The program offers several methods of navigation. In addition to the geographical and time-line approaches, there's a lovely image of an old-fashioned card catalog for those who prefer an alphabetical approach. Click on a letter, and you receive a breakdown of all the categories of information available under that letter.

This is very much a chronological program—and that's very much an Asimovian touch. We arrive at a survey of present knowledge only after thoroughly establishing and examining its background. Thus, an Asimov book ostensibly about quasars might begin thousands of years ago when humans first began looking at the sky.

The dilemma, if you can call it that, of the interactive approach to Asimov's material is that there's no single beginning place. While the material is linked and cross-referenced, those links could be made more overt. I'd like to see another window added to the screen, one that shows clearly the links, into past and future, of each advancement. In his books and essays, Asimov controlled both form and function: You read from beginning to end. Reading from software is more like reading by way of an index, making it easy to miss important points and congruences.

Asimov's text sections are superb. His prose is as clear and straightforward as ever. The miniessays in Science Adventure pack a great deal of information into the fewest possible words, always with an emphasis on clarity and insight. You could take any of the text sections as a model of how science writing should be done.

Technically, Science Adventure is well produced and impressive. It occupies seven or so megabytes of hard disk space, yet it installs on a 386 in under ten minutes. I wouldn't want to run Science Adventure on anything less than a fast 386 system with VGA graphics, and even on such systems the program occasionally slows down.

Much of the storage space is used for an enormous and impressive database of illustrations and pictures. These are judiciously chosen, combining historical illustration, technical illustration, and superb scientific photography. Here, VGA pays off handsomely.

Sound support is well managed, accommodating all of the major boards. For the most part, the sounds, music, and spoken words enhance the program, although you have to wonder how Asimov would feel about the opening music. The overture for Science Adventure is, ironically, "Also Sprach Zarathustra," that anthem so closely associated with *2001: A Space Odyssey,* the masterwork of Asimov's beloved friend and friendly rival, Arthur C. Clarke.

The program can be operated from the keyboard, but I'd say that a mouse is essential. Keyboard control is slow and difficult, but navigating with a mouse is easy.

The program's documentation offers instructions for launching Science Adventure from Windows, but I found that an uneasy fit at best. Science Adventure is best run as a stand-alone program from the DOS prompt.

It's also best run as an adjunct to more traditional methods of learning about science. Asimov once wrote a marvelous little story, called "The Fun They Had," about the future of electronic education and the abandonment of older tools. You might look that story up as you play with Science Adventure.

While no home with a computer should be without Isaac Asimov's Science Adventure, no home should be without *Asimov's New Guide to Science, Asimov's Biographical History of Science and Technology, The Human Brain, The Human Body, Understanding Physics,* and as many more of the master's books as your shelves can support. Use the computer program as a springboard to launch you into the unequaled pleasures of reading Isaac Asimov. ❐

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PATHWAYS

Steven Anzovin

DIGITAL DEMOCRACY

"Don't forget. Voting is on after 'Simpsons: The Next Generation,'" remarked my wife as I recycled the dishes.

"Who's running tonight?" my daughter asked.

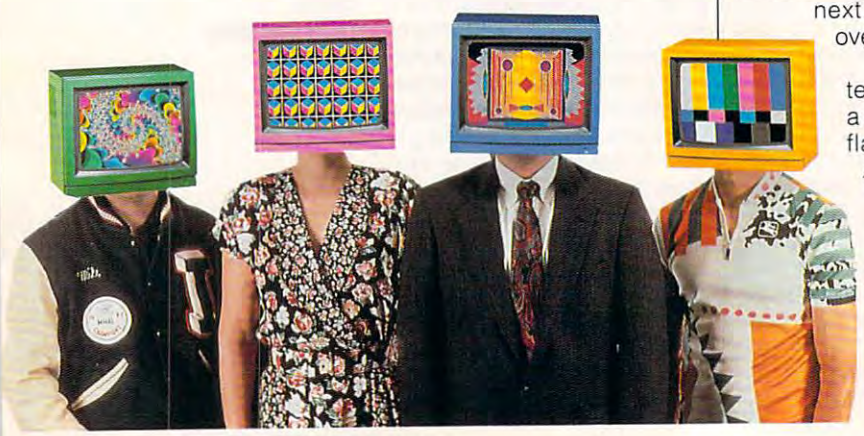
"Oh, it's for the presidency again, dear," said my wife. "You know that the first Tuesday of every month is president's night."

"Did they teach you in school yet about the 29th Amendment?" I asked, hoping to squeeze in a little American history lesson in the kitchen while the kids recharged the dog's batteries. "You know, the Declaration of Digital Independence, the Voters' Rebellion, and all that? When the American Patriotic Conglomerate—the Perot Data Party, Newvideo, Turner/Whittle, McDoulpia-Busch, and LottoNet—got together to create the world's first instant electronic voting network?"

My son chuckled. "Dad, please. They don't teach AmHist in school anymore."

No more primaries, debates, conventions, campaigns, or any of that old, time-consuming, expensive, boring political rigamarole.

After dinner we all trooped into the vidroom. We don't have much of a setup, just the standard 5- × 10-foot high-definition screen with a dozen ISDN feeds and an AppleCray controller. Bart's grandchildren were up to their usual antics on center screen, but no one paid much attention. My daughter got on the right-hand screen with a few of her friends to play the latest Newvideo game, the one where Super Zeppo decides whether to run for the presidency while hungry PACs try to gobble him up. Along the way the kids answer questions about the weekly family expenditures; if your mom or dad has bought Newvideo products, you earn extra games. My son took the left-hand screen to browse through tonight's preteen voting roster. He seemed to be especially interested in the details of the National Skateboard and Sneaker Rights Act. My wife, meanwhile, was playing the Instant Law Lotto numbers according to a system she'd worked out involving our PIN numbers. Since the Cray could generate a billion or so PIN variations every second, she felt we stood a reasonable chance of winning at least a small prize. The winners don't get cash, like in the old days; they get votes instead. I could see that the jackpot was up to nearly 200 million votes, enough to determine the fate of every legislative action pending tonight. I remembered one night two years back, when a grand-prize winner forced through a law banning sex. Luckily, the next week's winner overturned that one.



At 9:00 sharp, center screen flashed a waving American flag. "Welcome to America's Electronic Town Meeting," said the simulated voice of Don Pardo, "brought to you by APC, the folks that say, 'It's up to you!'" That corny Reagan simulation gave the opening monologue again. Everyone groaned, but it was all part of the ritual, and we really wouldn't have it any other way. After that came the text of all nine party platforms; the words scrolled by so fast that I simply captured them for later, knowing no one was likely to have the time to read any of it. Then the kids joysticked in their votes for video of the week, junk food of the week, and so on; as each vote was cast, eager product managers in stores from sea to shining sea rushed to fill their waiting shelves with cases of the winning products.

Finally, it was time for the main event. The nine presidential candidates flashed on the screen all at once, giving their 15-second spiels about what they would do for the country in the coming month. At the same moment, the phones began ringing with calls from pollsters, and all four fax machines began to spew reams of position papers, press releases, vote sweepstakes tickets, and direct mail asking us to open accounts in each party's name.

"Daddy!" the kids yelled. "You forgot to turn off the faxes again!"

"Sorry," I said. "I'll clean up later. Here comes the vote."

We all stood in anticipation with our infrared Vote Remotes at the ready. With one press of the button, we and 300 million other red-blooded Americans would determine the fate (and marketing plans) of the free world—for the next month, at least. No more Congress, Supreme Court, primaries, debates, conventions, campaigns, or any of that old, time-consuming, expensive, boring political rigmarole. As the choices again flashed on the screen, our thumbs did their patriotic duty.

Democracy in action. ❐

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Circle Reader Service Number 168

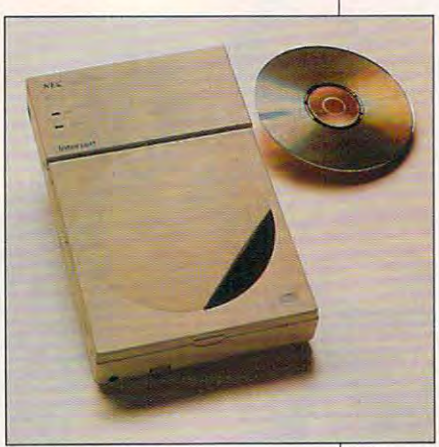
MULTIMEDIA PC

David English

CD-ROM TO GO

CD-ROM is finally catching on. Early returns from our most recent readership survey indicate that about 20 percent of our readers have CD-ROM drives. That's up from about 3 percent just a year ago.

That means a lot of you already know about the limitations of the technology. Foremost is the inability to use your new CD-ROM software on a PC without a CD-ROM drive. If your PC at work has a CD-ROM drive but your PC at home doesn't, you can't use your CD-ROMs at home. Also, it's nearly impossible to use your CD-ROMs with a laptop or portable computer. Wouldn't it be great if you could use your CD-ROMs on any PC?



NEC's portable CD-ROM drive is fully MPC-compatible, but weighs only 2.2 pounds.

There is an option for laptops and other slotless PCs. SCSI adapters plug into your parallel port and give you both a SCSI port and a pass-through parallel port. Since most CD-ROM drives use a SCSI interface, you can plug most external or portable CD-ROM drives into a SCSI adapter. Unfortunately, if you have a standard parallel port, you'll only be able to read data at about two-thirds the standard data-transfer rate (about 100K per second, rather than 150K per second).

If you have a bidirectional parallel port, like the ones found on many Toshiba laptops, you can pick up some extra speed with two new SCSI adapters: the T348 MiniSCSI Plus (Trantor Systems, 5415 Randall Place, Fremont, California 94538-3151; 510-770-1400; $229) and the AL-1000 (Always Technology, 31336 Via Colinas, Suite 101, Westlake Village, California 91362; 818-597-1400; $199). The same two models perform even better—in fact, about as fast as a card-based SCSI adapter—if you have a computer with the new EPP (Enhanced Parallel Port).

The best answer for laptops would be a built-in SCSI interface. Then you could easily add as many as seven SCSI devices to your laptop, including CD-ROM drives and additional hard drives. Currently, only NEC offers a laptop with a SCSI connector.

Now that you have a way to add a CD-ROM drive to your laptop, what about sound? There's the rub—you can't use the parallel port to do both at the same time. Media Vision offers the excellent Audioport, which plugs into the parallel port—in effect adding a sound card to any laptop. But it doesn't get along with the parallel-port SCSI adapters. If you could use both, you could convert your laptop into a multimedia PC (MPC). As it stands now, you'll have to choose one or the other—CD-ROM or sound—or resort to a bulky expansion unit.

You can still use the many CD-ROM applications that don't need sound, or you can use your SCSI adapter as a quick way to move a CD-ROM drive from one desktop PC to another. If you have a sound card in your computer both at work and at home, you could buy a portable CD-ROM drive with a parallel-port SCSI adapter and set up both machines as MPCs.

One of the best designed and most versatile of the new portable CD-ROM drives is NEC's CDR-37 (NEC Technologies, 1255 Michael Drive, Wood Dale, Illinois 60191; 708-860-9500; $449). It's fully MPC compliant with an average 450-millisecond access time, a 150K-per-second data-transfer rate, and 64K of cache memory. Best of all, it weighs only 2.2 pounds (or 3 pounds with the optional battery pack). It's small and can easily fit into many laptop cases along with the laptop. You can buy the drive with any of four interface kits (XT/AT card—$539, PS/2 card—$598, parallel-to-SCSI adapter—$559, or Macintosh connector—$485), or you can buy the drive and interface kits separately. You can equip all your computers with interface kits and move the drive from computer to computer.

I've spent several weeks carrying the CDR-37 between my home and office. While not as fast as NEC's new MultiSpin CD-ROM drives (these speed demons have a 280-millisecond access time and 300K-per-second data-transfer rate), the NEC portable handled well all but the most demanding data (we're talking full-motion video, which can choke even the fastest drives). I'd recommend it to anyone who needs a reliable and portable CD-ROM drive.

For now it's a real effort to bring multimedia to slotless computers. Maybe someday all computers will have the necessary SCSI and audio circuitry built right into the machine. ❐

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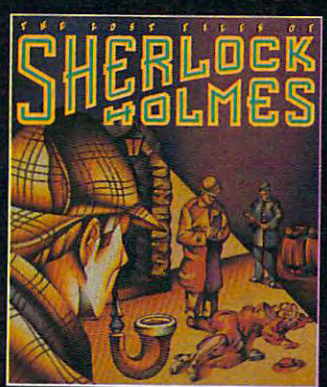

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ENTERTAINMENT CHOICE

Gain immortality by battling your way through mazes and returning control of the City of Legends to the gods in this action-adventure hybrid.

Alfred C. Giovetti

GODS

Beads of sweat glisten on your bronzed, corded muscles as you make your way through the ancient City of Legends, once the playground of the gods. Now in decay, the city is overgrown by weeds and inhabited by the denizens of evil. You recall the challenge laid down by the gods for a champion to free their city from the grip of evil. A massive warrior, you favor quick wits and flashing weapons over the protective covering of armor. You know the price of failure is death. But you are no ordinary hero—your name is Hercules. And your mission is no ordinary quest: to attain godhood and immortality.

Gods, by Bitmap Brothers, is a game which combines many of the best aspects of adventure games in an arcade-game environment, including puzzles, shortcuts, secret rooms, treasure chests, and keys not seen in most other arcade games. All these plus communication, character interaction, hints, and a limited save-game utility combine to make Gods a very effective and enjoyable hybrid adventure-arcade game that must be played to be appreciated.

