AA F0 79 A4
CAC8:ED B0 E9 65 AF FA AA AB 7F
CAD0:3A AA AB 0E 56 BC 0D FD 42
CAD8:B4 3A 56 D5 0E AA B5 0E 14
CAE0:AA C4 3A AB 00 EA AC 00 04
CAE8:3B AC 00 0C F0 00 00 53 E2
CAF0:43 4F 52 45 20 30 30 30 EC
CAF8:30 30 30 00 4C 49 56 45 32
CB00:53 20 33 00 54 52 41 43 61
CB08:4B 20 32 35 00 00 20 20 47
CB10:56 49 52 55 53 20 36 34 80
CB18:32 35 32 34 32 33 32 32 94
CB20:32 31 32 30 31 39 31 38 6F
CB28:47 41 4D 45 60 4F 56 45 E3
CB30:52 60 43 4F 4E 47 52 41 DB
CB38:54 55 4C 41 54 49 4F 4E A1
CB40:53 60 60 59 4F 55 60 4B 17
CB48:49 4C 4C 60 41 4C 4C 60 5B
CB50:56 49 52 55 53 E2 0C 35 78
CB58:5E 87 B0 D9 01 29 51 79 7D
CB60:A1 C8 05 FA E0 CA B8 AC 9B
CB68:A1 98 93 05 0D 05 0D 05 55
CB70:0D 05 0D 00 00 04 00 00 81
CB78:21 00 FF 08 04 00 00 21 62
CB80:00 FF 00 00 00 00 00 00 18
CB88:2F 2F 01 F3 1F 41 C8 96 09
CB90:5A AA 96 BE 64 AA B4 C3 B9
CB98:6E 78 FE C3 96 FE DE D2 E2
CBA0:9C D7 B9 F0 8A 01 02 04 23
CBA8:08 10 20 40 80 64 5A 46 E0
CBB0:46 37 2D 21 17 8C 7F 6D 48
CBB8:5F 51 43 35 28 82 84 86 EA
CBC0:89 8A 8D 8E 91 00 00 00 E6
```

PROGRAMS

ROBERT BIXBY

PERISCOPE II

READ AND WRITE TO ANY SECTOR ON ANY COMMODORE DISK DRIVE. VERSIONS FOR 64 AND 128.

There may come a time when you want to unscratch a file, change a file from sequential to program, reconstruct a damaged disk, or find the load address of a particular file. That's when a disk sector editor such as *Periscope II* comes in handy.

Periscope originally was a simple sector reader and editor for the 1581 and 128, but I realized that it could be made to work with any of the current Commodore drives since they all have virtually the same operating system. The original version was published in May 1988, but it worked only with a 128. Now, here's an upgraded version called *Periscope II*.

I changed the interface somewhat and added the ability to enter a specified value in a sector. It still works with all Commodore disk drives, but I've also added a version for the 64.

Getting Started

Periscope II is written entirely in BASIC. To help prevent typing erors, use *The Automatic Proofreader* to type it in; see "Typing Aids" elsewhere in this section. When you've finished typing, be sure to save a copy of the program.

How to Use the Program

When you load and run *Periscope II*, you'll be prompted to enter the type of disk drive you're using. Press the cursor key until the drive type is highlighted.

Next you'll be asked to enter the drive number. The default is device number 8. If this is your drive number, simply press Return. Otherwise, just enter the device number of your drive at the prompt. You can easily change the default to another number by altering the number in line 70 of the 128 version or line 60 of the 64 version.

The menu then appears with a list of six options. Its selections consist of J for jump forward, E for edit, N for new, B for back, Q for quit, and V for value. Let's take a look at each of these selections.

Jump Forward

Most of the time you'll be using *Periscope II* to trace programs or text files that are linked by the first two bytes in the sector. Pressing C for continue will cause the program to read these bytes and call up the next sector in succession. When you reach the last sector, it will go no further. That's when N and B come in handy.

New

Pressing N will allow you to specify a new track and sector. Simply enter these numbers at the prompt. Entering 18,0 will take you to the first sector in the directory sequence of a disk in the 1541 or 1571 drive. Entering 40,0 will take you to the equivalent sector of a disk in a 1581.

Another use for new is to confirm that your edit was correctly written to disk. When you've finished editing a sector and you've pressed Return to save it to disk, press N and Return without entering new track and sector numbers. This will call up the sector again for inspection.

Back

If you're going through a sequence of sectors and you want to go backward, you may do so. *Periscope II* will save the addresses of up to 25 previous sectors. It won't take you to the first sector, however; you must have progressed through at least two sectors before you can back up.

Edit

Edit is a powerful feature selected by choosing E from the starting menu. This puts you into the sector displayed in the first 256 bytes of screen memory. You can type a message, alter a directory, maintain a filing system (with up to 664 256-byte records on a 1541, 1328 records on a 1571, or 3160 records on a 1581), edit text files, correct a damaged sector, and so on.

Quit

It's very important to enter Q when you're ready to stop reading sectors.

When you want to save the sector to disk, press Ctrl-W. You'll be prompted with a message asking whether you really want to save this sector. If you respond with anything other than a lowercase *y*, the changes you've made to the sector won't be saved. If you've made a mistake or for any other reason don't want to save the sector to disk, press Return. By aborting the save, you'll move out of edit mode.

You may direct the sequence from within the editor. For instance, if you've looked through a disk directory and found a file you want to pursue, you may press N and enter the pointers to that file, if you're good at reading screen code. If you prefer, you can press E, place the cursor on the first byte of the pointer, and press Ctrl-J. You'll instantly go to the first sector of the file. Continue pressing Ctrl-J to proceed through the file. You'll remain in edit mode until you press Return.

If you need to go backward while in edit mode, press Ctrl-B. The same rules apply as with Ctrl-J.

I'd be remiss not to warn the novice that virtually every byte in an active file or directory is significant. If you begin putting in changes without understanding the disk operating system, you will be very likely to lose a

file or a whole disk. During *Periscope II*'s development, I lost a huge amount of important data, thinking I had thoroughly debugged the editor. I'd hate for that to happen to anyone else. Fortunately, once debugged, *Periscope* was instrumental in restoring the data. Before you start to work on any disk, make a copy of it first. Then use *Periscope II* with the copy.

Value

The original version of *Periscope* would allow you to enter a value only by typing in the sector area. Now you can enter a value either from within edit mode (by pressing Ctrl-V) or from outside edit mode by pressing V. You'll be prompted for a value, which will be placed in the current cursor location within the edit area.

Reading and writing to the disk are handled by a very fast machine language routine. Since the program is written in BASIC, however, you should have no trouble tracing it or altering it to suit your individual needs.

PERISCOPE 64