The side- and top-scrolling display of the City of Legends has a third-person perspective that shows your muscle-bound Hercules and the monsters within the stone Greco-Roman maze. At the bottom of the display are several windows which show the number of lives you have remaining, guardian and character energy levels, the item inventory, the point score, a message scroll box, and the amount of gold you've collected. The amount of energy remaining in your current life is shown as the fullness of a beaker.

The city is divided into four sections: the city proper, the temple, the labyrinth, and the underworld. Each section is divided into three worlds, and each world may be composed of multiple levels. Success in traversing the levels involves a combination of throwing the correct switches and levers, collecting the correct artifacts, and killing off all of the monsters—all within the time allotted and with the least damage to your character. Extra lives, more powerful protection, and more powerful weaponry are the rewards of the correct sequence of play.

Within the city you must defeat many enemies, which can appear out of thin air, accompanied by a flash of light. The basic monster types come in many interesting and varied somatotypes and weapons capabilities, making combat an interesting, ever-changing occupation. They are of four basic types: killers, fliers, thieves, and guardians.

Gods is a game of planning, not just a game of knee-jerk reflexes. You must locate switches and determine their functions via experimentation. The game's limited save-game resources require you to repeat portions of the maze over and over again, until you find the ultimate path through each city section.

Like an adventure game, Gods has progression and reward puzzles. Progression puzzles aid or hinder your advancement to the next level; reward puzzles provide you with better weapons, protection, and life power. To solve the puzzles, you'll have to get the right keys for the right doors and be able to select the correct path through the mazes.

A message scroll box at the bottom of the display announces the ultimate goal of a set of puzzles and offers hints to solving puzzles or explains the effects of artifacts. Determining the meaning of these messages is the source of another puzzle.

Gods has an inventory, another adventure-game feature. The three-item inventory holds items such as keys and other artifacts. Items in Gods

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have an existence of their own. When they're dropped, they appear on the city floor. If a thief picks them up, they can be retrieved later when the thief is killed.

Over 30 distinct types of artifacts, including six different types of keys, are hidden in Gods. There are also many types of weapons, artifacts of protection, magic potions, and weapons' arcs, which control the trajectory of the thrown weapons. As with characters in other adventure games, Hercules needs to know what to discard and what to keep. Many items disappear when used and so don't take up room in the small three-item inventory. Most gems add to the gold counter. Food replaces lost energy.

A shop appears at the halfway point and the end of each level. Some weapons, armor, food, weapon arcs, and other artifacts will perform specific tasks better than others. Some weapons kill monsters effectively but do little damage to the breakable blocks. Your choice of weapons will ultimately affect your ability to successfully traverse the dangers that lie ahead.

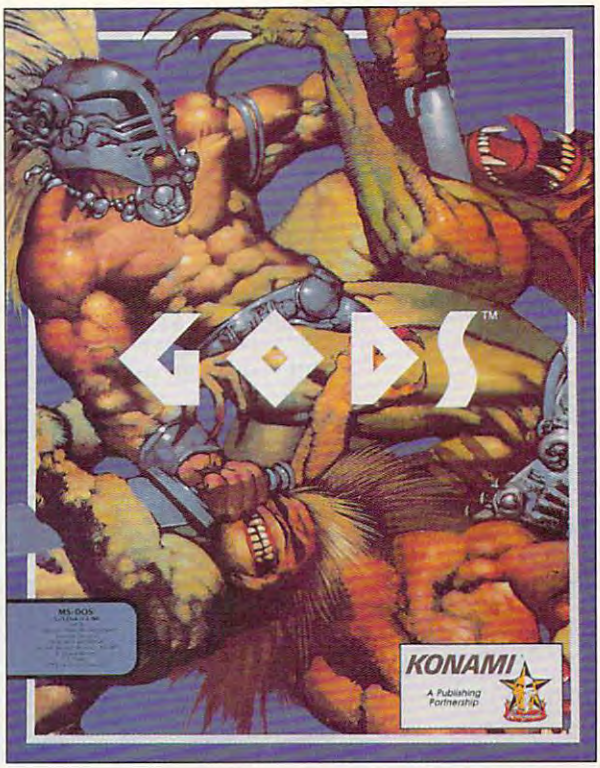
Potions have many effects, such as increase in health, weapon potency, and defense effectiveness. Those acquired in shops act differently than ones found in the city, providing an additional set of strategic choices. Shop potions can be saved as inventory items that are dropped from the inventory when used; city potions take effect on contact with Hercules.

Gods incorporates a new system called the Player Monitor mode. This mode keeps track of your skill level, making the game easier for the uninitiated and more difficult for the skillful. Clever solutions and skillful maneuvers reap higher rewards, while the inexperienced player is encouraged to improve in a less lethal environment. Player Monitor mode ensures that every game is different, since most of us don't perform with the precision of a computer.

Upon your successful completion of a world, the program constructs a personalized code for you. By inputting the code later, you can return to the beginning of the next world with the Player Monitor mode reactivated at exactly the same level as when you left the game. Gods is different from other code-based save games in that it remembers and lists the codes on the startup screen, thus eliminating the need for you to keep notes.

The interface can be most effectively controlled by a joystick, but it's also supported by a keyboard option. Joystick control is somewhat awkward and takes time to get used to. Keys allow you to pause or escape to the operating system. For selecting items in the shop or inputting alphabetical characters, the mouse and keyboard would've been a more effective combination, but the developers chose not to support it. The numeric keypad is active for inputting the copy-protection code, a four-digit number recovered from a nearly illegible red code card.

The graphics in Gods are crisp and tight, dazzling the eye and somehow seeming to squeeze out more than 16 colors from its 16-color VGA palette. Animation is incredibly smooth, with the monsters gliding along the screen without a hitch. The theme music was composed by Nation XII's John Fox, a former member of the popular European band Ultravox. Renegade, which produced the game with Bitmap Brothers, is a founding partner with Rhythm King Records, which produced the music in its studios. Sound effects show the same professional origins and are used sparingly to great effect.



Gods is much more than just another arcade game. By combining some of the best elements of adventure games in an attractive arcade-game format, it transcends the fast-reflex arena and becomes a game of intellect. It joins other Bitmap Brothers award-winning games as an innovation that goes beyond earlier hits. You won't want to miss it. ❐

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GAMEPLAY

Paul C. Schuytema

UP AGAINST THE WALL

It's 3:00 a.m., and you've just rammed full speed into the brick wall that designers work so hard to build into their games: the unstoppable opponent or the unsolvable puzzle. After committing hours to the game, you've reached an obstruction that seems impossible to overcome.

Computer games are tough (they have to be to justify the cost), and as we get better and better at anticipating what's coming, the game publishers work harder at creating more challenging puzzles and burlier opponents. And in this spiraling climb of difficulty, there has to be some friction. Don't hate the game. You wouldn't have bought it if you thought it was going to be easy. Every game has a solution (at least, I'd like to think so), no matter how cryptic or convoluted, and there are ways to hurdle that wall.

Computer games are tough. Game publishers work hard building traps and obstacles to stop you in your tracks. But every game has a solution. There are ways to hurdle that wall.

The first thing you should ask yourself when you hit the wall is, "Am I on track, or is this a dead end?"

If the game is a linear shoot-'em-up, then you know you have to overcome that obstacle to get any further. If it's an adventure game, the answer is trickier; you might have wandered into a blind alley. If so, all you need to do is back up and take another route. And if it's a simulation, you know it's just a matter of patience and learning the right skills before you put that F-16 down on the runway without crashing.

The best way to get past the wall is to arm yourself with as much information as possible. If you're playing a savable game, then play right up to your wall and save the game. Make a few copies of your saved game and settle down to experiment.

Search for resources beyond the game itself. Often, the game's manual contains a wealth of information. It's a great place to start looking for your solution. Some manuals have their own hint sections, while others will give information in the narrative introduction or in the fictional background material. It's worth a try.

Sometimes, the game itself will allow you to modify the parameters. Don't think of this as cheating, but as fact-finding. You're simply looking for the solution to a puzzle. If you change the parameters and solve your dilemma, you can set them back and recall for "honest" play a game you saved previously.

Often, the game is in real-time, and you only have a few precious seconds. So take a snapshot. A screen capture utility is also great for this. You can tell a lot from a screen shot, especially if the screen is crowded like the one in Falcon 3.0.

If your video card has an output jack, hook up your VCR and record the last minutes before you crumble. Think of yourself as a coach, evaluating the gameplay. (Digital Vision and others make interfaces that convert VGA to composite video for videotaping.)

Another good tactic is to get the game up and running and then have a friend run through the difficult part while you watch. Maybe you'll see something new. But watch out. If your friend breezes past your wall, your ego may be hurting for a long time.

Often, if a game is popular enough, you can buy hint books that solve nearly all of your problems. Generally, the books are written with the frustrated gamer in mind and organized so that you can get the information you need without spoiling the game.

Check out online resources, too. Often, a local BBS will have a library of text file hints that you can download. Also, large networks such as GEnie and CompuServe have gamers' forums that provide the opportunity to ask for specific help from people who have been there. CompuServe will also provide its members with contact numbers for the major game publishers. GEnie has a general RoundTable for computer game enthusiasts.

Nowadays, it seems as if everybody's installing 900-number help lines. Electronic Arts has a 900 hint line which allows you to access any level of any game through a menu and your touch-tone phone. But don't forget that these help sessions can cost as much as a hint book. And at times the hints may be as cryptic as the puzzles themselves.

Remember that these games have solutions. Sometimes the answer is practice, and sometimes it's a little more complicated. If you need help, the resources are out there. Someone somewhere has run into the same problem. You only need to track that person down. ❐

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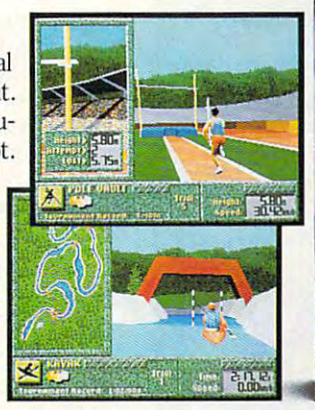

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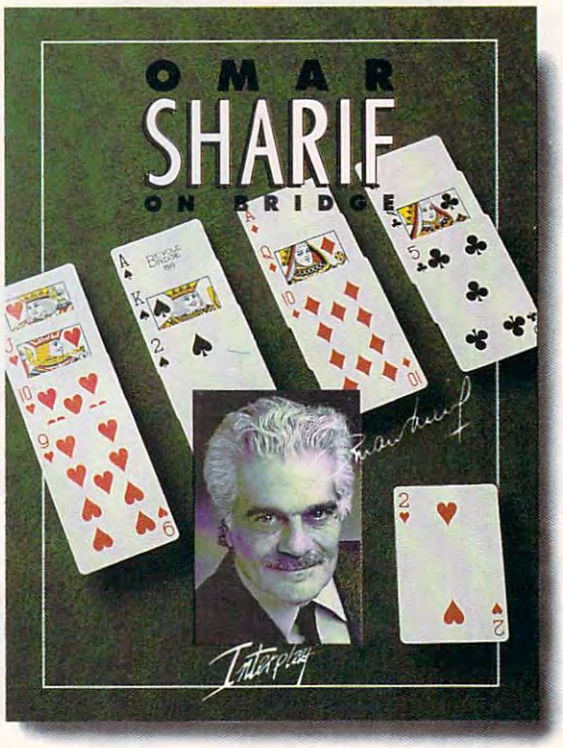

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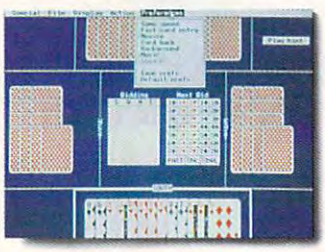

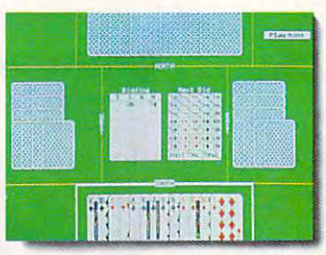

MS-DOS Screens Pictured.

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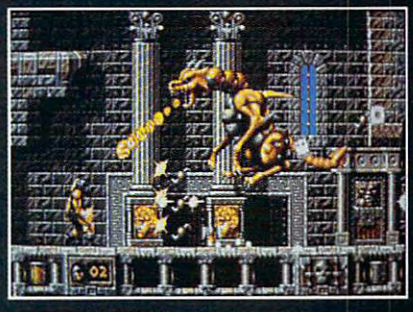
THE TOP 25



By David Sears

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Winter—a time for glowing hearths and heirloom quilts and, for some of us, long evenings spent with mugs of cider and a cherished PC. This is most certainly the best time of year to play. Maybe you'll try a few games of Populous or Star Control, but if you're like most gamers, you look forward to Christmas and the frenetic activity of entertainment software houses. The must-have RPGs of summer and the hottest simulators of spring fade from memory now, lost in the swirl of new product announcements and the buzz of seasonal industry hype. But doubt remains. Did you miss something important this year?

Probably. Over the last 12 months, digital entertainment took some tentative steps forward. In spite of the dual threat and promise of CD-ROM products, disk-based games continued to grow, both in megabytes and range of play.

We stormed the stars and walked alternate earths; in most cases our journeys were limited only by the size of our hard drives. We played in tree forts, and we solved mysteries worthy of Sherlock Holmes himself. Simulations made a strong showing against the more traditional hack-and-slash dungeon exploitation ventures; the philosophers in us all secretly rejoiced. And then, the lemmings came back. For computer owners with a little time to kill, here's a look at the highlights of the last 12 months. With luck, some of these replayable beauties—though forgotten for the moment—still wait for you on the shelves of local software boutiques.

Dune

Better than the movie and somewhat shorter than the novel, Dune (from Virgin Games) proves that adaptations aren't always inferior to originals. As Paul Atreides, players mine life-prolonging spice, ride the wild sandworm, and reclaim the desert planet Arakis. A no-problem interface puts you instantly at the heart of play; haunting melodies and visionary images courtesy of the European design team Cryo put Dune near the top of a long list of ecomanagement world-conquest games.

Falcon 3.0

Flying a more realistic F-16 flight simulator could prove hazardous to your health. Once Spectrum HoloByte worked the kinks out of this military-inspired wonder, armchair pilots everywhere held their breath as they pulled multiple G's and fought the good fight in the days after Desert Storm. Thanks to Spectrum HoloByte for the reminder of how dangerous modern warfare can be and for making a trip to the Middle East safer than the drive to work.

GODS

Sometimes the gods make a mistake, and this time, they've given you a shot at equality. Just defeat four nasty guardians and hordes of monsters, plus reclaim an inhospitable, unnamed city, and the big boys on Mt. Olympus will issue you a membership card, complete with requisite immortality. The Bitmap Brothers did another outstanding job for Konami.

DARK SEED

H. R. Giger makes his small-screen debut with DARK SEED, and players learn that smaller is no less fearsome. The designer for the movie Alien opened his disturbing portfolio for CYBERDREAMS, and together, they remade the world into a very menacing place. As Mike Dawson, you attempt to pierce the veil between light and shadow and uncover the threat of alien invasion. Poor Mike—you're victim number one. A moody soundtrack and simply gorgeous backgrounds unite in DARK SEED for a combination that's tough to beat and difficult to put away.

Wolfenstein 3-D

Didn't this one appear first on the 8-bit machines of the last decade? Maybe so, but the leap from simple sprites to dizzying, high-speed 3-D texture mapping more than updates this 1980s classic for the impending turn of the century. Trapped behind enemy lines, you possess the secrets the Allies so desperately need to win the war. Your duty? Escape! More than a bit on the violent side, Wolfenstein 3-D surprises not only with its bloody combat but with the idea that a game this good can be shareware. Apogee Software outdoes itself again.

Aces of the Pacific

Do the names Zuikaku, Hiryu, and Akagi mean anything to you? If not, you haven't flown for World War II Japan in Aces of the Pacific, Dynamix's realistic flight simulator. Anyone interested in alternative history can watch it unfold from the cockpit of a Zero; the more patriotic will fly American planes. Either way, you're out to earn commendations and come home in one piece. With plenty of history behind it, a nostalgic manual, and exhilarating bombing runs, Aces earns its wings among the very best flight simulators.

Star Trek: 25th Anniversary

Capturing the essence of the original series, down to the almost brotherly antagonism between Mr. Spock and Dr. McCoy, Interplay's Star Trek: 25th Anniversary finally gives us the chance to take the helm of an Enterprise we can believe in. Jim's still overly dramatic; both the Klingons and the Romulans demand satisfaction; Harry Mudd's making trouble. Each episode presents the away team with stringent puzzles and a dose of humor that will only leave Trekkers ready for more.

Out of This World

Ripped from this planet by an atomic accelerator gone bad, you find yourself in a cool blue world. Polygon-based graphics lend surprising realism to this cinematic masterpiece, and as you fight your way through what seems a very believable continuum, you'll wonder what all the fuss over the disappearing lone-wolf designer was about. Based in France, programmer, artist, and designer Eric Chahi went against the grain to present us with a one-man show rivaling the megabudget wonders of California. Of course, Interplay *did* produce and distribute it.

Oh No, More Lemmings

Perhaps better described as a game extension rather than a new game, Oh No, More Lemmings seemed much like its predecessor, so the new levels caught us flatfooted. The sadists at Psygnosis thought up fresh, devious ways to grind, mince, and otherwise eradicate our favorite pack of rodents, with levels ranging in difficulty from tame to wicked. Each new microadventure requires more both from players and from our cute little brolly-toting, bridge-building friends—and saving vermin from certain death never before held such charm.

Hardball III

Even if you don't like baseball, you'll probably enjoy Hardball III. The closest thing to actually sliding for home plate, complete with the digitized announcing of noted commentator Al Michaels, Accolade's newest ringer can make you feel like it's the top of the ninth with bases loaded every time. From batting practice to league championships, this game has everything a sports fan could want except the peanuts and Cracker Jack.

SimAnt

Least serious of all the software toys from Maxis—and therefore probably the most fun—this simulation nonetheless shows us the darker side of life in the backyard. Alternately queen, worker, and soldier, you lead your arthropodal colony to victory or extinction. Unlike in SimCity, you actually try to run the

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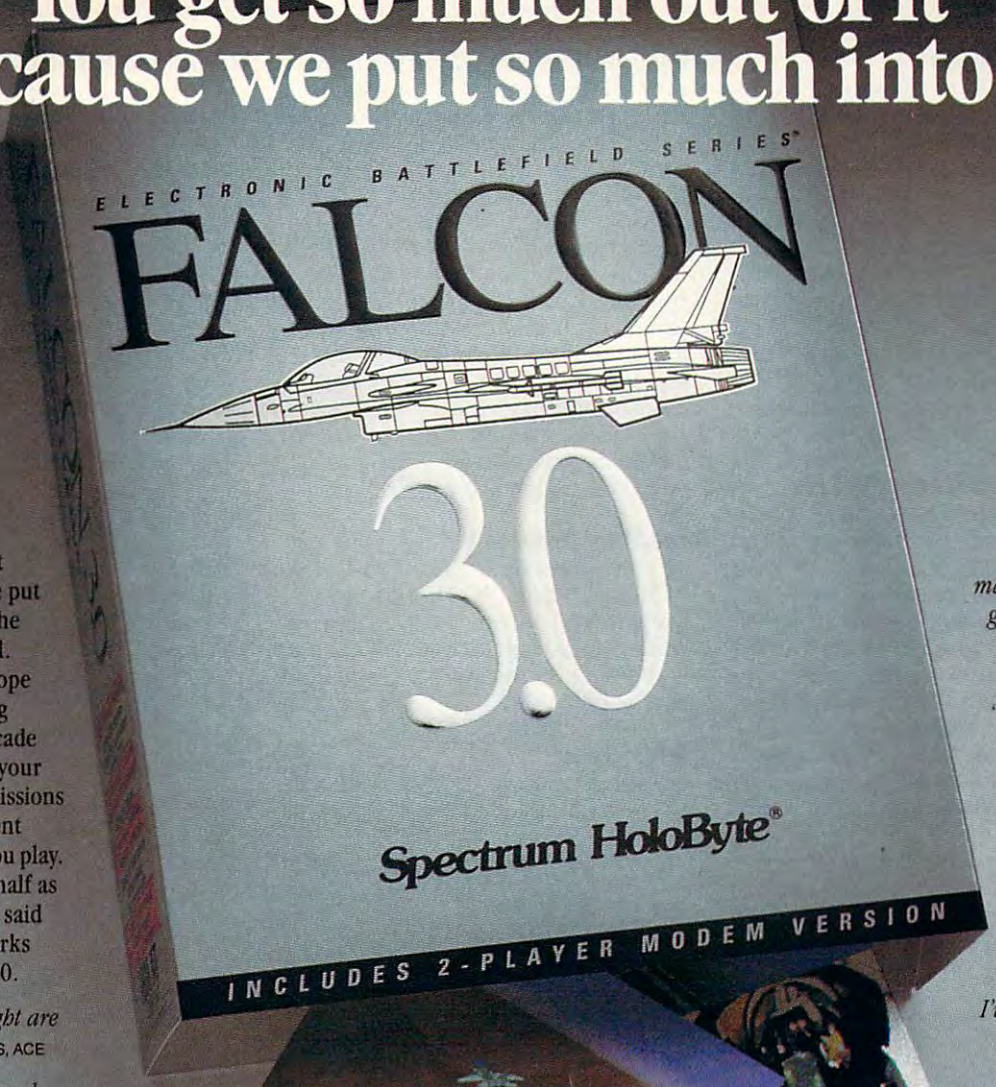
You get so much out of it because we put so much into it.



We could tell you about the superb graphics we put into Falcon 3.0™. And the incredibly real F-16 feel. And the sensational scope that delivers everything from Instant Action arcade excitement to plotting your own Red Flag training missions to engaging in a different campaign every time you play. But we couldn't say it half as well as the critics have said it. Look at the high marks they've given Falcon 3.0.

"The visuals during flight are awesome." JIM DOUGLAS, ACE

"If you aren't in the armed services–and maybe even if you are–this is as close as you can come to flying the Falcon."
PETER OLAFSON, COMPUTE

"The graphics are stunning, the sound is incredible and the game play is a rush."
DAVID ETHEL, VIDEO GAMES & COMPUTER ENTERTAINMENT

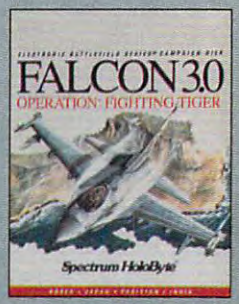
"It's not so much a game system as it is a way of life."
EVAN BROOKS, COMPUTER GAMING WORLD

"Realistic, contoured terrain. Your view from the cockpit is the best in the flight simulator world. And Falcon's user interface is slick and easy to use." PC GAMES EDITORS

"Be excited. Falcon 3.0 makes other efforts in this genre seem like test runs for the real thing."
STRATEGY PLUS EDITORS

"The most complete and accurate jet fighter simulation to be found this side of a security clearance. Period."
RICHARD SHEFFIELD, COMPUTE

"The most appealing aspect is the realism. This is as true to life as I've seen on a computer."
COMPUTER GAME REVIEW EDITORS



Now Falcon 3.0 takes you places you've never flown before.
Operation: Fighting Tiger™ takes you on action-packed missions in three new Asian campaigns. Fly your F-16 to Korea, to the Pakistan/India border, to Japan and the disputed Kurile Islands, where you can also fly the advanced FSX, Japan's newly modified F-16. Operation: Fighting Tiger requires Falcon 3.0

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Circle Reader Service Number 108

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humans out of their house rather than make their lives more comfortable.

Crisis in the Kremlin

Who knew Gorbachev would need to hit the classifieds even before Gorbachev himself? Spectrum HoloByte and the programmers of Crisis in the Kremlin, that's who. Another one for the deep thinkers in the crowd, this simulation lets you play hard-liner, reformist, or nationalist, each with the best intentions for what was once the U.S.S.R. Who knows what will happen next? Take matters in your own hands, monitor the digitized newscasts, and hope you can feed your people this winter.

The Lost Files of Sherlock Holmes

A grisly London murder might mean a new modus operandi for Jack the Ripper, or it may bear the mark of an altogether new killer. Either way, Sherlock Holmes must eliminate a long list of the impossible to solve the case in this Electronic Arts interactive mystery. More than mere extraneous characters, Dr. Watson and the Baker Street Irregulars help bring a treasured literary figure to life, even if they can't resuscitate the hapless victims.

Gateway

Humanity never found evidence of life in our solar system—other than native earth flora and fauna, that is. Then it stumbled upon the abandoned Heechee Gateway, a platform to the stars. Someone else is out there, and there must certainly be something out there worth taking. Sign on for a potentially fatal mission, and you might return a wealthy explorer. Or maybe you'd rather remain planet-bound after all. Legend Entertainment's hybrid of parser and point-and-click interface turns out to be an asset to gameplay, and the hi-res color graphics seem fitting accompaniment to this adaptation of Frederick Pohl's popular science fiction work. Distributed by Accolade.

Eye of the Beholder II

An adventure inspired by D & D, Eye of the Beholder II: The Legend of Darkmoon didn't show much innovation plotwise, but SSI couldn't hope to improve on the interface. Distributed by Electronic Arts.

Tetris Classic

Spectrum HoloByte lifted the bandages to reveal a spiffier Tetris. Either this attractive update or its beautiful cousin Super Tetris would make a fine gift.

The Adventures of Willy Beamish

To feel like a kid again, try Dynamix's The Adventures of Willy Beamish and thwart the despicable Leona Humpford's wicked plans.

Shuttle

Ever wonder what spaceflight in the 1980s was like? Strap yourself into Virgin Games' shuttle simulator, and discover all the joy and all the difficulty of leaving the earth behind.

Rules of Engagement

If you hanker for galactic conquest, there's no better space-combat simulator than Rules of Engagement from Mindcraft. Distributed by Electronic Arts.

Castles II

Perhaps you'd prefer to use catapults instead of energy weapons. The newest release of Interplay's Castles II lets you do just that, as well as build your own fortress of stone. Now politically correct, Castles even offers you the chance to play queen rather than king.

Ultima Underworld

Go back to the dungeons with Origin's Ultima Underworld, superior visually to all other spelunking hackfests; texture mapping seems to be the hottest thing these days.

Global Effect

Global Effect makes clear how difficult world management can be if the other guy won't cooperate. This simulation from Electronic Arts makes you think twice about the future.

Links Pro 386

Anyone with a 386 or better can hit the greens with Links Pro 386 from Access. When it comes to golf, nobody does it better.

Ultima VII

For days of adventure, the belated but worth-the-wait Ultima VII brings back the Avatar for another tour of Britannia. Origin scores another hit.

Civilization

Nurture cultures or burn them; either way, mankind marches to your beat in Civilization from MicroProse.