```
GD 10 REM COPYRIGHT 1991 - COM
      PUTE PUBLICATIONS INTL L
      TD - ALL RIGHTS RESERVED
XK 40 GOSUB720
XR 50 GOSUB870
RF 60 INPUT "DEVICE NUMBER
      {2 RIGHT}8{3 LEFT}";DR:I
      F DR<8 OR DR>11 THEN 60
BC 70 PRINT"{CLR}"
XX 80 OPEN15,DR,15:OPEN5,DR,5,
      "#":OPEN4,DR,4,"#":GOSUB
      220:GOTO270
QF 90 INPUT "{HOME}{8 DOWN}TRA
      CK,SECTOR NUMBER
      {10 SPACES}{10 LEFT}";TR
      ,SE
MP 100 PRINT "{HOME}{8 DOWN}
       {39 SPACES}"
CX 110 IFTY$="A"AND(TR<1ORTR>8
       0ORSE<0ORSE>39)THENRETU
       RN
KD 120 IFTY$<>"B"THEN170
EK 130 IF(TR<1ORTR>70ORSE<0ORS
       E>20)THENRETURN
KA 140 IF((TR>17ANDTR<25)OR(TR
       >52ANDTR<60))ANDSE>18TH
       ENRETURN
MF 150 IF((TR>24ANDTR<31)OR(TR
       >59ANDTR<66))ANDSE>17TH
       ENRETURN
FP 160 IF((TR>30ANDTR<36)OR(TR
       >65ANDTR<71))ANDSE>16TH
       ENRETURN
ED 170 IFTY$<>"C"THEN220
EK 180 IFTR<1ORTR>35ORSE<0ORSE
       >20THENRETURN
CJ 190 IFTR>17ANDTR<25ANDSE>18
       THENRETURN
GH 200 IFTR>24ANDTR<31ANDSE>17
       THENRETURN
GP 210 IFTR>30ANDSE>16THENRETU
       RN
BF 220 PRINT#15,"U1";5;0;TR;SE
SD 230 SYS49152
MQ 240 BK(PO)=TR:BK(PO+1)=SE:P
       O=PO+2:IFPO>51THENPO=0
BE 250 IFPO>LITHENLI=PO
CG 260 RETURN
BC 270 GOSUB850:PRINT"{HOME}
       {10 DOWN}"MES:PRINT"TRA
       CK{6 SPACES}{6 LEFT}"TR
       ;
GS 280 PRINT" SECTOR{6 SPACES}
       {6 LEFT}"SE"{8 SPACES}"
EH 290 GET C$:IFC$=""THEN 290
MA 300 IFC$="J"THENGOSUB680
EK 310 IFC$="E"THENGOSUB370
SJ 320 IFC$="N"THENGOSUB90
KK 330 IFC$="B"THENGOSUB650
PS 340 IFC$="Q"THEN690
SB 350 IFC$="V"THENGOSUB990
AP 360 GOTO270
SS 370 CL=0
KP 380 GOSUB1020
JB 390 GOSUB590:GETIN$:IFIN$="
       "THEN390
MA 400 IN=ASC(IN$):IFIN=23THEN
       630
BM 410 IFIN=22THENGOSUB990:IN$
       ="":GOTO390
AD 420 IFINCOS13THENRETURN
QE 430 IFIN=19THEN370
QF 440 IFIN=1ØTHENTR=PEEK(C1):
       SE=PEEK(C1+1):GOSUB110:
       POKE197,0:GOTO370
JG 450 IFINCOS2THENGOSUB650:PO
       KE208,0:GOTO370
GR 460 IFIN=17ANDCL<215THENCL=
       CL+40:GOTO530
AH 470 IFIN=29ANDCL<255THEN520
MM 480 IFIN=145ANDCL>39THENCL=
       CL-40:GOTO530
PE 490 IFIN=157ANDCL>0THENCL=C
       L-1:GOTO530
DJ 500 IFIN=18ORIN=146THEN530
KH 510 IFIN<32OR(IN>127ANDIN<1
       60)THEN390
PS 520 CL=CL+1:IFCL>256THEN370
DA 530 POKE781,(C1-1024)/40
FK 540 C2=(C1-1024)
JP 550 IFC2>39THENC2=C2-40:GOT
       O550
AB 560 POKE782,C2
MX 570 POKE783,PEEK(783)AND254
       :SYS65520
FA 580 PRINTIN$;:GOTO390
JF 590 C1=1024+CL:C2=PEEK(C1):
       POKE820,C2:SYS49198
DF 600 POKEC1,PEEK(820):C3=PEE
       K(C1+1):C4=C2+C3*256
HJ 610 POKEC1,C2:POKE782,19:PO
       KE781,7:POKE783,PEEK(78
       3)AND254:SYS65520
QJ 620 PRINT"{6 SPACES}
       {6 LEFT}"C2"{6 SPACES}
       {6 LEFT}"C4:RETURN
FD 621 PRINT"{HOME}{RED}
       {7 DOWN}";
HB 622 INPUT"WRITE THIS TO DIS
       K <Y/N>{16 SPACES}
       {12 LEFT}"
GM 623 IFWR$<>"Y"THEN200
RC 630 PRINT"{HOME}{RED}
       {7 DOWN}";
BJ 631 INPUT"WRITE SECTOR TO D
       ISK <Y/N> N{12 SPACES}
       {13 LEFT}";WR$
CM 632 PRINT"{HOME}{WHT}
       {7 DOWN}{49 SPACES}"
AX 633 IFWR$<>"Y"THEN220
SQ 635 SYS49171
XK 640 PRINT#15,"U2";4;0;TR;SE
       :RETURN
PC 650 PO=PO-4:IFPO<0THENPO=LI
       :PRINT"{HOME}{RED}
       {7 DOWN}NO PREVIOUS SEC
       TOR{WHT}":GOTO670
MJ 660 TR=BK(PO):SE=BK(PO+1)
JG 670 GOSUB1030:PRINT"{HOME}
       {7 DOWN}{20 SPACES}":GO
       TO110
QS 680 TR=PEEK(1024):SE=PEEK(1
       025):GOTO110
HJ 690 INPUT#15,A,B$,C,D:PRINT
       A;B$;C;D
EA 700 CLOSE4:CLOSE5:CLOSE15:P
       RINT"{CLR}"
HE 710 POKE808,237:END:REM ENA
       BLE STOP KEY AND RUN/ST
       OP-RESTORE
PH 720 PO=0:C1=1024:DIM BK(51)
       :PRINTCHR$(14)CHR$(8):P
       OKE248,192:TR=1:SE=1
FG 730 POKE53280,0:POKE53281,0
       :PRINT"{CLR}{WHT}"TAB(1
       4)"PERISCOPE 2.0":PRINT
QB 740 BX$="COPYRIGHT 1991 COM
       PUTE PUB. INTL. LTD.":G
       OSUB 9998
EJ 750 BX$="ALL RIGHTS RESERVE
       D":GOSUB 9998
PF 760 RE$=CHR$(13):ME$="{YEL}
       J{7 SPACES}JUMP TO NEXT
        LINK"+RE$+"Q{7 SPACES}
       QUIT"+RE$
AS 770 ME$=ME$+"E{7 SPACES}EDI
       T"+RE$+"N{7 SPACES}NEW
       {SPACE}SECTOR"+RE$
JX 780 ME$=ME$+"B{7 SPACES}BAC
       K UP{5 SPACES}"+RE$
MH 785 ME$=ME$+"V{7 SPACES}VAL
       UE{9 SPACES}"+RE$+"PRES
       S KEY{WHT}"
FP 790 EE$="{YEL}CTRL-J
       {2 SPACES}JUMP TO NEXT
       {SPACE}LINK"+RE$+"RETUR
       N{2 SPACES}EXIT
       {11 SPACES}"+RE$
FM 800 EE$=EE$+"CTRL-B
       {2 SPACES}BACK UP
       {3 SPACES}"+RE$+"CTRL-V
       {2 SPACES}VALUE
       {9 SPACES}"
HD 805 EE$=EE$+RE$+"CTRL-W
       {2 SPACES}WRITE SECTOR"
FD 810 EE$=EE$+"{12 SPACES}"+R
       E$+"{13 SPACES}"+RE$+"P
       RESS KEY{10 SPACES}
       {WHT}"
CS 820 CL$="{40 SPACES}"
AD 830 RESTORE:FORI=0TO54:READ
       A:POKE49152+I,A:B=B+A
BA 840 NEXT:IFB<>7120THENPRINT
       "{CLR}{RED}ERROR
       {2 SPACES}IN DATA STATE
       MENTS":END
KG 850 :
RS 860 POKE808,234:RETURN:REM
       {SPACE}DISABLE STOP AND
        RUN/STOP-RESTORE
GD 870 S1=0:S$="158115711541":
       TY$="ABC"
QX 880 GOTO940
JM 890 GETA$:IFA$=""THEN 890
DQ 900 IFA$="{UP}"ORA$="{DOWN}
       "ORA$=CHR$(13)THEN920
BA 910 GOTO870
```

PROGRAMS

```
MA 920 IFA$=CHR$(13)THENTY$=MI
       D$(TY$,S1+1,1):RETURN
FA 930 S1=S1+(A$="{UP}")-(A$="
       {DOWN}"):IF(S1<0ORS1>2)
       THENS1=-2*(S1<0):IFS1>2
       THENS1=0
XS 940 PRINT"{HOME}{9 DOWN}CUR
       SOR TO":PRINT"HIGHLIGHT
       ":PRINT"DRIVE TYPE":PRI
       NT
QG 950 FORI=0TO2:GOSUB970:NEXT
XE 960 GOTO890
ED 970 IFS1=ITHENPRINT"{RVS}";
AK 980 FORJ=0TO3:PRINTMID$(S$,
       I*4+J+1,1);:NEXT:PRINT:
       RETURN
PS 990 INPUT"{HOME}{RED}
       {8 DOWN}ENTER VALUE TO
       {SPACE}INSERT{WHT}";A$
DX 1000 A=INT(VAL(A$)):IFA>-1A
       NDA<256THENPOKEC1,A
MQ 1005 PRINT"{HOME}{8 DOWN}
       {26 SPACES}":RETURN
GD 1010 GOTO990
QD 1020 PRINT"{HOME}{10 DOWN}"
       EE$:PRINT"TRACK"TR"
       {LEFT}{2 SPACES}SECTOR
       "SE"{LEFT}{2 SPACES}":
       RETURN
PJ 1030 FORI=0TO1000:NEXT:RETU
       RN
EP 1040 DATA162,005,032,198,25
       5
BK 1050 DATA160,000,032,207,25
       5
XG 1060 DATA153,000,004,200,20
       8
GP 1070 DATA247,076,204,255,16
       2
GJ 1080 DATA004,032,201,255,16
       0
KG 1090 DATA000,185,001,004,03
       2
FQ 1100 DATA210,255,200,192,25
       5
GR 1110 DATA144,245,173,000,00
       4
XD 1120 DATA032,210,255,076,20
       4
JC 1130 DATA255,173,052,003,07
       3
ES 1140 DATA128,141,052,003,09
       6
MA 9998 FOR TX=1 TO 20-LEN(BX$
       )/2:PRINTCHR$(32);:NEX
       T:PRINTBX$:RETURN
```

PERISCOPE 128