Everything You Want

No matter where you look, you'll find excellent games for every taste. The lucky person who gets a great game gift will be ready to take on the new year with ambitions unleashed, skills whetted, and imagination stoked. ❑

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84116-2837
(800) 800-4880

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Hardball III—$59.95
Accolade
c/o Starpak
237 22nd St.
Greeley, CO 80631
(800) 245-7744

Wolfenstein 3-D—$50.00
Apogee
P.O. Box 476389
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(800) 426-3123

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CYBERDREAMS
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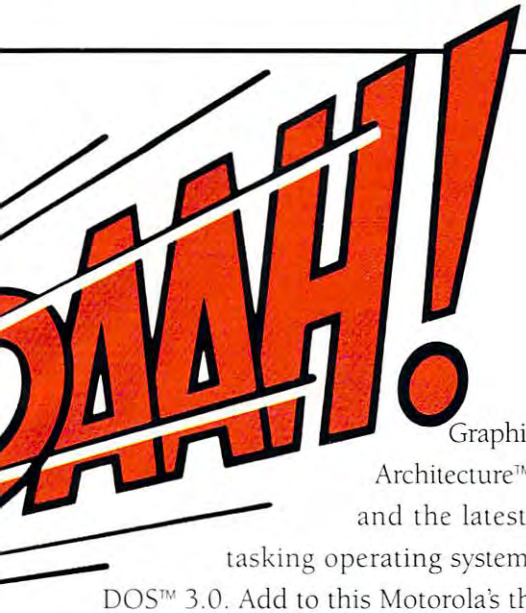

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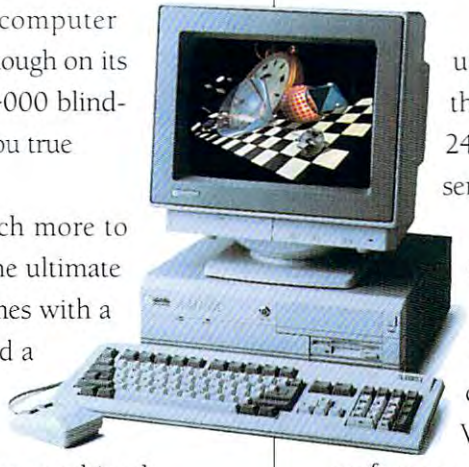

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64/128 VIEW

The 64 has always been kind of a barnstorming computer—just plug it in and fly by the seat of your pants.

Tom Netsel

A few months ago in this column, I was lamenting the fact that the number of new releases for the 64 had slowed to a pitiful trickle. Gone are the days when dozens of new titles from major developers vied for space on our review shelf.

In that column I suggested that smaller companies might take advantage of this calm to submit copies of their programs for review. Now that the big houses have moved into the IBM camp, smaller operations with one or two 64 products have a better chance for coverage in Gazette.

I have contacted a number of programmers and small publishers, and several of them have taken me up on my offer. I'm happy to announce that we now have a number of products on their way to our independent reviewers for evaluation. So keep your eye on our review pages next year. We haven't run out of good programs after all.

One small company to respond was Creative Pixels Limited of Library, Pennsylvania. It's a small firm headed by Jim Hilty, who sent a review copy of a new game called The Adventures of Eric Hawthorne, P.I. Hilty has done work in the past for *Ahoy!*, *Commodore* magazine, and *Loadstar*, so he knows his way around a 64. In fact, he's been around long enough to have some insight into the way 64 software has evolved.

"It seems the software development for the 64 has gone full circle," he writes, "from the small independent developer to the big corporate image and now back to individuals. Maybe this is good. The 64 has always been kind of a barnstorming computer anyway—just plug it in and fly by the seat of your pants. It's a fun computer, a truly personal computer, a computer that an individual can enjoy programming, a welcome friend."

Hilty makes some good points. In a way, I suppose the 64 is something like a barnstormer's airplane of yesteryear. It's not too fast, not too fancy—but it's a solid little machine that can still coax an "Ooh!" or an "Ah!" out of onlookers. You can throw a couple of switches, hit a few keys, and dazzle your friends with what it can do. Oh, you may move on to something snazzier, fancier, and faster, but you'll always have fond memories of your first machine.

Creative Pixels is not the only company that still supports the 64. To help our readers track down Commodore products and service, Lisa Hayes, a 64 fan in Chicago, has compiled a buyer's guide of more than 100 such companies. This listing, which has been augmented by the Gazette staff, should prove to be a valuable resource for finding software, hardware, and service for your 64 or 128. You'll find the list on page G-3.

Naturally, in a listing such as this, we're bound to omit some valid companies. I'll apologize in advance if your favorite firm is missing. So if you know of some companies that we've missed or if your firm handles 64 products, contact me. We'll prepare an updated supplement in a future issue. ❐

GAZETTE

64/128 VIEW G-1
Software development for the 64 comes full circle.
By Tom Netsel.

A BUYER'S GUIDE TO COMMODORE SOFTWARE, HARDWARE, AND SERVICES G-3
Here's a convenient list of mail-order companies that handle Commodore hardware and software.
Edited by Lisa Hayes.

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Videofox and Invoice Writer II.

WORLD VIEW G-16
The Commodore scene in Hungary.
By Geza Lucz.

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Examine ways users can enter data into your programs.
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Watch a character design itself—if you have the time.
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Since finding items for a Commodore 64 or 128 is not as easy as it once was, we've compiled this listing of manufacturers and of dealers, distributors, and service companies that handle the Commodore line. While this list is by no means definitive, it should make your shopping easier and help you locate some hard-to-find products.

Edited by Lisa Hayes

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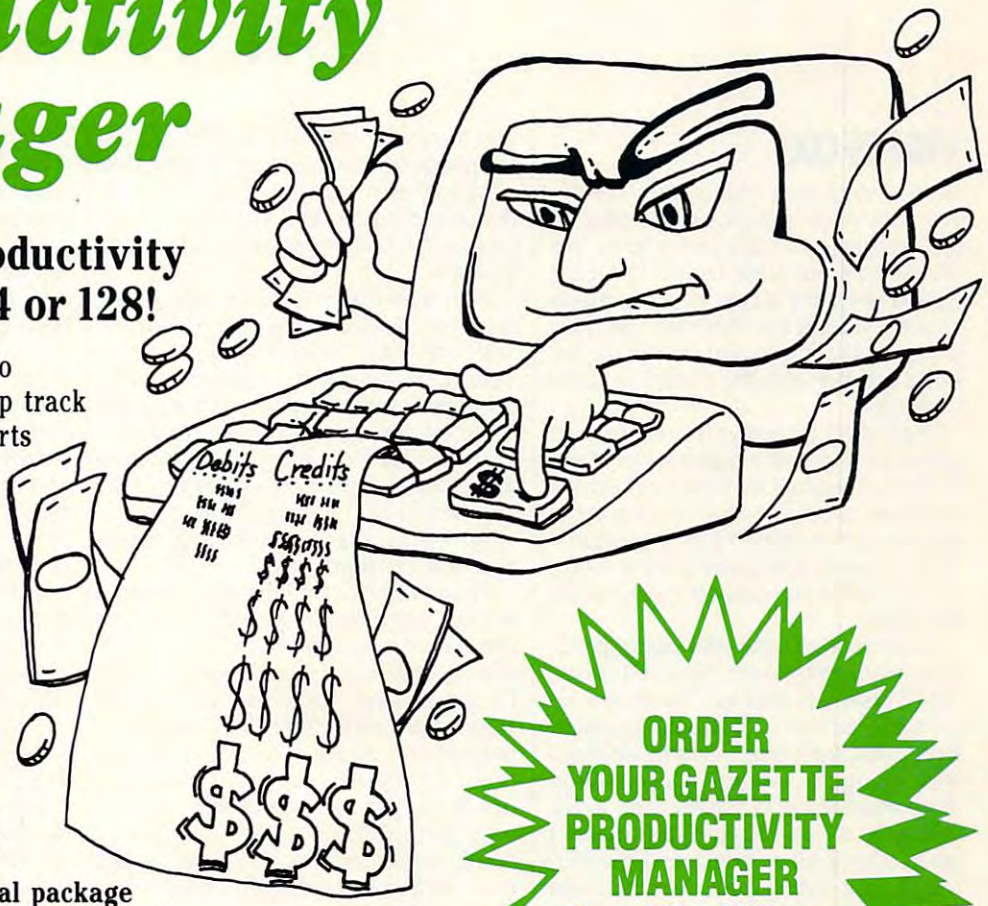

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VIDEOFOX

We're living in a video age. Nearly everyone owns a VCR, and judging by the response to television shows like "America's Funniest Home Videos," quite a few people own video cameras as well. Moving into this new electronic way of looking at and recording the world around us is the personal home computer.

High-tech products such as genlocks and frame grabbers let users capture individual frames from a video source or digitize live video segments for use with multimedia presentations. This creative processing of a video source with a computer is called desktop video.

Of course, all this fancy desktop video stuff is out of reach for us 64 users, right? Well, yes and no. There are no genlocks or frame grabbers available for the 64, that's true. All of those high-tech gadgets require a great deal more memory and speed than you'll find on a 64 or 128, but that doesn't mean your 8-bit wonder can't contribute to your video work. You can use the graphics capabilities of your 64 or 128 to create screens that can be copied onto videotape. The hookup is fairly simple, and the results can be every bit as impressive as graphics created on more sophisticated computers.

There are a number of fine programs that provide tools and effects to make your Commodore graphics fade and wipe with the best of them. Each of these packages is designed to take graphic images from your Commodore and run them in sequence while recording the output onto your videotape. Of course, you could create simple animated titles by filming your monitor as you type with a word processor or as your graphics program displays a screen or two. These software packages automate the process and add some nice screen effects, too.

Videofox, imported from Germany and distributed by RIO Computers, is a newcomer to the field of Commodore video software. Videofox is part of the Fox line of Commodore products, which includes the Pagefox cartridge. As a result, Videofox is designed to operate like other products in that line, using a similar point-and-click interface and fonts and clip art files that are interchangeable between programs. The package also includes a full-featured drawing program that lets you design your own bitmap images to import into Videofox.

With Videofox you can create a series of screens that are called boards. The program then displays these boards in sequential order, switching from one to the next using various transition methods. You can adjust variables such as how long each of the boards is displayed and how fast they scroll. The timing of the sequences can be fine-tuned to fit the space you have available on your video.

When satisfied with the effect on the screen, you can connect your computer's output to your VCR and record the results. In this way you can create titles for a videotape. You could also create introductory screens or short animation sequences. Since you can set a sequence to repeat, you could use a series of images as an animated display for a shop window or at a user group computer show. You can have it play from videotape or straight from the computer itself.

Videofox includes a variety of transition options, including some that use the border in unexpected ways. The effects are smooth, professional, and often surprising. You can place text anywhere on the screen and import bitmap images to dress up a display. Any video-titling program offers a selection of fades and wipes between graphic screens, but Videofox does it better, and it gives you more. Transitions are quick and clean—quick enough for some honest-to-goodness page-flipping animation.

Videofox does have a few problems, however. The icons on the screen are somewhat confusing, and they give no indication, either by highlighting or flashing, when they are selected. It's too easy to forget which of the tools is selected, especially when you're not always sure what they're supposed to do. On top of that, some icons are letters of the alphabet. That would be fine if they didn't stand for German words. I had to look them up.

As soon as I did, I encountered another problem. The documentation, haphazardly arranged, is vague and confusing. It also references illustrations and diagrams that apparently are missing from the English version. This situation is made all the worse because the translator obviously knew a lot more about German than about English. The resulting prose ranges from baffling to hilarious.

I have finally figured out what most of the icons do, although I still can't get used to pressing J for *Yes* at prompts. Fortunately, there is a list of keyboard commands that helps. I can't help but wish for a nice tutorial—in real English—that would nurse me through things like importing and placing a bitmap or turning on text mode.

The process of transferring your sequence to videotape is explained as murkily as everything else. This is unfortunate, since that's the whole point of the program. RIO Computers is working on an upgrade to the manual; I hope my registration card entitles me to a new copy.

Despite the documentation's shortcomings, I do like the program. There are plenty of great features here, although they're a bit hard to find at times. I like the continually updated readout of cursor position and the various text effects available. I appreciate the ability to set tab positions on the screen so I can place images in exactly the same spot on each board for smooth, fast animation. Videofox doesn't have the scripting capabilities that Screen F/X has, but its effects are unmatched. Seeing my titles hop, skip, and jump across the screen makes wandering through the foggy documentation worthwhile.

Videofox is amazingly fast. Boards can be displayed so quickly because they're not full-screen bitmaps. Instead, the editor limits you to a certain percentage of the screen, up to 255 cells (8 × 8 pixels each). You can highlight the cells that you've used as you place text and graphics, adjusting when necessary to keep your designs from taking more than the allowable area. This process restricts your creativity to some extent, but the resulting speed makes it worth the effort.

There are a lot of great programs coming from Europe these days. The Fox series is a good example, and Videofox is a decent addition to that col-

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lection. Companies like RIO Computers should be commended and supported for importing and distributing these products for the United States market. The problem with translating the documentation is a major stumbling block, however, one which must be overcome before packages like Videofox will appeal to everyone.

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particulars, the part numbers or short descriptions of the items being purchased, the cost per item, and whether the item is taxable or not. The program will create an invoice for those items, placing a header on top with your company name, address, and whatever else you'd like. An invoice can handle up to ten items, listing them and totaling the final price.

If you need multiple invoices for a purchase of over ten items, the program can add and display their totals. At the bottom of each invoice is a line detailing the transaction. It's all very simple and straightforward (remember that know-nothing part-timer?).

Invoice Writer II also lets you enter negative quantities to include returns or refunds. If the product is multiple-priced, say four for a dollar, and the customer is only buying three, you can enter the price of the full quantity and the quantity purchased as three out of four in the form *3/4*, and the program will do the math.

While creating invoices is the heart of the program, Invoice Writer II doesn't stop there. Recordkeeping is another important part of running a business. As products are sold and invoices generated, the computer keeps a running total of sales. If a second disk drive is available, the program writes this information to a storage disk. Your sales figures are continually updated and recorded. This part of the program, called the Filing System, lets you access old sales records and invoices on any disk by entering a date or range of dates to be printed out. Multiple invoices are coded with a trailing digit so you can be sure of identifying them later.