```
GD 10 REM COPYRIGHT 1991 - COM
      PUTE PUBLICATIONS INTL L
      TD - ALL RIGHTS RESERVED
FE 40 GRAPHICCLR
GJ 50 GOSUB700
DK 60 GOSUB800
AA 70 INPUT "DEVICE NUMBER
      {2 RIGHT}8{3 LEFT}";DR:I
      F DR<8 OR DR>11 THEN 70
JG 80 OPEN15,DR,15:OPEN5,DR,5,
      "#":OPEN4,DR,4,"#":GOSUB
      210:GOTO260
HD 90 INPUT "{HOME}{8 DOWN}TRA
      CK,SECTOR NUMBER";TR,SE
SX 100 IFTY$="A"AND(TR<1ORTR>8
       0ORSE<0ORSE>39)THENRETU
       RN
RR 110 IFTY$<>"B"THEN160
AJ 120 IF(TR<1ORTR>70ORSE<0ORS
       E>20)THENRETURN
RB 130 IF((TR>17ANDTR<25)OR(TR
       >52ANDTR<60))ANDSE>18TH
       ENRETURN
SG 140 IF((TR>24ANDTR<31)OR(TR
       >59ANDTR<66))ANDSE>17TH
       ENRETURN
KP 150 IF((TR>30ANDTR<36)OR(TR
       >65ANDTR<71))ANDSE>16TH
       ENRETURN
GR 160 IFTY$<>"C"THEN210
AS 170 IFTR<1ORTR>35ORSE<0ORSE
       >20THENRETURN
GK 180 IFTR>17ANDTR<25ANDSE>18
       THENRETURN
KG 190 IFTR>24ANDTR<31ANDSE>17
       THENRETURN
MQ 200 IFTR>30ANDSE>16THENRETU
       RN
SM 210 PRINT#15,"U1";5;0;TR;SE
KB 220 SYS4864
SR 230 BK(PO)=TR:BK(PO+1)=SE:P
       O=PO+2:IFPO>51THENPO=0
RF 240 IFPO>LITHENLI=PO
SG 250 RETURN
AS 260 GOSUB780:PRINTME$:PRINT
       "TRACK "TR;" SECTOR "SE
BP 270 GET C$:IFC$=""THEN 270
PF 280 IFC$="J"THENGOSUB660
HS 290 IFC$="E"THENGOSUB350
GX 300 IFC$="N"THENGOSUB90
HX 310 IFC$="B"THENGOSUB640
BM 320 IFC$="Q"THEN670
DS 330 IFC$="V"THENGOSUB920
DK 340 GOTO260
DX 350 GOSUB950:WINDOW 0,0,39,
       7:CL=0
SH 360 GOSUB570:GETIN$:IFIN$="
       "THEN360
GH 370 IN=ASC(IN$):IFIN=13THEN
       RETURN
MS 380 IFIN=23THEN600
GM 390 IFIN=22THENGOSUB920:IN$
       ="":GOTO360
BF 400 IFIN=6THENRETURN
EB 410 IFIN=19THEN350
XE 420 IFIN=22THENTR=PEEK(C1):
       SE=PEEK(C1+1):GOSUB100:
       POKE208,0:GOTO350
BX 430 IFIN=2THENGOSUB640:POKE
       208,0:GOTO350
PG 440 IFIN=17ANDCL<215THENCL=
       CL+40:GOTO510
KJ 450 IFIN=29ANDCL<255THEN500
SQ 460 IFIN=145ANDCL>39THENCL=
       CL-40:GOTO510
PC 470 IFIN=157ANDCL>0THENCL=C
       L-1:GOTO510
SQ 480 IFIN=18ORIN=146THEN510
XQ 490 IFIN<32OR(IN>127ANDIN<1
       60)THEN360
FC 500 CL=CL+1:IFCL>256THEN350
AG 510 POKE7,(C1-1024)/40
RG 520 C2=(C1-1024)
MA 530 IFC2>39THENC2=C2-40:GOT
       O530
JR 540 POKE8,C2
JM 550 POKE5,PEEK(5)AND254:SYS
       65520
PR 560 PRINTIN$;:GOTO360
SB 570 C1=1024+CL:C2=PEEK(C1):
       POKEC1,XOR(C2,128):C3=P
       EEK(C1+1):C4=C2+C3*256
SA 580 POKEC1,C2:POKE8,19:POKE
       7,7:POKE5,PEEK(5)AND254
       :SYS65520
DJ 590 PRINT"{2 LEFT}"C2"
       {LEFT}($"RIGHT$(HEX$(C2
       ),2)")"C4"{LEFT}($"HEX$
       (C4)"){5 SPACES}":RETUR
       N
QM 600 PRINT"{HOME}{RED}
       {7 DOWN}";:INPUT"WRITE
       {SPACE}THIS TO DISK <Y/
       N>{16 SPACES}{15 LEFT}"
       ;WR$:PRINT"{HOME}
       {7 DOWN}{39 SPACES}"
KP 610 IFWR$<>"Y"THEN210
QP 620 SYS4883
MG 630 PRINT#15,"U2";4;0;TR;SE
       :RETURN
HA 640 PO=PO-4:IFPO<0THENPO=LI
       :PRINT"{RED}{HOME}
       {7 DOWN}THERE IS NO PRE
       VIOUS SECTOR{12 SPACES}
       ":SLEEP1:PRINT"{HOME}
       {WHT}{7 DOWN}
       {29 SPACES}"
JP 650 TR=BK(PO):SE=BK(PO+1):S
       LEEP1:GOTO100
BK 660 TR=PEEK(1024):SE=PEEK(1
       025):GOTO100
JG 670 INPUT#15,A,B$,C,D:PRINT
       A;B$;C;D
KG 680 CLOSE4:CLOSE5:CLOSE15:P
       RINT"{2 HOME}{CLR}":POK
       E248,0
EP 690 SYS4944:END:REM ENABLE
       {SPACE}STOP KEY AND RUN
       /STOP-RESTORE
DC 700 PO=0:C1=1024:DIM BK(51)
       :PRINTCHR$(14)CHR$(8):P
       OKE248,192:TR=1:SE=1:TR
       AP680
DH 710 POKE53280,0:POKE53281,0
       :PRINT"{CLR}{WHT}"TAB(1
       4)"PERISCOPE 2.0"
QD 711 BX$="COPYRIGHT 1991 COM
       PUTE PUB. INTL. LTD.":G
       OSUB 9998
AS 720 BX$="ALL RIGHTS RESERVE
       D":GOSUB 9998
FK 730 RE$=CHR$(13):ME$="{YEL}
       J JUMP TO NEXT LINK"+RE
       $+"Q QUIT"+RE$+"E EDIT"
       +RE$+"N NEW SECTOR"+RE$
       +"B BACK UP"+RE$+"V ENT
       ER VALUE"+RE$+"PRESS KE
       Y{WHT}"
XR 740 EE$="{YEL}CTRL-J
       {2 SPACES}JUMP TO NEXT
       {SPACE}LINK"+RE$+"RETUR
       N{2 SPACES}QUIT"+RE$+"C
       TRL-B{2 SPACES}BACK UP"
       +RE$+"CTRL-V{2 SPACES}E
       NTER VALUE"
DD 750 EE$=EE$+RE$+"CTRL-W
       {2 SPACES}SAVE SECTOR"+
       RE$+"PRESS KEY{WHT}"
DQ 760 RESTORE:FORI=0TO114:REA
       DA:POKE4864+I,A:B=B+A
PH 770 NEXT:IFB<>12696THENPRIN
       T"{2 HOME}{CLR}{RED}ERR
       OR{2 SPACES}IN DATA STA
       TEMENTS{WHT}":END
EX 780 WINDOW 0,16,39,24,1
RX 790 SYS4919:RETURN:REM DISA
       BLE STOP AND RUN/STOP-R
       ESTORE
CS 800 S1=0:S$="158115711541":
       TY$="ABC"
PP 810 GOTO870
RC 820 GETKEY A$
HD 830 IFA$="{UP}"ORA$="{DOWN}
       "ORA$=CHR$(13)THEN850
AJ 840 GOTO800
```

```
MQ 850 IFA$=CHR$(13)THENTY$=MI
       D$(TY$,S1+1,1):RETURN
EE 860 S1=S1+(A$="{UP}")-(A$="
       {DOWN}"):IF(S1<0ORS1>2)
       THENS1=-2*(S1<0):IFS1>2
       THENS1=0
SM 870 PRINT"{HOME}{9 DOWN}CUR
       SOR TO":PRINT"HIGHLIGHT
       ":PRINT"DRIVE TYPE":PRI
       NT
AC 880 FORI=0TO2:GOSUB900:NEXT
SQ 890 GOTO820
AG 900 IFS1=ITHENPRINT"{RVS}";
DC 910 FORJ=0TO3:PRINTMID$(S$,
       I*4+J+1,1);:NEXT:PRINT:
       RETURN
HQ 920 WINDOW0,0,39,24:INPUT"
       {HOME}{RED}{8 DOWN}ENTE
       R VALUE TO INSERT";A$
RR 930 A=INT(VAL(A$)):IFA>-1AN
       DA<256THENPOKEC1,A:PRIN
       T"{HOME}{WHT}{8 DOWN}
       {27 SPACES}":WINDOW0,0,
       39,7:RETURN
HF 940 PRINT"{HOME}{WHT}
       {8 DOWN}{27 SPACES}":WI
       NDOW0,0,39,7:RETURN
HE 950 WINDOW 0,12,39,24:PRINT
       "{CLR}{4 DOWN}"EE$:PRIN
       T"TRACK "TR;"SECTOR "SE
       :RETURN
GD 960 GOTO920
SH 970 DATA162,005,032,198,255
SG 980 DATA160,000,032,207,255
JD 990 DATA153,000,004,200,208
BR 1000 DATA247,076,204,255,16
       2
DC 1010 DATA004,032,201,255,16
       0
BJ 1020 DATA000,185,001,004,03
       2
EA 1030 DATA210,255,200,192,25
       5
HB 1040 DATA144,245,173,000,00
       4
SH 1050 DATA032,210,255,076,20
       4
AH 1060 DATA255,165,005,041,25
       3
RH 1070 DATA133,005,165,145,09
       6
PP 1080 DATA120,169,051,141,02
       4
AQ 1090 DATA003,169,255,141,02
       5
DE 1100 DATA003,169,046,141,04
       0
JH 1110 DATA003,169,019,141,04
       1
MR 1120 DATA003,088,096,000,00
       0
MC 1130 DATA120,169,064,141,02
       4
MB 1140 DATA003,169,250,141,02
       5
JX 1150 DATA003,169,110,141,04
       0
JR 1160 DATA003,169,246,141,04
       1
RA 1170 DATA003,088,096,082,07
       9
ED 1180 DATA066,069,082,084,03
       2
KJ 1190 DATA066,073,088,066,08
       9
MA 9998 FOR TX=1 TO 20-LEN(BX$
       )/2:PRINTCHR$(32);:NEX
       T:PRINTBX$:RETURN
```

BEN CAMPBELL

BOUNCE

SPRING INTO ACTION IN THIS ARCADE GAME FOR THE 64. JOYSTICK REQUIRED.

You're traveling through space in a metallic ball that's armed with forward-firing cannons. The ball is perpetually bouncing, and your only means of control is bouncing left or right using a joystick in port 2.

No space game is complete without hostile aliens, and you'll find there are plenty to keep you busy in this outstanding arcade game. *Bounce* is fairly long, but you'll find it comes close to commercial quality. The object of the game is to blast your way through five zones filled with enemy attack waves. Avoid collisions and watch out for the heavily armed guardians.

Typing It In

Bounce is written entirely in machine language. Type it in by using *MLX;* see "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: 0801
Ending address: 25B0

When you've finished typing, be sure to save a copy to disk. Load and run *Bounce* as you would any BASIC program.

Getting on the Ball

After the title screen has appeared, press the fire button to begin play. Your bouncing ball appears, and aliens head your way. You must destroy them with your cannon, but you'll have to maneuver your sphere to bounce between those that escape your fire. You'll have to perfect your timing to bounce between those that approach from your rear since your cannon can't fire in that direction.

At the bottom of the playing screen is a window that contains your score, current zone, shield status bar, and distance bar. Keep your eye on the shield status bar. In addition to blasting alien vessels, try to avoid collisions with them. Collisions deplete your shields—and when the status bar reaches 0, your ball explodes.

The distance bar gradually diminishes as play progresses. It represents the distance you must travel before you reach the next zone. When it reaches 0, the end-of-zone guardian appears. This unpleasant alien's vessel is armed with cannons much like the ones on your ball, and it also has shields. You'll need to score multiple hits on the guardian to deplete its shields and defeat it before you can move on to the next zone.

On higher numbered zones, the guardians have better shields and take more hits to destroy. The attack waves also get harder as you progress through the levels. At the end of each level, you'll be awarded a bonus proportional to the number of shields remaining. In addition, you get 2000 points if you make it through all five zones and complete the game.

While you're playing, press f1 to pause the game. The border will change to a multicolored mode during this time. Press f7 while the game is paused to abort it.

BOUNCE