Should the electrical power fail or that part-timer inadvertently introduce errors into your data, you can edit the saved invoices and figures as needed. As you use Invoice Writer II, you are assured of accurate records stored safely on a disk for review a week, a month, or even years later.

All this makes Invoice Writer II a winner, but the marks of a truly great program are the extra touches it offers. One feature that doesn't have to be there but which makes life easier is Invoice Writer II's ability to operate without a disk drive, once the program has been loaded. This not only frees up limited equipment but also makes the system run quicker. You don't lose your recording capabilities, though; the program simply updates everything later when your drive is available. That's a great touch.

Another example is the invoice-storing system, by which you can stash away up to three unfinished transac-

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tions while you work on another. Yet another example is the capability of storing two different printer setups, one for invoices and another for records. This means that you don't need to have the same printer at home or in the back office that you use at the sales counter. It's features like these that make Invoice Writer II a real gem.

Let's get back to that know-nothing part-timer I've been grumbling about. A program that any computerphobic clerk can use must be user-friendly. It's not enough that the program lets you fix errors after they happen; the program must be so simple that anyone can use it. After all, as one offshoot of Murphy's Law so eloquently puts it, "It's impossible to make anything foolproof because fools are so ingenious!" Invoice Writer II is ready for any fool you might have running it.

Aside from the required typing, the program is operated almost exclusively by pressing the unshifted function keys. This speeds up the transaction process. A menu of functions is always displayed on the screen. The manual is well written and concise, giving you not only the basics of operation but also a chapter of tips and tricks to help you get the most out of your 64 as a retail tool.

There is one drawback to the program, however. Each purchased item must be entered from the keyboard—there's no database of products for the invoicing system to access. If entering a part number would automatically generate the description, price, and tax status, that would have been great. Oh, well, I suppose you can't have everything for ten bucks.

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WORLD VIEW

Geza Lucz

VIEW FROM HUNGARY

Even if you don't know exactly where Hungary is, you've probably heard about paprika and Hungarian goulash. Hungary is about the size of Indiana, with a population of about 10 million people. About 20 percent of the population live in Budapest, the capital.

Being in the Carpathian Basin, a natural crossroads for Eastern and Western Europe, Hungary has always felt a strong pull toward Western Europe, even though it can feel Eastern at times. Around 1988, Hungary reacted to this pull, shifting from a socialist to a capitalist economy.

During the transition to a free-market economy, computers in Hungary have become widely available and much more affordable.

During the transition to a free-market economy, computers have become widely available and much more affordable, in spite of a still-low income level. A Commodore 64, for instance, now costs about 14,000 forints ($180), and the price of a 1541 drive is about the same. For a little more than twice an average monthly salary (39,000 forints or $500), you can purchase an Amiga 500 or an IBM-compatible computer.

Until the late 1980s, computers entering Hungary came primarily through private sales. There were shops in Austria, right across the border, that specialized in Hungarian customers. The big computer boom occurred about seven years ago when the first Hungarian company started selling Commodores, albeit at irrationally high prices.

Thanks to a special government program, elementary and high schools are now online, equipped mostly with Commodores. These computers have proven to be perfect for teaching children how to apply computers to useful purposes. In colleges and universities, IBMs are the standard. There are many in-school networks (Novell), but a linkup between schools is still missing.

Commodore software is usually not available in stores. In spite of this, there are several options by which to update your game pool. There are magazines describing the latest games and utilities. All you have to do is pick out the programs you're interested in and order them. Prices usually range between 200 forints and 400 forints ($3–$6).

You can also go to club meetings and swap programs. The best-known club is Commodore Egyesulet (Commodore Association). It has had its own monthly magazine since 1985. In it, you can find programming tips and software and hardware reviews. This club also collects short programs that are created by members. These help other members learn programming.

There are also workshops where you can have your old computer supercharged. For about 4000 forints ($50), you can have a little electric circuit board added that can increase the speed of your 1541 at least fivefold. You can also get software and hardware that speed up datasettes. Now you can buy four floppy disks for about the price of a good-quality audiotape, and they can store close to the same amount of data, as well.

Available hardware elements range from music digitizers and light pens to the Commodore mouse. In case you're not satisfied with your power supply, you can also buy certain kinds of kits. From these kits and with expertise, you can assemble any equipment in a couple of hours. Finally, for about the price of an IBM AT, you can purchase a bridge card that makes your Amiga 500 compatible with the IBM XT.

Servicing a computer in Hungary may be a difficult task if you don't live close to a major city, but there are many workshops all over the country. Still, sometimes when an expensive integrated circuit breaks down and needs to be exchanged, it's possible that the repair will cost more than a brand-new 64. When you're buying a new computer, some stores may give credit for an old operational or nonoperational computer. In this way they solve their component supply shortage, and you get a certain amount of money for a computer that you probably couldn't have sold otherwise.

Hungarians seem to love their Commodores, as their numbers still increase. It's also true, however, that 64s and 128s have been slowly losing ground to Amigas.

The 64 and 128 have always had the most diverse program pool, with the most games, at the lowest prices. Because of this, they've been the most popular game machines. Since the 64's introduction, children have always wanted it. Now these same children are in college or high school, and many are upgrading and entering the world of IBM.

Another challenge seems to be on the Commodore horizon. The new 10- to 15-year-old generation seems to be buying more Amigas. Flashy graphics, perfect music, and realtime motion seem to be the key words of the nineties. These features, combined with a huge quantity of good-quality programs, make the Amiga 500 a dream machine for Hungarian teenagers.

Basically, the situation in Hungary is a healthy one for Commodore and the business that goes with it. Being a small country with big computer needs, Hungary will probably be staying online with Commodore for years. ❐

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BEGINNER BASIC

Larry Cotton

GATHERING INFORMATION

Let's look at ways users can enter information into your program.

Suppose you're writing a BASIC program that requires the user to enter something. There are three BASIC commands that accept information from a program's user: GET, WAIT, and INPUT. So which one or ones should you use? Let's look at all three.

GET is probably the easiest and most flexible command to program. Its main disadvantages are that it lacks a blinking cursor and requires extra programming to accept more than one character. Here's GET at its simplest.

```
100 GETA$: IFA$="" "THEN100
```

GET (unlike INPUT) doesn't wait for something to be typed unless immediately followed by an IF-THEN statement similar to the above. A$ is an empty (null) string variable until the user presses a key. In this simple execution, A$ will be only one character: a letter, number, or even punctuation mark.

Enter the above line and run it. The computer seems to be frozen in its tracks. Actually it's in a loop within line 100, waiting for the user to press a key. If A$ is empty (the user hasn't hit a key yet), the IF-THEN repeatedly sends control back to the beginning of the line at the rate of at least 100 attempts per second. (To find out how many times GET loops, add a counter in front of the GET. C=C+1 will do it. Run the program; then divide C by the number of seconds the program runs. This slows GET down, so the actual number of GETs is higher.)

GET commands are often followed by more IF-THEN statements which evaluate the entered characters. Here's one way to use GET to form longer strings.

```
100 GETA$: IFA$="" "THEN100
110 IFA$="*"THEN140
120 B$=B$+A$
130 GOTO100
140 PRINTB$
```

Run the program; then hit a few keys. When finished, press the asterisk key. Whatever you typed—almost anything except the asterisk, including spaces and carriage returns—should be printed on the screen.

To rule out everything but one character, say, *T*, do something like this.

```
100 GETA$: IFA$ <> "T"THEN100
```

The symbols <> mean "is not equal to." Multiple IF-THENs often follow GET.

```
90 PRINT "DO YOU WANT TO
   CONTINUE (Y=YES N=NO)?"
100 GETA$: IFA$ <> "Y"THEN
    IFA$ <> "N"THEN100
```

The above routine waits for the user to type either *Y* for yes or *N* for no. It won't move on with any other response. After you present a menu of several numbered choices, you can use GET like this.

```
100 GETA$: IFA$ <> "1"ANDA$<>
    "2"ANDA$<> "3"THEN100
110 IFA$="1"THEN . . .
120 IFA$="2"THEN . . .
130 . . .
```

Notice that IF-THEN isn't needed in line 130. If *3* is typed, control falls through to that line, and another check isn't necessary. As used above, AND takes the place of THEN IF in the preceding example.

An alternative to the above approach is to take the value of A$ (using VAL) and use ON-GOTO.

```
100 GETA$: IFA$<> "1"ANDA$<>
    "2"ANDA$<> "3"THEN100
110 ONVAL(A$)GOTO120,130,140
120 PRINT"YOU PRESSED 1!":
    END
130 PRINT"YOU PRESSED 2!":
    END
140 PRINT"YOU PRESSED 3!"
```

In this particular case, one can use A$ itself to shorten the program.

```
100 GETA$: IFA$<>"1"AND
    A$<>"2"AND
    A$<>"3"THEN100
110 PRINT"YOU PRESSED "A$"!"
```

Suppose you just wanted the user to enter numbers. What's wrong with using a numeric variable like this?

```
100 GETA: IFA=0THEN100
110 PRINTA
```

Nothing—or is it? Enter these lines; then try pressing any number key. No problem! But try typing a letter. Zing! You're rewarded with a error! To minimize problems with numerals, always use GET for a string variable; then use VAL to change the input to a number. If you need numbers larger than a single digit, concatenate the string, as you did in the second example above, and then use VAL.

To finish up, here's a neat trick to eliminate everything but numbers or letters. First, here's the one for numbers.

```
100 GETA$: IFA$<"0" OR
    A$>"9"THEN100
110 PRINTVAL(A$)
```

Yes, greater-than and less-than symbols can be used with A$. They evaluate the ASCII value of the character. Now, let's work with letters.

```
100 GETA$: IFA$<"A" OR
    A$>"Z"THEN100
110 PRINTA$
```

Next month, we'll take a look at the INPUT command. ❐

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MACHINE LANGUAGE

Jim Butterfield

ANIMATED CHARACTERS

Animation is always fun, and you can achieve it in a number of ways on your Commodore. You can create image movement by using sprites, turning pixels on and off on a high-resolution screen, or even using graphics characters to write new information to the screen. There's one more method that we'll investigate this month—animating the characters themselves.

That's what we'll do with Charzoom, a program for the 64 or the 128 in 64 mode. Charzoom has a conventional character screen, but it uses a custom character set rather than the standard ROM character base. To do our simple animation, we'll leave the screen data unchanged; instead, we'll modify the appearance of the letter *O* in the character set.

To define custom characters, we must place the whole character set somewhere in memory. I've chosen addresses 49152–51199 ($C000–$C7FF) for the character descriptions. We'll copy these characters from ROM, so you won't notice any difference until we animate one of them, the letter *O*.

All video—screen memory, characters, and sprites—must come from the same quadrant of memory in the 64. For screen memory, I selected 51200–52223 ($C800–$CBFF). You'll see the POKEs to set all this up in the BASIC program; when the program ends, it puts everything back.

The program copies the character set found in ROM at $D000 to our chosen spot in RAM at $C000. Since we must copy 2048 bytes, that's a natural job for machine language. And ML also makes it easy to do another trick—make the character ROM visible.

Here's the problem that we face: Addresses $D000–$D800, where the character ROM resides, are normally the ones used by the I/O chips, CIAs, VIC-2, and SID. To see the characters, we must make the I/O chips disappear. That's fairly easy. We do it by turning off bit 2 of address 1.

But there's another catch. If the I/O chips disappear, even for a moment, we must not allow the IRQ interrupt to strike! This interrupt normally occurs every 1/60 second and does such jobs as checking the keyboard and updating the clock. It couldn't do its work if the I/O chips were gone; in fact, it would cause a system crash. So we lock out the interrupt with an SEI (Set Interrupt Disable), kick out the I/O chips, copy the ROM, and then put everything back and release the interrupt. Nothing to it, once you know how.

You'll find the code to do this in memory at addresses $CC00–$CC28. If you're used to the indirect, indexed addressing mode, there should be no surprises there.

Now let's have some fun. In screen PEEK and POKE terms, the letter *O* is represented by value 15. To find the character drawing, we multiply 15 by 8 (there are eight bytes for each character). Adding the result to our character base starting address, we find that the letter *O* is drawn in the bytes at $C078–$C07F. The first byte contains the pixels for the top of the character; the last byte, the pixels for the bottom.

Our objective, then, is to roll the letter *O* so that it appears to be moving upward. Each pixel line will replace the pixel line above it, except for the top one, which will flip to the bottom. In memory terms, that means each byte of the character description moves down one position, with the bottom one moving to the top.

Machine language is too fast, however. Pixel moves need to be slowed to a rate of, say, ten per second. We achieve this slowdown by counting video raster scans and acting on every sixth scan. This reduction produces a very smooth scrolling effect on the screen.

If you wish to use your disassembler to view the code, you'll find it at $CC29–$CC59. The outermost loop repeats until it detects that a key has been pressed. The middle loop does eight pixel rolls on the *O* character. Two innermost loops are used, with one waiting six raster scans and the second moving the pixels.

There's an extra bonus in using the raster position as a timing control. It ensures that the character won't be modified at the same instant that it's being displayed. That way, we avoid screen jitter or tearing.

Animate on a small scale by moving pixels within a single character.

CHARZOOM

```
KX 100 DATA 169,208,162,192,16
       0,0,132,34,132,36,133,3
       5,134,37,120
CD 110 DATA 169,51,133,1,177,3
       4,145,36,200,208,249,23
       0,35,166,37,232
SQ 120 DATA 224,200,208,233,16
       9,55,133,1,88,96
QH 130 DATA 162,0,160,6,173,17
       ,208,205,0,205,141,0,20
       5,176,245,136
PX 140 DATA 208,242,173,120,19
       2,72,185,121,192,153,12
       0,192,200,192,8
HK 150 DATA 208,245,104,141,12
       7,192,232,224,8,208,216
DK 160 DATA 32,228,255,168,240
       ,208,96
MF 200 FOR J=52224 TO 52313
EJ 210 READ X:T=T+X
BP 220 POKE J,X
AE 230 NEXT J
DC 240 IF T<>12735 THEN STOP
XC 300 SYS 52224
QH 310 POKE 56576,4
RX 320 POKE 53272,32
EX 330 POKE 648,200
GH 400 PRINT CHR$(147)
AJ 410 PRINT "COMPUTE MAGAZINE
       "
FK 420 PRINT "{5 SPACES}FOR"
QK 430 PRINT "COMMODORE MAGIC!
       "
MD 440 PRINT
FP 450 PRINT "PRESS ANY KEY TO
         STOP!"
SA 460 SYS 52265
FF 500 POKE 56576,7
CG 510 POKE 53272,20
MP 520 POKE 648,4
```


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FEEDBACK

Questions and answers about justified printing, and an enhancement to File Logger

Not Justified

I recently ordered the SpeedScript disk, and I am having trouble with the right-justification function.

I type a letter and print it to disk with Shift+Ctrl+P, as stated in the directions. I run SS Justified and enter the filename of my letter. Having assigned a left margin of 10 and a right margin of 70 on the original letter with l=10 and r=70, I enter 10,70 at the margin prompt as directed and press Return. All I get on my printout is one column of text running down the page. What's wrong?

LYLE PRUETT
HOLTON, KS

Your problem is with your margin settings. It's fortunate that you included a sample of how you set them instead of simply stating that you set the margins to 10 and 70.

The l *and* r *are in reverse type since they were entered after you pressed Ctrl+3 or Ctrl+£. You're making a mistake by including equal signs when setting SpeedScript margins. Do not use the equal signs when setting margins. What you have done by using an equal sign is to make the L key equal CHR$(10) and the R key equal CHR$(70). You haven't changed the margins at all, and your SpeedScript default margins of 5 and 75 remain in effect. So when you tell SS Justified that your margins are 10 and 70, you get the garbled output.*

SpeedScript Justified does require you to set the 1 key to CHR$(1) and the 2 key to CHR$(2). To do that, you do need the equal sign. To set the margins, however, omit the equal sign. At the top of a SpeedScript file that you plan to print justified with a left margin of 10 and a right margin of 70, you should have something like the following.

1=1
2=2
l10r70

Then be sure to put the 1 *where you want your justification to begin and* 2 *where you want it to end.*

File Logger Revisited

I've just finished loading and testing Roger Bachelder's File Logger program (June 1992) and have come up with an enhancement that will allow the program to handle locked files, those that are protected from being scratched. They normally appear as XXX files, and the starting addresses are omitted. Try entering the following line.

```
425 IF ASC(K$)>191 THEN
    K=ASC(K$+CHR$(0))-
    192: GOTO 440
```

This line may cause the program to crash, however, if it encounters a splat file.

Scratched files also appear as XXX files in the original version. If you don't want deleted files to appear in the listing, enter the following line.

```
375 IF K$="" THEN 520
```

DAVID KLICH
MT. PROSPECT, IL

Saving Data

How can I save data or variables to disk? BASIC's SAVE command doesn't work.

J. S. SAMPLE
FT. PIERCE, FL

It might seem that the logical thing to do when saving variables to disk is to use a command like SAVE "A$",8, but that would only save whatever program was in memory under the filename A$. Unfortunately, variable storage is a bit more complicated than that, but it's very useful when you know how to do it. For example, if you're building a custom database, it often makes sense to have a program for handling the database and a separate disk file for the actual data or information itself.

BASIC commands for manipulating programs don't work with variables. For example, once a program is in memory, you can put it onto the screen with LIST. But you can't list a variable; you must print it.

The SAVE command sends a program to tape or disk; LOAD recalls a saved program. But SAVE and LOAD, like LIST, don't work with variables. They're commands that apply to programs only. Take a look at this example.

```
10 A$ = "John Smith"
20 SAVE A$,8
```

When this program executes, it saves itself to disk under the filename John Smith! If you load and list John Smith, you'll see the above two lines of code.

To save a variable, you must open a file; print the variable, number, or string to the file with PRINT#; and then close the file. Here are a couple of ways to do it.

```
10 A$="THIS IS A TEST"
20 OPEN1,8,2,"TESTFILE,S,W"
30 PRINT#1,A$
40 PRINT#1,"END OF TEST"
50 CLOSE1
```

The first number after OPEN in line 20 is the logical file number, which can be any number from 0 to 127. This number is used later in the PRINT# and CLOSE statements. It's followed by a comma and the device number (a disk drive is device 8). The third number is the secondary address. For disk files, the secondary address specifies the

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disk channel which will be used and which must be in the range 2–14. The filename is followed by ,S,W which means it is a sequential file and we are writing to it.

When a disk file is opened, the drive light turns on and stays on until the file is closed. Be sure to close a file when you've finished with it.

Line 30 uses PRINT# to print the A$ variable to the disk, and line 40 illustrates another way to print a string. Line 50 closes the file.

To reverse the process, delete line 10. In line 20 change the S,W to S,R because now we want to read the sequential file rather than write to it. Since we now want to take information (A$) from the disk, instead of PRINT#1, A$ in line 30, we use INPUT#1,A$. That loads A$ into memory, and PRINT A$ prints it onscreen. Since we have two strings on disk, we have to repeat this line to read the second one. Here's a simple routine that will do the job. You can make it more sophisticated, depending on your needs.

```
20 OPEN1,8,2,"TESTFILE,S,W"
30 INPUT#1,A$: PRINT A$
40 INPUT#1,A$: PRINT A$
50 CLOSE1
```

Using INPUT# on strings longer than 80 characters will return a STRING TOO LONG *error. In such a case, use GET# instead. It lets you read sequential files a character at a time. Use a FOR-NEXT loop or GOTO statement to read the entire file.*

File Types

Can you explain the different file types I see whenever I list a disk directory?

TOM GAYNOR
HYDE PARK, NY

The 64's Disk Operating System (DOS) provides for five types of disk files: program files, sequential files, user files, relative files, and deleted files. On a directory they usually appear as PRG, SEQ, USR, and REL. DEL is a deleted file, but it does not appear on a normal directory listing.

When you save a program, your computer has to read through program memory and send information through the cable to the disk drive. The drive could put the program anywhere on the disk, but you wouldn't want it to overwrite other programs or files. So DOS has to keep track of where the programs or other files are. It puts the name of the file into the disk directory, marks it as a program, looks at the Block Allocation Map (BAM) to find some free space on the disk, and then saves the program.

A program file (PRG) is just what the name implies. It's information that was saved as a program. In most cases it contains a BASIC or machine language program. It might contain a section of memory that's been transferred to disk using BASIC's SAVE routine. SpeedScript, for example, saves its text to disk as PRG files. To get the program back into the computer, you use the LOAD command. LOAD works only on PRG files.

A sequential file (SEQ) is most often used for storing information such as mailing lists, inventories, etc. Instead of SAVE, you use OPEN, PRINT#, and CLOSE to write to the file. To read it, use OPEN, INPUT# or GET#, and CLOSE. Information in such files is accessed sequentially starting from the first entry in the file. So to get to item number 319 in a sequential file, you must read through the 318 prior entries.

Relative files (REL) are also used to store information. They're trickier to work with, but they can save a lot of time when you're working with many files. Such files are accessed with the OPEN command, but the data records are numbered. So before you read in the data, you have to position a pointer. This lets you home in on the desired record. To reach record number 319, for example, you just set the pointer to 319, and the disk drive goes straight to that record, rather than searching though all of the previous records. Relative files are faster than sequential files for individual records and don't require much of the computer's memory, because the entire file isn't read in.

Problems with saving variables to disk, and an explanation of file types

USR files have a specialized purpose, and you'll rarely see them used outside of GEOS disks. You can open and write to them as if they were sequential files (replacing the S *for sequential with a* U *for user). Since the VALIDATE command scratches random files, some programmers will create dummy USR files to protect data written to disk. There's also a machine language technique for writing PRG files to USR files.*

A deleted file (DEL) is one which no longer exists in the directory and has no blocks reserved for it in BAM. When you scratch a program or file from the disk, it's not actually erased. The directory entry is marked as a deleted file, and the BAM is updated, freeing the space allocated by the program. The file still exists on the disk until you save or write new information to the blocks occupied by that file. By using a disk editor, you can change the byte in the directory which indicates a deleted file to its original value. Now validate the disk with OPEN15,8,15: PRINT#15, "V0": CLOSE15 to update the BAM and restore the deleted file. ❐

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GEOS

Steve Vander Ark

ULTIMATE GEOS (PART 2)

The ultimate GEOS hardware that I selected last month now needs the ultimate in GEOS software.

In last month's column I put together what I consider to be the ultimate GEOS hardware configuration. If you'll recall, it consisted of a flat 128 with the following: a 1571, a CMD FD-4000 high-density 3½-inch drive, a RAMLink loaded with a brain-numbing 16 megs of memory, a CMD 200-meg hard drive, two monitors, and a mouse. I figured I wouldn't need the 64K video RAM that you get with the 128D, since no GEOS program that I knew of made use of it. At the time I made that list, I wasn't sure how I was going to access four drives from GEOS.

Since then, New Horizon Software has released its Landmark Series disk. As a result, I've had to add the extra video RAM since several excellent programs on that disk require it. Landmark Series also presents a possible solution to my four-drive problem with DualTop, a file manager program to replace the deskTop.

Great as this may be, that solution only compounds the difficulties in selecting software for my ultimate GEOS system, which is what I'll do this month. Before I get into that, however, I'll state the obvious and note that we'll be using the 128 GEOS version 2.0.

That part is easy. Now comes the hard part: selecting the file manager software. Why not stick with the deskTop? After all, it's probably the best-known file manager. With the GEOS utilities now available from Creative Micro Designs, the deskTop can handle the various CMD devices that we want to plug into our system. I am sorely tempted to stick with the deskTop, since I'm so familiar with it. But the deskTop can only access CMD devices like RAMLink in 1581-sized chunks, and I'm planning to set up a larger native mode partition rather than chop up that 16 megs. (When I create a bunch of partitions, I always end up placing a lot of duplicate files in each partition, which really wastes space.) On top of that, the deskTop drivers can only access the FD-4000 super drive as 1581 partitions. No, for all its ease of use and cute little icons, the deskTop simply isn't powerful enough to handle the high-tech equipment in our ultimate GEOS system.

So what about DualTop 3.0? It can certainly handle CMD RAM devices, and as I mentioned, it lets you access up to four disk drives. The unique display, showing the directories of two drives simultaneously, is a nice touch, and no file manager software for GEOS can match its speed, especially as it scrolls through a directory.

I realize that icon fans decry the trend away from pictures toward simple lists of filenames, but frankly, you waste a lot of time waiting for the deskTop to draw its little pictures. With DualTop, you can scroll through the alphabetical list of names almost faster than you can read them. DualTop also features a RAM drive priority system. This means that whenever you double-click on a file or document to open it, the system first checks the RAM drives or drives for the application, regardless of where the document is stored, since applications run much faster from the RAM drive.

As to its look and feel, DualTop loses a little ground when we compare it to the deskTop or to Gateway, which we'll talk about in a moment. The screen is a bit busy with the two directories showing (a nice feature, but one I seldom need), and operation isn't as intuitive as it is with the deskTop, even with the file operation buttons constantly displayed. And DualTop, like the deskTop, sees RAM devices as drive-emulating partitions only. Even so, DualTop's four-drive support and its RAM drive priority system make it a very strong contender.

Gateway fully supports CMD RAM devices in either drive-emulating or native mode. Drivers written for Gateway allow it to access the FD-4000 drive the way it's supposed to be accessed, as a 3.2-meg wonder, not as two or more 1581 drives. Until recently, however, I wouldn't have been able to recommend Gateway because of the number of bugs still plaguing it, but the program has been reworked by Jim Collette, and it's now bug-free. Gateway has always been intuitive and a joy to use—except when one of those notorious bugs jumped out at you. Now that it's safe, Gateway might just be the way to go. Unfortunately, Gateway won't support four drives, a very big minus for my ultimate system.

Another contender is geoShell, the DOS-style command line interface for GEOS. GeoShell will access four drives, but again only as 1581 partitions. And when it comes to look and feel, well, what can I say? GeoShell isn't a graphics interface at all, and this *is* GEOS, after all.

Do you start to see the problems I had picking this software? I figured I'd just rattle off a few names and be done with it. So where do I turn? I suppose the only way to go is Gateway, since handling three drives completely is better than incompletely handling four. That leaves us with a few more decisions to make, but I've run out of room this month. I guess this ultimate GEOS series will skip along for yet another issue. ❐

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PROGRAMMER'S PAGE

Randy Thompson

TO FILL A CELL

Consider the character—a simple 8 × 8 cell. It's the basic building block of almost any 64 or 128 screen.

Being somewhat unoccupied, I, while pondering the graphical magnitude of the unassuming character, wrote the following 64 program. Believe it or not, this program generates every possible character that can be created in an 8 × 8 cell, and it does so without any human assistance.

Warning! The sun may burn out before this program comes to an end.

The inner workings of this program are really quite simple. Considering that a character is defined by the values stored in eight consecutive bytes, a character definition can be treated as one large 64-bit (eight-byte) number. So to generate every possible character, you simply start at $0000000000000000 and count up by 1. By the time you reach $FFFFFFFFFFFFFFFF, the 64 will have calculated and displayed every possible character.