```
0801:0B 08 70 17 9E 32 34 30 6E
0809:37 00 00 00 20 20 20 20 96
0811:20 20 20 20 20 A0 C4 B9 06
0819:3C 08 99 F8 00 B9 FD 08 F6
0821:99 33 03 88 D0 F1 A0 09 4C
0829:B9 0C 08 99 FF 03 88 D0 A1
0831:F7 A9 B0 85 2D A9 25 85 F5
0839:2E 4C 00 01 16 A0 07 B0 75
0841:25 2E 1C B9 6E 09 99 E8 42
0849:07 C8 D0 F7 EE 02 01 EE 19
0851:05 01 C6 F9 D0 ED A2 03 23
0859:20 34 03 F0 33 C9 07 D0 95
0861:16 A2 01 20 34 03 D0 0A A0
0869:A2 04 20 34 03 18 69 07 65
0871:10 05 A2 0A 20 34 03 85 1D
0879:A8 A5 A7 85 A9 A5 FE 85 FB
0881:F7 A5 FF 85 F8 20 6C 03 73
0889:A5 F8 85 FF A5 F7 85 FE 72
0891:E8 20 34 03 D0 1E A2 08 21
0899:20 34 03 A0 02 84 A8 85 2A
08A1:A6 18 A5 FC 65 A6 85 F7 58
08A9:A5 FD 65 A7 85 F8 20 6C EF
```

PROGRAMS

```
08B1:03 4C 13 01 E8 20 34 03 FB
08B9:D0 1C A0 03 84 A8 E8 20 36
08C1:34 03 F0 08 A2 08 20 34 F4
08C9:03 4C 5C 01 A2 0C 20 34 C3
08D1:03 E6 A7 4C 5C 01 E8 20 AF
08D9:34 03 D0 0A E8 20 34 03 B2
08E1:18 69 04 A8 D0 D6 E8 20 37
08E9:34 03 D0 0A A2 02 20 34 21
08F1:03 18 69 06 D0 ED A2 08 A2
08F9:20 34 03 D0 E6 A9 00 85 F7
0901:A7 A4 FB F0 0C 06 FA 2A 37
0909:26 A7 C6 FB CA D0 F2 A8 D8
0911:60 48 B1 FE 85 FA A9 08 FE
0919:85 FB 68 A4 FE D0 02 C6 4A
0921:FF C6 FE C0 E7 D0 DE A4 B5
0929:FF C0 07 D0 D8 A9 37 85 BA
0931:01 58 4C 13 08 A4 A8 F0 A9
0939:22 A5 F7 38 E5 A8 B0 03 7E
0941:C6 F8 38 85 F7 A5 FC E5 8A
0949:A8 B0 02 C6 FD 85 FC B1 3A
0951:F7 88 91 FC 98 D0 F8 C4 42
0959:A9 F0 0A B1 F7 C6 FD C6 76
0961:F8 C6 A9 10 EC 60 78 E6 98
0969:01 4C 16 08 60 00 11 08 7F
0971:C5 07 9E 20 28 32 30 36 9E
0979:37 29 E6 A3 43 22 02 20 4F
0981:82 D4 D5 95 BC 3C 86 07 09
0989:E1 5F 1A A2 00 63 46 96 82
0991:D0 02 A2 0B 8E 20 D0 06 2E
0999:07 79 D8 20 59 16 3A B9 FB
09A1:DE C2 23 45 03 F0 38 F0 C9
09A9:AA 5E 72 9E 0B 31 89 89 9A
09B1:0B 20 AC 1A 20 68 0C 20 63
09B9:0B 30 8E DF 0E 4C 36 20 5B
09C1:9A 12 72 30 4A 4C 15 F1 96
09C9:2A 13 8C 1A AD 35 AF 21 AB
09D1:24 B9 4C 63 18 A6 17 9C 4A
09D9:B0 80 01 58 3B B7 A0 08 0C
09E1:07 D0 70 64 3B 1D CB 8E 74
09E9:21 CF 18 ED 4C 16 08 03 30
09F1:0C 1C 4D C3 B5 1C 4F 50 04
09F9:4C 45 CF 3D 3D 3A F3 F5 02
0A01:C4 CE 8E 47 D0 DB 51 B1 BB
0A09:47 2D 41 2D 4D 6B 00 09 28
0A11:4F 2D 56 2D 45 2D 52 0D 46
0A19:C2 F9 32 9B 7C 0E EA 18 17
0A21:C8 08 2D 2D 00 30 C0 8D E3
0A29:C7 18 01 32 80 0F AA 16 16
0A31:6C 00 74 F0 4A 8D 04 F1 9B
0A39:20 92 A6 02 04 06 08 23 62
0A41:C1 9B 00 28 50 78 A0 C8 0E
0A49:F0 18 40 68 90 B8 E0 08 9B
0A51:30 E8 75 06 04 8F 83 D1 FD
0A59:0F 03 23 15 14 20 19 11 CF
0A61:27 01 04 12 12 0A 05 D1 7F
0A69:0B E2 B8 D8 A0 02 68 FC 3B
0A71:D5 C3 63 D1 00 01 03 00 F4
0A79:08 10 E8 FD 02 AC EA B9 E4
0A81:46 0E 60 21 34 0C 60 B9 A6
0A89:99 3A 51 96 09 20 77 F4 39
0A91:9C 95 96 B9 9F AA A5 A0 5B
0A99:03 1A 02 EA 06 2A 8A 4C DE
0AA1:D6 80 5C 8A AA 0C 35 CD 33
0AA9:E9 80 7A E9 61 1C 92 20 81
0AB1:F0 60 23 A2 0D 8F A4 6D 42
0AB9:66 04 A8 0A BD A9 01 F6 45
0AC1:0D 02 A0 27 BE 97 C9 20 6B
0AC9:D0 04 CD 15 78 98 9D 21 D4
0AD1:0F 60 AD 52 00 5B C0 48 97
0AD9:06 00 8D A2 09 92 16 4B D6
0AE1:71 08 FB BD 5A 09 70 BC A0
0AE9:69 09 C9 94 9D 87 09 A9 3E
0AF1:40 18 7D 78 09 88 1F E8 F4
0AF9:E0 0F D0 E1 A9 55 A9 43 B3
0B01:55 00 0A A8 3B 0A 44 52 6A
0B09:00 0A 1B 0F A9 45 54 06 07
0B11:20 31 88 F8 DA E5 28 21 04
0B19:DB 8C 96 0A B9 98 C8 12 87
0B21:FB B9 9B 0A 85 FC 30 B1 E9
0B29:FB 08 09 20 9E 0A 91 FB 9E
0B31:B4 A5 F1 39 19 28 20 18 9E
0B39:32 32 32 18 2A 90 02 09 5D
0B41:01 C1 72 F4 23 EC 12 0B E1
0B49:8D 25 BE 8E 26 1C 02 0C E1
0B51:8D 27 6B 14 8D 1C CA FE 18
0B59:8D 81 CE 12 8D E7 2C 7D 73
0B61:19 01 20 B4 81 B0 09 FE 73
0B69:C6 FF 41 E4 08 03 00 2C D1
0B71:00 08 0D 12 17 87 EB 14 0F
0B79:C6 C4 0A 8E 4E D1 01 52 5C
0B81:16 1E 69 45 E1 0C 43 45 B6
0B89:18 01 14 72 22 04 04 54 13
0B91:10 10 00 1D D5 D5 50 DD 0A
0B99:DD CB 00 CD CD 00 07 DA C5
0BA1:DA 50 40 10 14 10 10 14 57
0BA9:BE 3E 04 90 51 24 D9 0D 14
0BB1:0B D0 3C A8 75 B9 E8 1C 14
0BB9:D9 1D 0B F0 0B BE 30 E8 11
0BC1:8A 01 21 4C 85 0B B9 94 A6
0BC9:AC A1 51 8C 90 0E D4 7E 76
0BD1:C0 12 03 19 70 FC 17 06 6A
0BD9:8E A9 03 50 BA C8 4C 37 CF
0BE1:C2 E5 DC 8D 54 0B 85 97 B8
0BE9:61 2C BE C8 C2 08 0E DC 4F
0BF1:11 0B E1 E2 B1 0B 41 B4 AE
0BF9:AB 03 20 2A 0C 60 7F 0D 3B
0C01:52 B8 09 86 48 1C 91 20 EF
0C09:B2 41 C9 19 5A 89 19 36 F6
0C11:22 AD 39 09 20 91 03 B0 5B
0C19:04 57 50 90 8D F6 0B 74 EE
0C21:55 1B 24 E1 72 9C E1 8D A4
0C29:94 71 00 13 29 36 47 3E 08
0C31:63 04 CA 70 64 30 0A 17 6B
0C39:3C 8C 42 47 4F 61 4F 04 F1
0C41:55 13 13 86 91 76 84 AD B0
0C49:8B D4 69 1E 8D 02 D0 AD 2F
0C51:01 15 5C 03 55 2C CC 8D 6D
0C59:F9 07 50 3D D6 0A A9 0A 4A
0C61:8D EE 0A 08 0E 59 FD 38 C7
0C69:C5 87 02 13 06 84 2C 24 76
0C71:80 6E C9 8D E6 0A F7 0D D3
0C79:8C 38 6D 8D 92 03 48 1F BC
0C81:11 3E 10 90 09 55 32 D8 97
0C89:4C AF 0C 20 B2 5B 95 C9 2F
0C91:78 90 27 33 01 60 97 51 2C
0C99:18 6D BD 0C 69 94 0A 13 56
0CA1:08 8C E3 0C 8D 98 37 10 6B
0CA9:56 50 00 24 10 D2 20 07 56
0CB1:1A 30 05 34 D8 44 BC A0 B8
0CB9:06 60 20 F9 0C B0 0C 0B D6
0CC1:67 28 0D E2 0C AF 94 C2 72
0CC9:ED 04 0D 63 29 02 0D 2C 49
0CD1:87 8D 13 B8 8C 8E 30 04 02
0CD9:2D 27 01 8D 15 AA 28 22 11
0CE1:01 02 03 02 F0 05 CF A0 57
0CE9:20 49 00 8D 29 0D D2 AB 0C
0CF1:88 18 D2 06 89 21 60 8C 2D
0CF9:AD 02 20 4B 0D AC 4A 0D DE
0D01:4C 38 0D 07 E3 86 19 10 DC
0D09:02 39 42 C5 44 03 93 10 7C
0D11:C7 44 04 93 50 EC C0 44 D5
0D19:05 4E 42 1C 13 06 4D 42 E0
0D21:45 0F 35 91 07 93 10 47 4F
0D29:48 08 03 51 84 4C BC D0 7E
0D31:09 85 40 CE 12 54 97 06 3D
0D39:20 1A 13 4C 89 0F 44 F0 13
0D41:27 20 0C DA 0D C9 FE D0 84
0D49:A0 F7 51 80 2E 4C 85 A2 34
0D51:BA 88 E8 D8 35 E9 A8 F0 29
0D59:76 E9 C8 F0 B9 01 01 C4 E9
0D61:17 61 D8 07 B9 ED 0A BE 43
0D69:3A C2 BE 0C 92 5A 0C E3 E3
0D71:60 66 05 08 80 20 30 01 5C
0D79:C3 0C 92 07 0C 0D 60 BD 4E
0D81:26 17 01 70 8A F8 07 BD 9F
0D89:2F 2C 1D 0B BD 38 0E D0 56
0D91:91 22 B2 15 0B 60 3A 04 F6
0D99:CD D6 DA 43 C8 CB CC D5 C4
0DA1:D9 DD DE DF E0 E1 19 05 BF
0DA9:19 14 C2 E9 05 06 45 86 9D
0DB1:F9 60 B4 0E 86 60 4F 7F 2C
0DB9:A9 5B 25 38 18 A7 43 07 94
0DC1:5D D0 3C 1C A2 02 0C DA 18
0DC9:FF C3 C8 16 00 99 16 02 E3
0DD1:E4 24 71 3F B9 90 0E 1C D1
0DD9:4E 01 60 4C D7 02 8E 8A 9A
0DE1:31 0C 18 D1 8D C6 10 80 DF
0DE9:24 3C 39 34 02 D9 3B 64 E1
0DF1:32 24 92 80 F0 43 91 02 42
0DF9:C9 02 D0 05 A0 FD FF 0D ED
0E01:44 CD 4A F4 17 34 34 D0 0E
0E09:0E 73 CD 1B ED 30 09 DE 95
0E11:D4 60 24 14 21 0A 0D 85 46
0E19:C7 B6 44 80 20 FE 13 86 01
0E21:DD 09 09 F0 25 C9 66 21 DC
0E29:C9 0B D0 0C AD 16 0F 29 D4
0E31:27 F1 51 01 99 1F E2 01 A7
0E39:58 32 08 A0 61 0E 8D 00 77
0E41:A9 AA 0B 5C 46 E3 13 AD 99
0E49:EF 00 40 0D 08 67 53 88 43
0E51:89 0D 1D 68 62 D8 89 78 A1
0E59:18 A9 02 4A 4F A0 07 4C 28
0E61:AB C8 6C 10 80 C9 80 F0 31
0E69:1B B9 AF 43 8D 5C 88 62 FC
0E71:38 E9 00 C9 32 B0 1B 0E 59
0E79:5E 91 32 4C 7C 0F 69 2B 52
0E81:18 0F 40 27 C9 96 90 05 B6
0E89:20 80 0F A9 96 58 DC 26 48
0E91:E3 B4 49 80 0A 60 B9 AC EF
0E99:14 60 A2 D9 31 F0 04 A3 C2
0EA1:82 60 C6 6C 23 B0 28 1A FC
0EA9:3F 9C 0F 24 AE 00 08 3A 70
0EB1:5E 1B 28 2E 60 AA 2E 23 D8
0EB9:CA E0 FF 43 0B 06 4C BA 6B
0EC1:BC 2A 60 8D 72 AA BD EA 50
0EC9:11 CD 33 09 90 03 20 4E F7
0ED1:9E 45 38 5D B7 0F A0 02 A8
0ED9:8E BA BD 46 45 05 D5 52 44
0EE1:82 20 05 40 BD BE 43 05 60
0EE9:ED 52 FA 10 40 41 BD 36 AA
0EF1:43 29 C0 9D 00 30 30 BD CA
0EF9:72 11 C3 CD 0C B1 50 E4 95
0F01:03 6A 73 00 65 BD AE 11 3A
0F09:29 0F AA 42 C3 08 B9 DD 88
0F11:25 23 18 C2 B9 FD 0A 29 BC
0F19:40 C1 CE 24 06 20 56 0E 4F
0F21:4C 3A 10 C1 59 8F AE 44 BC
0F29:10 E8 5C 09 9B 60 0B 3C 56
0F31:CE 95 63 6B E1 88 0B F1 78
0F39:B0 44 8C 84 8C AD C5 F0 32
0F41:10 28 BE 9A 0A 01 35 E2 94
0F49:0E 31 0A 32 22 E2 64 46 CA
0F51:A0 82 50 91 5A 3C 8C 78 D8
0F59:46 82 E5 C1 03 32 96 64 86
0F61:64 A7 01 14 C4 51 10 32 BA
0F69:46 5A 5F 25 0C 02 D9 46 E1
0F71:D9 86 87 C2 86 40 04 04 7C
0F79:04 37 AC 14 1E 1D 75 14 A2
0F81:C4 41 AF 01 F0 D0 B4 C6 53
0F89:A8 52 78 30 6C 78 48 64 DC
0F91:02 F8 54 34 1C 05 71 E4 79
0F99:29 02 CE 00 15 15 AF 75 78
0FA1:DC 71 11 3C 6E B4 DC FF 70
0FA9:00 28 41 6E 82 AA 00 4B EA
0FB1:96 E1 47 CF 1E 3C 5A 78 88
0FB9:96 68 17 E6 28 88 19 32 56
0FC1:4B 64 7D 57 B8 49 3C 46 6D
0FC9:32 3C 2E E2 08 80 00 08 4E
0FD1:3B 0D 00 B6 43 A0 40 40 99
0FD9:40 FB 6F E3 33 13 D3 53 24
0FE1:79 23 E2 28 88 94 24 34 77
0FE9:64 54 A4 3B 00 02 54 24 6C
0FF1:28 00 02 53 63 A8 20 8E 26
0FF9:82 94 84 74 34 E4 64 C5 1A
```

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PROGRAMS