With a program such as this, you don't need to be artistic. Whenever you want an impressive Gothic font or cool alien shape, just run this program and sit around until you see the image you like best. Let the computer do the work. Simple, right?

Wrong!

To be honest, this program is absolutely ludicrous. While $FFFFFFFFFFFFFFFF may look like a fairly manageable number in hexadecimal, consider its phenomenal base-ten representation. It equals 18,446,744,073,709,551,616. (I don't even know how to pronounce this number.) Don't try converting this number on your home calculator, folks. It won't work. In fact, I had to hand-calculate this number, so please forgive me if you discover any misplaced digits.

Silly as it is, I found my character-generating program to be quite intriguing. It makes one think: Shouldn't a computer be able to effortlessly compute and display every possible Commodore 64 character—a small graphic blob confined within a simple 8 × 8 grid? The fact is that it can't.

Computers are fast, but they're simply not up to the task of computing every possible character, no matter how small and insignificant a character cell might appear. First of all, the maximum speed at which the computer can switch between displaying one character and another is approximately 1/60 of a second. That's the scan rate of your TV and most computer monitors, unless you live in the U.K., where scan rates are only 50 frames per second. Even if your monitor could handle faster screen updates, your eyes couldn't. So due to both human and computer limitations, the best your 64 or 128 (or any other computer, for that matter) can hope to display is 60 different characters in a second.

So how long would it take? Since an eight-byte number is practically unfathomable, let's cut the size of the character in half for illustration purposes. For example, let's make the character half as tall (8 × 4) so that the character definition is only four bytes in size. (This much more than halves the number of possible characters since a four-byte number can hold a value only 1/4,294,967,296 as large as an eight-byte number.

A four-byte number can hold a value between $00000000 and $FFFFFFFF. This works out to be 4,294,967,296 different character patterns. At 60 characters per second, it would take over two years for the computer to finish displaying all possible 8 × 4 characters. That means that with an 8 × 8 character, it would take over two years before any pixels in the top half of the character would even begin to change.

If you understand binary numbering, it's easier to understand the order in which my program cycles through each character definition. Each pixel is being treated as a separate bit in an ever-increasing binary number. Observe the program in progress, and you'll see the pattern. The lowest byte affects the character's lowest line of pixels while the least significant bit of each byte affects the character's rightmost pixels. As a result, pixels are twiddled (for lack of a better word) in right-to-left, bottom-to-top order.

While the program runs, see if you can locate the pixel situated in the character's third row, second column. Gloomy as it may sound, you will die before this pixel comes to life. See the first pixel sitting on the top line? The sun will burn out about the time this sucker lights up. Mind-boggling, isn't it?

So what's the final result? To complete the entire set of 8 × 8 characters, it would take 9,749,040,289 years. In words, that's nine billion, seven hundred forty-nine million, forty thousand, two hundred eighty-nine years. That's give or take 90 days or so.

Now, consider the sprite . . . !

```
EB 100 POKE 53280,0:POKE 53281
       ,0:PRINT "{CLR}"
BR 110 FOR I=12288 TO 12295:PO
       KE I,0:POKE I+40,0:NEXT
KG 120 FOR I=828 TO 854:READ D
       :POKE I,D:C=C+D:NEXT
DX 130 IF C<>3100 THEN PRINT "
       ERROR IN DATA STATEMENT
       S":END
CD 140 POKE 53272,(PEEK(53272)
        AND 240) OR 12:POKE 15
       23,0:POKE 55795,13:SYS
       {SPACE}828
BE 150 DATA 162,7,173,17,208,4
       8,251,173
BH 160 DATA 17,208,16,251,189,
       0,48,024
RX 170 DATA 105,1,157,0,048,20
       8,233,202
DE 180 DATA 16,242,96
```


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DEMON

By Vaughan Bardell

Just as you were ready to pull your hair out in frustration, here is the ultimate in disk monitors to ease the pain. If ever there was a tool for delving into files, this is it.

DeMON is an enhanced disk monitor for the 64 that fills the gap between a memory resident and a cartridge-based monitor. It enables the user to view and edit files on disk using powerful commands, without directly loading the file into memory.

The main advantage of a disk monitor is its ability to view a large file on disk without the need to load it into memory. This overcomes the problem encountered when the file takes up most of the memory, leaving little, if any, for the monitor.

To get the most out of DeMON, an understanding of Commodore 64 assembly language and experience with machine language monitors is necessary. Novices can use it to view text in a file, among other features.

Typing in DeMON

DeMON is a large program written entirely in machine language. To enter it, use MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following.

Starting address: 8000
Ending address: 9967

When you've finished typing, save several copies to disk before leaving MLX.

Using DeMON

Load DeMON with ,8,1 and then press the Restore key. The screen will turn dark blue, and a startup message will appear. After exiting DeMON the Restore key can be used to restart the program as long as it hasn't been overwritten by another program.

Restore also returns you to the command entry mode. This can be used in the event of a crash or to stop the Load or Hunt operations. Many of the commands are exited simply by using the Run/Stop key.

Use the space bar to pause listings. Press it again to let the listing continue. On some commands other features can be accessed while the listing is paused.

All addresses in DeMON are hexadecimal. No dollar sign is required before hex values. If one is included, an error will result. Track and sector numbers, however, are in decimal and are expected to be entered in decimal. The ending address of a file using DeMON is the last byte of a file, not the ending address plus 1 as is common with many monitors. This is important since some commands list the ending address of a file.

If you call a file that isn't on the current disk, you'll get an error message. Insert the correct disk and press Return again to continue.

The Commands

When DeMON is in command entry mode, you'll see a line prompt (>) and a flashing cursor. The commands are represented by a one- or two-letter abbreviation, followed by appropriate parameters. Below is a description followed by a summary of all the 13 main DeMON commands.

Load (L). To set up a file for use with DeMON, you must first load it. The load command constructs a table of the link track and sectors in memory. A file in the directory can be loaded, or the starting track and sector of a file can be entered. DeMON will load the file starting at that track and sector. Please note that if the latter option is used, then the first two bytes of the sector are expected to be the link track and sector, and the next two, the starting address of the file.

To load a file, type *L* with the filename in quotes (*L"filename"*). As with a normal load from the disk drive, all forms of pattern matching are acceptable. The ,8 isn't required.

To load a file using the starting track and sector, type the load command followed by a comma, the track, another comma, and then the sector. For example, L,19,5 will load a file starting at track 19, sector 5.

After loading, the file's starting and ending addresses will be displayed.

Find address (FA). This command is very handy for finding the position of a specified address from the current file on the disk. The command will list the track, sector, and position in the sector of an address in the file. The command is followed with an address that is between the starting and ending addresses of the current file, inclusive—for example, FA 6F01.

Relocate (RL). If the load address of the current file needs to be changed, use the relocate command. Follow the command with the new starting address. This command also clears the current offset. More about that later.

Offset (OF). The offset command is similar to relocate but allows more flexibility with the changing of addresses. It allows an offset to be set which is added to the addresses in the file. This is particularly helpful when the file moves part of itself once in memory. After using offset, any JMPs or JSRs to the transferred portion can be viewed.

The offset command is followed by the new address, an equal sign, and then the old address. The new address now equals the old address—for example, OF 2000=0900.

The command is like a soft relocate since the offset can be cleared by entering *OF* without the addresses.

List address (LA). The list address command is used for listing the starting and ending addresses of the current file. It can also calculate new starting and ending addresses from an input starting or ending address for the file. It doesn't change addresses.

Type the command without parameters to list the starting and ending addresses of the current file. If an address is included after the command, then the ending address of the current file, if it were to be loaded at this address, would be calculated and printed along with the starting address.

If a comma precedes the input address, then this address will be interpreted as the ending address. The starting address, if the file ends at this address, will be calculated and printed.

Exit DeMON (X). Use this command to exit DeMON back to BASIC. A BASIC program can be typed in without fear of its overwriting DeMON since the end of the BASIC storage area is moved

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down in memory. Be sure to type *NEW* before entering a BASIC program.

Disassemble (D). Disassemble is one of the major commands and is the crux of DeMON. It is different from most monitors but has features that allow flexible disassembly of machine language programs.

Two modes are accessible in disassemble. These are interrupted and continuous modes. In continuous mode, the file is listed on the screen, like listing a BASIC program. The screen scrolls up as more data is printed. Press the space bar to halt the listing.

In interrupted mode, the file listing is printed page by page. At the end of each page DeMON waits for keyboard input from the user. The space bar will continue disassemble with the next page. Other keys can be pressed at this stage to access other advanced features.

One advantage of interrupted mode is that at the end of the file, the message *THE END* will be printed. Other features can then be used to jump elsewhere in the file instead of ending disassemble by pressing the space bar. More features will be detailed later.

The disassemble mode can be toggled while the listing is paused, either in interrupted or continuous mode, by pressing f8.

If only *D* is entered, disassemble commences at the beginning of the file. If an address follows the command, then disassemble starts at that address. Modes can be preset by including the suffix ,C for continuous mode or ,I for interrupted mode. When started, DeMON is in interrupted mode.

The screen display in disassemble consists of the memory address, the assembly language code (followed by the bytes of that command), the ASCII, and then the screen code representations of these bytes. The screen codes are the characters that would appear if these bytes were placed directly into screen memory.

To exit disassemble, press Run/Stop. This returns you to command entry mode. Before examining the other features available with disassemble, let's take a look at the rest of DeMON's primary commands.

Interrogate (I). Interrogate is used to view simultaneously the hex bytes in the file and their ASCII/screen code representations. The display scrolls upward as data is printed. On the far left is the address of the first byte on that line. Eight hex bytes follow and then their representations are shown. These are preceded by an apostrophe. Place ,S after the address to view screen codes; omit the suffix for normal ASCII display. During viewing, the mode can be toggled by using the f3 key once the listing is paused.

The f4 key toggles between interrogate and disassemble. It can be used with text list, interrogate, or disassemble in interrupted or continuous mode while the listing is paused. Like the disassemble command, the interrogate command can be used with the default address function if no address is entered—for example, I; I 5000; I 5000,S; or I,S.

Text list (TL). This command rapidly scans a file for any text or messages. It will simultaneously print the ASCII and screen code of the bytes in the file in two columns, with ASCII on the left and screen codes on the right. A black hyphen separates the two columns. To use the command, either enter an address after the command or leave it blank for the default starting address.

To toggle between text list and interrogate, press f1 while the listing is paused. Run/Stop will exit the text list.

Change (C). Use this command to alter bytes in a file. It allows character strings, byte strings, and assembly code to be entered anywhere in a file. The entry must, however, fit in the file. It cannot extend beyond the end of the file.

The entry is performed line by line. A period (.) at the start of the line indicates that DeMON expects the next change-line entry. At the beginning of a line is the address at which the bytes in that line will be stored. This address can be anywhere in the file, and entries don't have to be in ascending address order.

After the address comes the actual data that is to be stored in the file. Only one type of entry can be on any single line. The first character distinguishes what type of entry it is: assembly, string, byte, or no entry.

To enter assembly language, no such character is required. Just simply type in a valid assembly statement, making sure any branches are in range, and press Return. When entering LSR, ASL, ROL or ROR commands that use the accumulator addressing mode, no *A* needs to follow the command. All hex numbers must be preceded by a dollar sign when typing in an assembly line. No other number base can be used to enter numbers. No spaces between the command and the addressing mode code are needed.

Here are some examples.

```
.5000 LDA$7000,X
.1209 BNE$1250
.31FF LDY#$91
.49F0 "Mary had a little lamb."
```

To enter a character string on a line, enclose the string in double quotes. Spaces inside quotes will be recognized.

A byte string may be entered by preceding the 8-bit hex numbers with a colon. Spaces between the bytes are not necessary, but they make the entry easier to read.

```
.F000 :01 FF 41 20 50 49 47
```

To finish the entry, press Return on a blank line. DeMON will then ask you to confirm that you want the changes sent to disk. If you do, press Y and Return. If not, press N or just Return. When you press Return at the end of a data entry line, DeMON checks the line, enters it into memory, and then prints the address that follows the last byte in the previous line. You can edit this address if you like.

DeMON stores the entered changes in RAM under BASIC ROM at $A000. It doesn't limit the number of bytes to change, but it does limit the number of lines to be changed at one time to 255.

Hunt (H). This command enables you to search the file for a character or byte string. Follow the hunt command with a character string enclosed in double quotes or a byte string. Follow this with the optional parameters for setting the search block. To hunt from a spe-

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cific address to the end of a file, include a comma and the address after the string. To hunt from the beginning of a file to a certain address, include two commas and the address after the string. Finally, to hunt between two addresses in a file, follow the string with a comma, the hunt starting address, another comma, and the hunt ending address. At the end of the hunt, DeMON will output all the addresses at which the string was found.

The hunt command is reasonably fast, hunting through a 200-block file in less than 25 seconds. DeMON will stop after it locates the first 127 finds. If this happens, *BUFFER FULL* will appear on the screen. To search the rest of the file, simply specify the last address found as the starting address for the next hunt.

Here are some examples.

H "food"
H 01 02 03 20
H "great",2300 (Search from $2300 to end of file.)
H FF D0 00,,1000 (Search from start of file to $1000.)
H "ball",2000,4000 (Search between $2000 and $4000.)

Directory ($). Entering this character and pressing Return loads the directory of the disk in the drive. The listing can be paused, as with other listings, by pressing the space bar. Run/Stop exits the listing.

Pattern matching is supported with the directory listing so only files matching the pattern entered will be displayed. Follow the dollar sign with a colon and the pattern, such as $:FAD*.

Disk drive status (@). This command allows you to read the disk drive error channel for an error that may have occurred.