```
1001:C6 C7 C8 F8 B8 C3 02 03 FA
1009:00 02 01 03 04 61 F0 6A EB
1011:21 12 8D 06 DC 20 A0 0F 10
1019:B5 8C C0 FF D0 F9 52 6A CC
1021:6A 6A 29 1F A8 8D 1F 12 F3
1029:C6 C3 38 4E 88 B4 00 06 A6
1031:33 88 4C 14 12 A0 0E A9 B0
1039:74 29 07 61 BC 0B 06 98 8B
1041:3D 46 C8 91 FB 60 A9 5F D7
1049:E0 0D 73 48 0E D1 A9 87 A2
1051:85 FB A9 07 85 FC 20 3C 75
1059:AD 20 F4 11 0B 2A A2 04 52
1061:47 04 0A 01 06 DC 6D 6B 61
1069:69 0D EE 5C 12 D0 0D A0 B3
1071:D0 67 03 EC 20 61 12 1B C8
1079:08 82 11 40 0D 76 7A 0A A5
1081:0F C9 09 B0 93 11 18 E6 BF
1089:B8 F8 A9 22 1D C7 0F B2 74
1091:84 0E A0 2C AD A8 50 20 1F
1099:08 CD 2D 09 90 1E CE 68 6A
10A1:01 AD 39 09 83 28 12 C6 0D
10A9:59 88 D9 2E 09 18 E1 04 27
10B1:6D 33 2A 23 38 E9 08 38 7E
10B9:96 2A 3C 00 8B 04 98 04 D8
10C1:A7 22 30 79 F5 0A 0F 30 02
10C9:03 29 04 81 8A 8D 12 89 86
10D1:A9 FF 38 F9 28 1D 2D 44 C1
10D9:00 16 4C 0F 13 AD CA 02 E0
10E1:19 81 00 8C 20 42 FF 72 34
10E9:0C 20 68 0E 60 B9 3B 09 6F
10F1:81 D7 04 41 BD D3 24 80 63
10F9:A7 B0 02 50 46 D0 52 1C 95
1101:D7 4A 0A D0 13 85 0E 12 CC
1109:C9 03 B0 3D 2B 47 36 A9 47
1111:02 F0 D9 09 91 43 84 34 13
1119:10 EE C0 02 E1 AD 04 D0 D5
1121:C0 85 03 A9 17 20 BF 0C C4
1129:AD 0D 05 73 0B 9D 01 D0 DE
1131:AD 2F 0C 03 59 44 EC 40 9D
1139:32 C0 02 27 D0 05 02 B9 AF
1141:41 AC E0 07 DE 18 F4 E7 E4
1149:64 15 F1 B9 9D 1B 61 0C E4
1151:07 B9 65 1C C9 0F D0 03 03
1159:AD 32 09 99 20 DB CE F1 99
1161:07 E8 47 0A 88 6A 30 C9 E2
1169:99 13 04 C8 05 D0 F8 34 BB
1171:22 48 8D 53 A1 02 29 29 2E
1179:52 90 02 2A 29 51 90 02 7D
1181:2B 29 50 90 02 2C 09 8D F6
1189:4F 07 BD 14 31 8D 9F 07 14
1191:60 A2 00 BD 1D BE 00 0C 58
1199:82 3A D0 0D 37 0B 0A E8 59
11A1:E0 05 F0 03 4C E3 13 9D 79
11A9:28 09 25 67 88 D0 87 11 E4
11B1:2C 61 A2 AD 31 C9 08 F0 23
11B9:0C AE 50 04 BD 20 2A 20 BA
11C1:D0 EE B2 B2 08 0B 0C 0F 1D
11C9:01 0F 0C 0B 00 A0 F8 13 E9
11D1:D5 E9 08 DD 88 E5 80 08 1D
11D9:ED 88 F5 80 08 FD 0A 99 C1
11E1:05 A0 0D 80 08 15 88 25 23
11E9:0B 99 1D 0B 80 AA 80 DA D6
11F1:60 8E 7F 14 8C 80 14 A0 48
11F9:3F 71 62 30 8D 67 14 C8 62
1201:C0 85 A8 A2 0F CE F0 FF BB
1209:A0 02 20 7E 14 C9 00 F0 A2
1211:08 11 B9 45 C8 C0 00 D0 23
1219:F1 60 B9 FE 17 60 70 9C 2D
1221:A2 18 D0 A9 D8 1C D0 11 3B
1229:70 C0 78 19 A9 2E 8D 05 7C
1231:1D 69 40 00 72 40 30 72 AD
1239:40 EE 72 40 1F 72 40 E2 B1
1241:A9 EF 8D E3 24 1F 8D E4 C3
1249:30 02 C0 8D E6 23 32 8D AC
1251:E7 1A A9 AF 8D 15 1B A9 C0
1259:25 8D 16 1B 20 E2 1A 60 09
1261:B0 AE 09 28 38 C3 80 0C 0B
1269:0D AD 31 09 6B 0E 44 42 94
1271:3A 43 00 97 21 36 CF 1A 98
1279:68 00 82 A2 74 96 41 DD AA
1281:A0 15 7C 06 A2 4D 8D C0 51
1289:F1 05 A5 0A 72 99 09 00 49
1291:03 2C 44 0D 10 D0 A9 07 B9
1299:90 90 A9 C2 78 0A A9 00 CA
12A1:99 ED 0A BE 43 09 B9 64 51
12A9:15 9D 00 D0 B9 5C 4E 2F D7
12B1:DD 0A B9 6C 15 99 27 D0 73
12B9:C8 C0 08 D0 CD 60 DE 04 32
12C1:05 0D A9 FF 8D 1B D0 60 BB
12C9:00 05 0A 0F 14 19 1E 23 C5
12D1:28 46 64 82 A0 BE DC FA 05
12D9:06 0E 03 01 07 02 08 FC 42
12E1:E0 D3 0E 9B 08 A7 C3 23 70
12E9:12 34 3A 42 2D 4F 2D 55 E5
12F1:2D 4E 2D 43 2D 45 0D 9B 4E
12F9:BC B9 57 70 78 14 C4 21 9B
1301:50 04 3D 3D 50 91 C0 41 57
1309:0F 14 42 59 20 7E 07 60 03
1311:43 22 37 50 42 14 4C 00 48
1319:09 00 9F A7 D7 60 87 54 D5
1321:41 20 4A 4F 59 6E 36 43 62
1329:4B 50 3E 1B 4A 54 20 32 98
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READERSHIP SURVEY

Take a minute to tell us what you like most about Gazette. We also want to know what you don't like. What subjects would you like to see us cover? We want the magazine to be as useful and interesting as possible and to provide you with the coverage you want. Please take a minute to fill out and mail us the questionnaire that appears elsewhere in this section. We'll tabulate the results and use them to help us produce the magazine you want. If you don't want to tear out the questionnaire, a photocopy will be fine.

CONQUER CHAOS • BATTLE THE RED BARON MANAGE YOUR MAIL • FORTIFY YOUR HARD DRIVE

INFO SELECT

Just when chaos had built up a sizable lead, *Info Select* came along and helped me find my desk again.

Info Select is a personal information manager that specializes in random information—the kind I put on the backs of envelopes, in the margins of magazine articles, on the kids' school papers, and worst of all, in my head.

When memory resident, *Info Select* is just a hot key away should the phone ring or the boss drop by with a new assignment.

An enhancement of the acclaimed *Tornado* from Micro Logic, *Info Select* is a master at controlling all of the bits and pieces of information that keep you afloat. Among other things, the program serves as a data manager, a tickler file, and a project-tracking and time-management system.

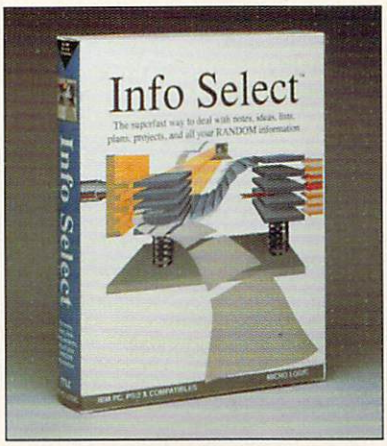
Info Select organizes data in groups of windows called *stacks.* Each window sizes itself to fit the information in it. Display as many windows as will fit on the screen at one time, with the current window highlighted. This system of showing multiple windows gives you access to as much pertinent information as possible. When Mr. Big calls to discuss the contract you're negotiating, you could have notes from a half-dozen of your previous conversations onscreen at once.

Searching *Info Select* information is as close to instantaneous as imaginable. To find all windows containing a reference to Mr. Smith, press G (for Get). This activates the search screen, which includes several rows of boxes representing your windows. Letter by letter, as you type the word *Smith,* boxes disappear as *Info Select* eliminates them from the search.

When *Info Select* has narrowed the possibilities to a handful, the pertinent windows are flashed onscreen. The whole process ends as quickly as you can type *G-S-M-I-T-H.*

This program is loaded with features and options, permitting and encouraging customization. You can change the window sizes, borders, and colors. You can automatically time- and date-stamp any new window. You can import information from databases and ASCII files, and you can pull a screen from an underlying application into a window.

The manual bulges with specific ideas on how the program might be useful. An online tutorial introduces you to *Info Select* commands and shows how you might set up a hypertext system using *Info Select.*



Organize your random notes quickly and easily with Micro Logic's *Info Select.*

In the manual you'll also find four pages of compatibility information with tips to make *Info Select* work with your other applications. These tips help resolve hot-key conflicts, or, as with *Microsoft Windows,* suggest running *Info Select* in a non-memory-resident mode.

Info Select is a keyboard-controlled DOS program without mouse support. Although it displays information in what it calls *windows,* these shouldn't be confused with the windows of Microsoft. There are no buttons to click on or scroll bars to move.

Running *Info Select* memory resident is fast, but doing so consumes upward of 120K of memory. Fortunately, the program includes a utility that swaps *Info Select* off and on disk as you enter and exit. In this mode, *Info Select* takes only 7K when it's inactive. If you can install a ramdisk as the swap device, you'll never notice the swap occurring.

Innumerable other features make *Info Select* a terrific tool. It includes a phone dialer, allows special information windows to be assigned to function keys, and includes a handful of tools for extracting specific information from your stacks. It lets you set up fill-in-the-blank templates for order taking, shipping labels, or purchase requisitions. Printing options give you hard copies of these forms or any of your windows. The program also supports some of the editing commands of *WordStar, WordPerfect,* and *Microsoft Word. Info Select* is an outstanding organizational tool, a workhorse that remembers everything. I've never had so much fun cleaning up my desk.

TONY ROBERTS

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

IBM PC and compatibles, 256K RAM—$99.95 (new users), $49.95 (upgrade from *Tornado*)

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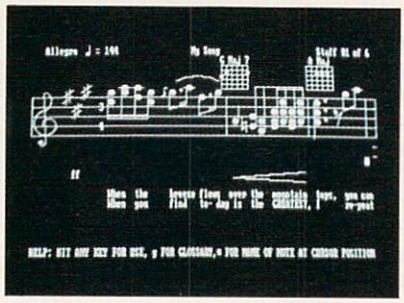
BASIC COMPOSER 4.3

At last I've found a simple and effective music composition program for people without MIDI experience. It's *Basic Composer,* from Education Software Consultants, and unlike the expensive and elaborate MIDI-based composition programs I've seen, this one should suit my music students quite well.

Since *Basic Composer* is menu driven and features onscreen help prompts, it provides a very user-friendly way to compose and notate music.

Basic Composer's Main Menu gives you a real sense of the program's capabilities. You can start editing, retrieve, print, and save a song; you can also choose to reformat or extract parts of songs or work on a single staff or a grand staff. When you start editing a song, the Compose Menu lets you set the clef, key signature, tempo, dynamic level, and other options. Once you've made these selections, you're ready to begin composing on the workscreen, which pictures the musical staff you have selected.



***Basic Composer* lets you include guitar chords with a melody line and lyrics.**

You place notes and other musical symbols on the screen using various keystrokes, which appear in tables at the end of the manual. If you prefer, you can have onscreen listings of any or all of the keystroke codes you need help with. To hear your composition played back at any time, press R for the last note, P for the current staff, or C for the entire composition.

One hardware limitation PC compatibles have, unfortunately, is that they can play only one note at a time, so you can't hear chords and harmony. You can, however, play the different notes of chords back separately to check for accuracy.

Once you've finished your musical masterpiece, use one of the many supported printers to generate a detailed hardcopy of your composition. The printouts from my Epson LQ 24-pin printer looked impressive, and I particularly appreciated the program's ability to let me print guitar chords along with a melody line and lyrics. I also found that with *Basic Composer* I could quickly and automatically transpose a piece of music and print it out in a different key.

Basic Composer comes with an exceptional 61-page user's manual, complete with a thorough index and instructions on getting free technical support by calling, writing, or sending a letter on CompuServe using a modem.

I highly recommend *Basic Composer* to music teachers, students, and hobbyists as a powerful and user-friendly alternative to costly and confusing MIDI-based music processors.

JOEY LATIMER

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

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The program provides easy management of a number of separate but related databases. The central feature is the contact menu, through which you process information about prospects and contacts. When you add a record to this database, *Totall Manager* leads you through the process of entering the phone number, name, address, and title of the individual, as well as the letter salutation. Other noteworthy items are Source (how you encountered this person), Origin Date (when you started working with this person), and Progress (where you are in the sales cycle). When you bring up a client's record, the program automatically presents the local time at the client's office.

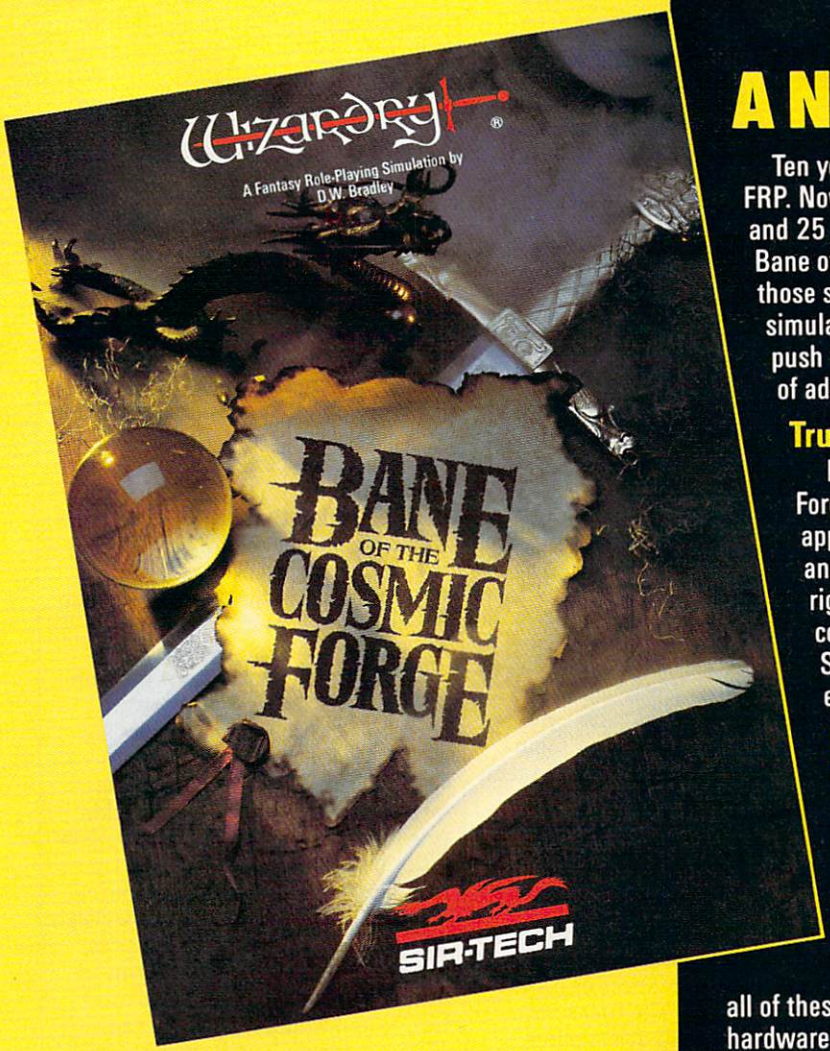
Once you've entered the client record, use the Track option to help you record your last contact with the client. You can indicate the type (call, letter, meeting), date, objective, and result of the contact. You can also enter your next planned contact by date and time, objective, and priority, as well as tasks to be performed in preparation for the contact. After you've made your plans, you can call up your agenda, which shows your planned activities by day or week.

Conveniently, you can at any time bring up a calendar, point to the date desired, and enter it into the record. You may also specify a minimum time between activities, which will automatically keep you from making too tight a schedule. A pop-up calculator lets you enter the results of a calculation into the field of a record.

Many other options in the contact menu show just how flexible and handy this program can be. You can set up filters to screen your database by state or ZIP code or any field you wish. Write a letter, check the spelling, and send it to the printer or print queue. Choose to make a form letter, and vary the paragraphs in it. View the entire history of dealings with a client. Keep records of orders from a client.

In menus other than the contact menu, you can create a multistep marketing plan for a product. You can also create a database of expenses, orders, or goals.

Totall Manager is a very powerful program. It's entirely menu driven (though it lacks mouse support), and you can become quite at ease with it ▷



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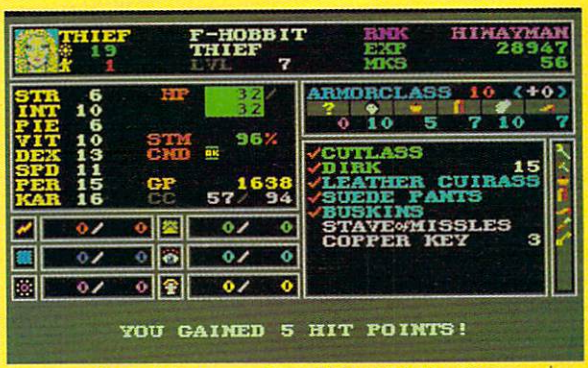
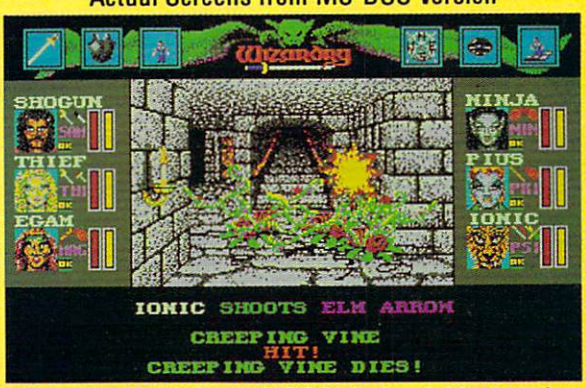


Actual Screens from MS-DOS Version



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after spending a few hours with the tutorial and getting a little practice. The program is a bit pricey, but with all *Totall Manager* can do to keep you afloat in your business's ocean of information, it could be well worth its cost.

CHARLES IDOL

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

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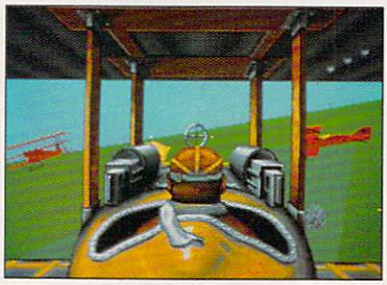
Amiga

WINGS

Part simulator, part role-playing game, and part arcade game, *Wings* is a truly impressive program. It takes you back in time to the latter half of the Great War, World War I. You join the 56th Squadron in the Allied forces as a fresh combat pilot. Earn your wings by successfully completing one of three training missions. They're easy to beat, so you should be in the air quickly. After passing this skill test and entering a word from the manual, you're ready to begin the game proper. What impressed me most about *Wings* is that all of the events in the game fit into a story line that ties in with what was actually going on at that point in the war. You'll eventually fly over 200 missions that take place between March 1916 and November 1918.

As you progress through the story, the missions become more difficult. The planes and equipment that you encounter accurately reflect the weaponry in use in each stage of the war. For example, you'll only encounter monoplanes, not biplanes, until around September 1916. This approach draws you into the game and compels you to keep playing. At the beginning of each mission day, you read an entry in the squadron's journal that outlines what will happen that day. You then go to a briefing screen, perform one of the three mission types, and are shown a postflight log that details the success or failure of the mission.



The 3-D aerial combat sequence puts you in the pilot's seat against German fighters.

Wings can be played with the joystick, keyboard, or mouse. Most commands are entered by selecting choices from menu screens. The first screen allows you to add and delete pilots, view their statistics, earn your wings, and join the squadron. On every game day, you're notified of any deaths or departures of members and any new pilots that have joined your group. The command screen lets you review pilots' characteristics, start a new game, send a pilot to flight school, and save your game.

Four characteristics affect the performance of each pilot: flying ability, shooting ability, mechanical aptitude, and stamina. As you play the game, these statistics and others, like number of confirmed kills, number of missions, and number of bomb hits, are tallied on the pilot data screen.

There are three sequences in *Wings:* aerial combat (3-D view from behind the pilot), bombing (2-D view from above your plane), and strafing (in three-quarters perspective, like the old *Zaxxon* arcade game). All three are easy to learn, but *Wings* throws a lot of variety into each mission. The animation in the 3-D fighting sequences is flawless. A great feature of the 3-D combat is the ability to switch views by pressing one of the four compass directions on the keypad. You can use this ability to take a quick look around when you don't know where the enemy planes are hiding. You have to hit the enemy planes a number of times to destroy them, and it takes more than a bullet or two to down your biplane. Bullet holes and other structural damage in the cockpit appear as your plane takes hits.

The graphics in *Wings* are superb. All of the images are colorful and detailed in the Cinemaware tradition. I was extremely impressed with the animated graphics in the combat sequences. From the pages of the journal, which turn as if the book were right in front of you, to the funeral scene, in which a tombstone pops up with your name on it after you've been killed in action, the images are the best that they can possibly be without being digitized. As you get farther along in the game, the action gets faster, and the graphics don't slow down things at all.

The music in *Wings* is inspiring and lively. Familiar military marches play during the mission summaries, journal entries, and other interim sequences. The sound effects are excellent, as you would expect in a game of *Wings'* caliber. Overall, *Wings* gets my vote of confidence. It takes a theme that has been beaten to death and creates something entirely new with it. The included Aviator's Briefing Manual gives a very well-written summary of aerial combat in World War I, as well as combat techniques, famous pilot biographies, plane data, and interesting stories. It's well worth the time it takes to read this booklet. I didn't think that Cinemaware could surpass *It Came from the Desert* until I played *Wings*. It's certainly the most unique combat simulator involving aerial combat—and a must-have for all aviation buffs. ▷

RUSS CECCOLA

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

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LOOM

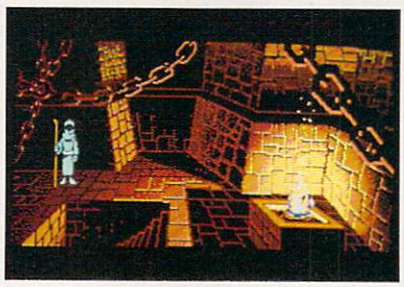
On the barren island of Loom, the exiled Guild of Weavers plies its trade and works its magic, spinning threads that alter the present and the future. No children had been born to the Weavers for many years, until you, Bobbin Threadbare, arrived 17 years ago. Instead of being a welcome member of the Guild, you're an outcast, for your birth was an evil omen. Shadow will soon fall across the world, and the age of the Great Guilds will be over. Unless, of course, you, the untrained and youthful Bobbin, can stop the cataclysm. Thus begins *Loom,* an unusually well-conceived and -implemented graphic adventure game from Lucasfilm.

Before actually playing *Loom,* you're advised to read the Book of Patterns, which contains spell descriptions and blanks to fill with the musical sequences that you discover throughout the game. Since much of the game concerns magic, knowing what could become available to you is an advantage. The spells, or *drafts,* as they're referred to by the Weavers, are found in objects around you and are noticeable to you when you carry your distaff. Drafts are easy to record and use; you simply play them back on your distaff. Magic seems to work on most objects in *Loom,* and weaving drafts just to see what might happen is quite entertaining.

Unlike most other adventure games, *Loom* does not kill you every time you make a mistake. There's often more than one way to solve a problem, and the problems are not so convoluted as to be unsolvable, as in some other games. This simple combination alone makes *Loom* far less intimidating than virtually any other adventure game I've played. Because thought is rewarded with success, not death, thinking is encouraged, and the game feels more like a challenge than an insult. While this approach to game design makes *Loom* an excellent game for beginners, it's no less a game for the seasoned player.

The story that you participate in is told with devastating humor, and the supporting cast is quite lovable. Your role in the fiction allows you to become an offbeat fantasy hero, and the ease with which you become attached to Bobbin is surprising.

Graphics in *Loom* are limited in palette and low in resolution, ported directly from IBM EGA, but they're rendered fairly well in a cartoonish sort of 3-D. You move Bobbin by pointing with the mouse and clicking on the destination; the game moves the character for you. Animation is everywhere, but again, it's limited. Most figures move in a laborious, choppy manner, and when one or more are onscreen with Bobbin, there's an appreciable delay in all movement. Yet most of the animation is charming, and some of it's rather complicated. Despite being so graphically dependent, floppy disk access is moderate and holds up gameplay very little. The music in *Loom* is neither brilliant nor annoying, but it supports the actions of the characters well enough and can always be counted on to accompany plot developments.



***Loom*'s Bobbin stands ready with his distaff; what mysteries lie below?**

Occasionally Bobbin is removed from your control; the game loads a lengthy animated sequence to which you're merely the audience. Much inside information is related this way, like Bobbin's own history and what can be done about the oncoming apocalypse, but these sequences are sometimes disturbing. At one point Bobbin's distaff is taken away, and he's imprisoned. Without the distaff Bobbin is powerless, yet I was unable to prevent its theft. While necessary to the plot, the sequence was extremely obtrusive, and the animation that depicted Bobbin's escape also proceeded without my intervention. For several minutes, I could only watch and wonder what would happen.

Despite my annoyance with some of the animation, I was delighted with *Loom* as a whole. I'm pleased to announce that it's the first adventure game that I've been able to solve on the Amiga, and that's not because it's an easy game. It's because *Loom* is a sensible fantasy—engrossing, amusing, and a minor epic in its own right.

DAVID T. SEARS

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

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Mail List Manager is newer and works with as much if not greater ease than its partner. Filling in the nine predefined fields is child's play. Memory resident, it sorts quickly. A list on a 64 can handle approximately 300 records; a 128 can handle about 1000. Transfers between lists are handled via exporting and importing functions. Editing is done with standard techniques.

The two programs make excellent use of drop-down menus and direct one-letter commands. Both have drivers for several printers. (*Label Maker* will support two at once.) Management and mastery of the programs are accomplished with ease—but with one exception. The problem comes when trying to make the finished product turn out exactly the way you've envisioned.

Generally, the problems have to do more with the vagaries of individual printers and not the printer drivers or the programs themselves. Part of the problem is due to documentation that's comprehensible but not thorough enough. As with a new graphics or desktop publishing program, you have to play around with them to really understand what you'll get.

For instance, my first Rolodex list of relatives was great. My second list, magazines and their editors, came out in an unexpected format. The editors' names were printed where I thought the magazine titles would be, and the magazine titles were listed next, after a comma, where

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the program expected a first name to be. Nothing I couldn't remedy, but after this error it took a trial or two to discover how to fix it. Embedded printer commands presented another difficulty until I learned to leave enough room on a line for all the commands I wanted before I entered text.

Mail List Manager works only with labels created within the Design Your Own option of *Label Maker,* not with those made in any of the other options: Rotary Cards, Standard Mail Label, and so on. This is because *Label Maker* identifies each label file as it's saved by the option that created it. Labels will load back only into the same option. *Mail List Manager* recognizes only files coded for the Design Your Own option. On the positive side, you can load a *Mail List Manager* label file into *Label Maker's* Design Your Own option to modify it.

To boil it down, you can usually find a way to do what you want, but it takes a while and some experimentation. Like tackling a new desktop publishing project, with perseverance you can open new worlds of productivity.

It takes time to tame this dynamic duo. But old Leroy (he of Cheatsheet fame) has a good thing going. Keystone knows it, too, because the final option on *Label Maker* is a printout of an order form for all kinds of continuous labels.

Mail List Manager can be sufficient unto itself. It has a good selection of labels, and it's a terrific program for handling all kinds of mailing lists: relatives, clients, help services, club members, and so on. *Label Maker* invites you to customize labels to your heart's content, and it will work with several databases and word processors. Each program will work within the other. Together they can solve almost all your label needs.

ROBIN MINNICK

Ease of Use	★★★
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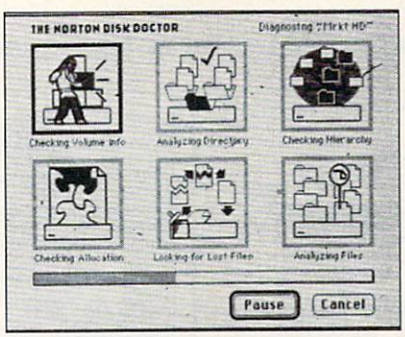

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If you sometimes see the sick Mac face when you boot up or if you've lost work to a damaged or crashed disk, you need *Norton Disk Doctor.* This suite of diagnostic and recovery programs can fix 45 kinds of problems that render disks unbootable and files unreadable. I tried it on a couple of corrupted MS-DOS files I had earlier ported to my Mac, and the program recovered everything but a few bytes.

Whiplash is a common malady on the Mac that's caused by slapping yourself in the forehead when you've trashed a file you really wanted to keep. The trashed files are actually still on your disk, but they can be overwritten at any time by another file. Norton's *FileSaver* cdev keeps track of hundreds of deleted files, while another program, *UnErase,* helps you save them before they're gone forever. *UnErase* displays a list of files you can still recover and tells you if they're in good shape or if they're poor candidates for recovery. I tried to recover several trashed files and found that, in most cases, even files in poor condition can be UnErased with only minor patchups.

If you've forgotten yourself so much that you've accidentally formatted your hard disk, the *Format Recover* program can probably restore most of the lost material.

Speed Disk optimizes your disk by defragmenting files that have been splattered all over the disk by frequent write operations. Fragmented files make your drive do more seeks, which really slow things down. While *Speed Disk* isn't as fast as other defragmenters, such as Symantec's *HD Tuneup,* it gets the job done—and it reorganizes your directories, which speeds up your disk even more.

The documentation is easy to use and well organized. The instructions on how to recover from a disk crash or fix a damaged disk are right up front in the manual, where panicked users can find them quickly. Also included in the package is a red emergency floppy that you can use immediately to help get you out of a jam. Many of the other disk utility programs make you create your own emergency startup disk, which the typical lazy user may never get around to doing.

Rounding out the package are some useful utilities for managing files and folders from the Open and Save dialog boxes, customizing the look of the Finder, snooping around in hex and ASCII, and more. All in all, *The Norton Utilities for the Macintosh* is a package well worth having, even if you already own another disk utility.

STEVEN ANZOVIN

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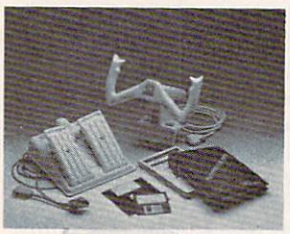

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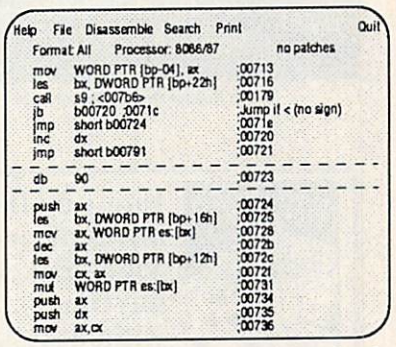

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6. First Publisher 3.0
Create professional-looking documents.
Software Publishing
IBM

7. Managing Your Money
Figure your finances.
Meca
IBM

8. PC Nations
Add features to *PC Globe* 3.0.
PC Globe
IBM

9. Print Shop Graphics Library: School and Business
More clip art for *The Print Shop.*
Brøderbund
Apple II, IBM

10. Resume Maker
Go job-hunting with your PC.
Individual
IBM

HOME ENTERTAINMENT

1. SimCity
Run the world's first simulated city.
Maxis
Amiga, Commodore 64/128, IBM, Macintosh

2. Playroom
Learn by having fun!
Brøderbund
Apple II, IBM, Macintosh

3. Teenage Mutant Ninja Turtles
The Fab Four command the sewers of New York.
Konami
Amiga, Commodore 64, IBM

4. Tetris
Deceptively addicting falling-block game.
Spectrum HoloByte
Amiga, Apple IIgs, Commodore 64/128, Macintosh

5. Flight Simulator
Head for the wild blue yonder.
Microsoft
IBM, Macintosh

6. Silent Service II
Sub combat in the Pacific.
MicroProse
IBM

7. Monopoly
Buy Boardwalk using your PC.
Virgin Mastertronic
IBM

8. ChessMaster 2100
Board strategy that isn't boring.
Electronic Arts
Apple II, Apple IIgs, Commodore 64/128, IBM

9. Jack Nicklaus Unlimited Golf and Course Design
Play the Bear's favorite courses.
Accolade
Amiga, IBM, Macintosh

10. Prince of Persia
Run, jump, and rescue the Princess.
Brøderbund
Amiga, IBM

HOME LEARNING

1. Mavis Beacon Teaches Typing
Learn to touch-type.
Electronic Arts
Amiga, Apple II, Apple IIgs, Commodore 64/128, IBM, Macintosh

2. Where in Time Is Carmen Sandiego?
Can you find Carmen in time?
Brøderbund
Amiga, Apple II, Commodore 64/128, IBM, Macintosh

3. Where in the World Is Carmen Sandiego?
Chase Carmen around the world.
Brøderbund
IBM

4. New Math Blaster Plus
Have fun with basic math concepts.
Davidson
IBM

5. Computer SAT Preparation
Study with the help of the computer.
Study Ware
Apple, IBM, Macintosh

6. Reader Rabbit
Helps children learn to read.
The Learning Company
Apple II, Commodore 64/128, IBM, Macintosh

7. Children's Writing & Publishing Center
Newsletter and story designer.
The Learning Company
Apple, IBM

8. Outnumbered
Super Solvers is back.
The Learning Company
IBM

9. Math Rabbit
Develop early math skills.
The Learning Company
Apple II, IBM, Macintosh, Tandy

10. Mavis Beacon/DS Tutor Bundle
Typing lessons and more.
Software Toolworks
Apple II, IBM, Macintosh

COMPUTE's Hotware lists were prepared by Egghead Discount Software and are based on retail sales of Apple II, IBM, and Macintosh software from September 15 through October 13, 1990, at 188 Egghead stores in the United States and Canada.

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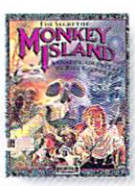

Lucasfilm's The Secret of Monkey Island

Electronic Arts' Stormovik: Soviet Attack Fighter SU-25

Virgin Mastertronic's SPOT™

MicroProse's Lightspeed

DigiTek's DINOWARS

System Requirements: IBM® PC, XT, AT, 386, 486 or compatible with 256K RAM, DOS 2.0 or higher, CGA, EGA, VGA or MGA, and headset or external speaker.

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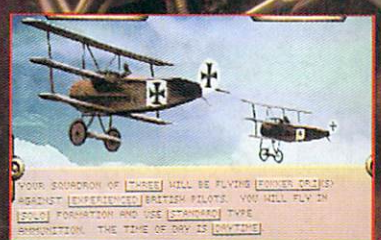

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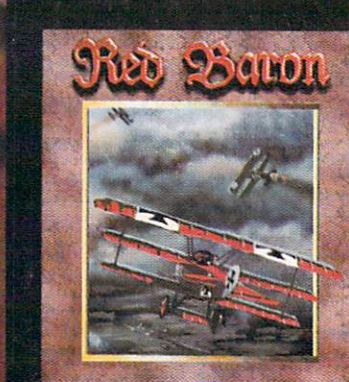

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