Disk command (@). To send a disk command, precede it with the at symbol (@). No quotes are needed—for example, @ R:RAISIN=SULTANA.

Command Summary

Here is a summary of DeMon's 13 main commands.

Load (L). Load a file.

Find address (FA). List track, sector, and position of an address in a file.

Relocate (RL). Set new starting address for a file.

Offset (OF). Set an offset which is added to absolute addresses output.

List address (LA). List starting and ending addresses of a file.

Exit (X). Exit DeMON.

Disassemble (D). Disassemble code from a file.

Interrogate (I). Examine bytes in a file.

Text list (TL). List text found in a file.

Change (C) Change data in a file.

Hunt (H). Hunt through a file for a specified character or byte string.

Directory ($). Display disk directory.

Drive status or disk command (@).

Other Disassemble Features

When the disassemble display is paused in the interrupted mode, f5 and f1 can be used to access two advanced commands that expand the versatility of DeMON. Jump investigation enables a JSR or JMP command or any manually entered address to be investigated.

When f5 is pressed, DeMON checks to see if there are any jumps on the screen that are in range of the file. If so, DeMON highlights the first of these valid jumps on the screen. The cursor up/down key can be used to move the highlight line onto another jump. To jump to the highlighted jump, press the space bar.

If there are no jumps, or none in range on the screen, then DeMON replaces the top line of the screen with an address entry line where an address can be entered manually. If the address entered is not in range, then DeMON will continue disassemble on the following page.

If there are any valid jumps on the screen, subsequent presses of f5 will toggle between manual entry and jump selection. If you press Run/Stop to exit jump investigation mode, DeMON will continue with the next page of disassemble.

When investigating a jump, other jumps can be accessed by the same method. To return to where the jump originated, press the Return key. With nested jumps, each press of the Return key will return you to the previous jump command until the first jump is reached.

To clear the return addresses for jumps that have taken place, press f6. The screen will flash yellow, indicating that the table has been cleared. This command will also clear the Backward-Jump table. (See below.)

Pressing Shift/Return returns you to either the start of disassemble, the last place where f6 was pressed, or where the disassemble mode was changed from continuous to interrupted mode.

Back Screen. When in the interrupted mode, disassemble can either proceed or move backward. Press f1 to move backward at the end of the page, and DeMON will display the previous page. The listing will stop at the beginning of disassemble, at the point where the disassemble mode was changed from continuous to interrupted, at the beginning of a jump investigation section, or at the point where f6 was pressed.

Back Screen allows easy access to previous screens, enabling the user to go back and check the disassembly after looking forward in the file.

Special Key Summary

Here is a summary of DeMon's various key commands.

f1. In disassemble, used to jump back in the listing. In interrogate or text list, f1 toggles between these two displays.

f3. In interrogate, used to toggle between ASCII and screen code representation of data.

f4. In disassemble, text list, or interrogate, used to toggle between interrogate and disassemble display.

f5. In interrupted mode disassemble,

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used to enter a jump investigation address (manually or automatically) and look at the code referred to by a JMP, JSR, or any other code in the file.

f6. In interrupted mode disassemble, used to clear the current Back Screen table and the Jump Investigation table, making the current screen the first screen. This is as if disassemble started at this address. Using f1 displays back screens only up to this screen.

f8. In disassemble this is used to toggle the current disassemble mode between interrupted and continuous.

Space. Used to pause listings to the screen. In the jump investigation, automatic-jump selection, it is used to jump to a JSR or JMP. In interrupted disassemble mode, it will display the next screen of the listing.

Return. Used to return from a jump investigation to the previous address.

Shift/Return. Returns to the first address in the Jump Investigation table when disassemble is in the interrupted mode.

Run/Stop. Exits most commands and functions.

Restore. When in DeMON, this will return you to command entry mode. It is particularly handy when you're hunting or loading if you need to exit partway through. Exiting from a load, however, will leave the File table and variables corrupted. Use the load command to load another file.

Mastering DeMON

As you continue to use DeMON, you will get better at using the commands and viewing and changing files, and you will be able to get the most out of it and realize its true potential. However, this may take a while, but practice makes perfect! Many happy hours of hunting through files.

DEMON

```
8000:F2 FC 09 80 C3 C2 CD 38 DF
8008:30 A9 06 8D 20 D0 8D 21 A5
8010:D0 A2 18 86 D6 20 D7 AA 1F
8018:CA 10 FA A9 D5 8D 18 03 94
8020:A9 80 8D 19 03 A9 80 85 9E
8028:38 E8 86 37 AD D4 96 D0 82
8030:05 EE D4 96 86 96 E8 8E 62
8038:86 02 20 44 E5 A9 44 A0 44
8040:99 20 1E AB 20 D7 AA 20 6A
8048:43 82 A0 00 84 3C 20 CF C4
8050:FF C9 0D F0 0D C9 3E F0 71
8058:F5 C9 20 F0 07 A2 80 86 24
8060:3C FC A9 00 99 00 02 AA 6F
8068:F0 03 C8 D0 E1 98 F0 D4 F0
8070:24 3C 10 D0 A9 FF 85 7A 74
8078:A9 01 85 7B 84 11 20 C2 62
8080:80 A0 00 D9 9F 96 F0 0A CA
8088:C8 C8 BE 9F 96 D0 F4 4C 20
8090:F8 80 48 20 C2 80 C8 BE A1
8098:9F 96 D0 06 20 B9 80 4C BE
80A0:AE 80 D9 9F 96 F0 07 20 F4
80A8:B9 80 68 4C 89 80 68 88 20
80B0:B9 BB 96 48 B9 BA 96 48 03
80B8:60 A5 7A D0 02 C6 7B C6 98
80C0:7A 60 20 73 00 C9 00 60 D9
80C8:84 FB A0 01 B1 7A 08 A4 5B
80D0:FB E6 7A 28 60 20 42 F6 5A
80D8:20 E7 FF A2 FF 9A E8 86 D0
80E0:C6 86 3B 8E 33 99 F0 86 9F
80E8:20 D7 AA A9 47 8D 18 03 83
80F0:A9 FE 8D 19 03 4C 74 A4 A0
80F8:20 45 AB 4C D5 80 68 85 9C
8100:62 68 85 63 84 64 86 65 5D
8108:A0 00 20 37 81 08 29 7F D0
8110:C9 01 F0 11 20 D2 FF 28 DB
8118:10 EE A5 63 48 A5 62 48 AF
8120:A6 65 A4 64 60 20 37 81 1E
8128:AA 20 37 81 20 D2 FF CA 9E
8130:D0 FA 28 10 D3 30 E3 E6 6E
8138:62 D0 02 E6 63 B1 62 60 56
8140:20 57 81 20 D7 AA 20 C2 C7
8148:80 F0 2A C9 2C F0 7E 20 EB
8150:FE 82 90 77 4C F8 80 A5 E9
8158:96 D0 C9 20 FE 80 0D 20 4A
8160:02 3F 20 4E 4F 20 46 49 ED
8168:4C 45 20 4C 4F 41 44 45 F8
8170:44 8D 4C D5 80 A5 BE 05 FC
8178:BF F0 05 A9 FC 8D A3 81 B9
8180:A5 B0 18 65 9E 48 A5 B1 EE
8188:65 9F 48 20 3A 82 A6 B1 0C
8190:A5 B0 20 9A 82 A9 2D 20 75
8198:D2 FF 20 3A 82 68 AA 68 20
81A0:20 9A 82 4C D5 80 20 FE 5F
81A8:80 20 4F 46 46 53 45 54 A0
81B0:3A A4 20 6A 86 AA A5 C3 92
81B8:18 65 9E 48 A5 C4 65 9F 24
81C0:48 A9 4C 8D A3 81 A5 C3 E6
81C8:4C 92 81 90 17 20 D8 82 3D
81D0:48 20 3A 82 68 48 38 E5 2A
81D8:9E A8 A5 FD 48 E5 9F AA AD
81E0:98 4C 92 81 C6 7A 20 D8 E6
81E8:82 48 20 3A 82 68 85 C4 6C
81F0:18 65 9E 48 A5 FD 65 9F 41
81F8:48 A6 FD A5 C4 4C 92 81 E1
8200:20 57 81 20 D8 82 AA 20 63
8208:D7 AA A4 FD 20 4A 86 86 D5
8210:FA 85 F8 98 AA 20 A8 85 49
8218:20 46 82 A6 FA 20 A8 85 A8
8220:20 46 82 20 3A 82 A5 F8 39
8228:20 A0 82 4C D5 80 20 D8 44
8230:82 85 B0 A5 FD 85 B1 4C FD
8238:62 82 A9 24 FC A9 23 FC 58
8240:A9 2C FC A9 3E FC A9 2F C7
8248:FC A9 93 FC A9 20 4C D2 B1
8250:FF 20 C2 80 48 20 B9 80 74
8258:68 60 20 57 81 20 51 82 D4
8260:D0 0C 20 67 82 F0 30 A9 2D
8268:00 85 BE 85 BF 60 20 D8 97
8270:82 85 C1 A5 FD 85 C2 20 56
8278:C2 80 C9 3D F0 03 4C F8 31
8280:80 20 D8 82 85 C3 A5 FD 95
8288:85 C4 38 A5 C1 E5 C3 85 95
8290:BE A5 C2 E5 C4 85 BF 4C 1D
8298:D5 80 48 8A 20 A0 82 68 4B
82A0:48 20 AE 82 20 D2 FF 68 84
82A8:20 BE 82 4C D2 FF 29 F0 5C
82B0:4A 4A 4A 4A 18 69 30 C9 EB
82B8:3A 90 02 69 06 60 29 0F E8
82C0:4C B4 82 48 20 AE 82 85 34
82C8:FD 68 4C BE 82 20 A6 AD EB
82D0:20 F7 B7 A6 14 A4 15 60 03
82D8:20 DD 82 85 FD 20 EC 82 DA
82E0:0A 0A 0A 0A 85 FE 20 EC A4
82E8:82 05 FE 60 20 C2 80 20 83
82F0:FE 82 B0 1E 38 E9 30 C9 A1
82F8:0A 90 02 E9 07 60 C9 30 83
8300:90 0E C9 3A 90 08 C9 41 29
8308:90 06 C9 47 B0 02 18 60 A4
8310:38 60 4C F8 80 20 67 82 3A
8318:85 B3 85 F7 85 3B 85 A6 C9
8320:8D 3A 99 A8 20 C2 80 C9 11
8328:2C D0 19 20 51 82 F0 14 29
8330:20 6C 90 A5 AA 8D 35 99 5E
8338:48 A5 AB 48 8D 36 99 A0 DF
8340:00 A2 00 FC A2 0A 8E 33 4D
8348:99 F0 15 C9 22 D0 C3 20 93
8350:C8 80 C9 22 F0 08 99 40 52
8358:01 C8 C0 10 90 F1 84 FB 7C
8360:A9 9A 85 A7 20 AD 85 20 F0
8368:63 85 20 CF FF 85 C1 20 3D
8370:CF FF 85 C2 20 CC FF AD 1E
8378:33 99 F0 33 A5 FB A2 40 73
8380:A0 01 20 BD FF A9 03 A0 45
8388:00 20 00 86 A2 03 20 C6 28
8390:FF 20 CF FF 85 C3 20 CF E4
8398:FF 85 C4 20 CC FF A9 03 58
83A0:20 C3 FF A5 90 4A 4A 90 D5
83A8:17 20 CC FF 4C 11 86 68 F8
83B0:85 AB 68 85 AA A9 02 20 EA
83B8:B7 85 20 63 85 4C 91 83 3B
83C0:A5 C1 85 03 A5 C2 85 04 33
83C8:A5 C3 85 B0 A5 C4 85 B1 4C
83D0:A0 49 20 2F F1 E6 96 A9 73
83D8:06 8D 34 99 A2 D9 A0 84 A8
83E0:20 7E 84 20 6C 84 A0 00 E0
83E8:88 D0 FD 2C 00 DD 50 FB FE
83F0:A9 04 8D 3B 99 A9 80 8D 35
83F8:3C 99 20 73 84 20 60 85 AA
8400:A0 00 20 CF FF 91 A6 C8 B6
8408:C0 80 D0 F6 98 18 65 A6 B1
8410:85 A6 90 02 E6 A7 20 5C 2A
8418:84 A5 A7 C9 9C D0 DB A9 E7
8420:03 8D 3C 99 A9 B7 8D 3A B0
8428:99 A9 00 8D 3B 99 20 73 35
8430:84 20 60 85 20 CF FF 85 AD
8438:9E 20 CF FF 85 9F 20 CF 4D
8440:FF 85 9C 20 CC FF A5 9E 90
8448:05 9F F0 06 20 D7 AA 4C 3C
8450:75 81 A9 00 85 96 20 45 B5
8458:AB 4C 11 86 98 18 6D 3A 0F
8460:99 8D 3A 99 90 03 EE 3B 24
8468:99 4C CC FF 20 68 85 A2 3B
8470:00 F0 05 20 68 85 A2 07 FD
8478:20 CC 84 4C CC FF 85 C4 50
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8480:86 C1 84 C2 A0 00 B1 C1 24
8488:E6 C1 85 3C 98 85 C3 20 6C
8490:68 85 A5 C3 A4 C4 8D 41 B4
8498:99 8C 42 99 A2 0E 20 C9 CA
84A0:84 A0 00 B1 C1 20 A8 FF 0F
84A8:C8 C0 20 D0 F6 20 CC FF 29
84B0:A5 C1 18 69 20 85 C1 90 C1
84B8:02 E6 C2 A5 C3 18 69 20 A0
84C0:90 02 E6 C4 C6 3C 10 C5 C8
84C8:60 A0 05 FC A0 06 BD 30 63
84D0:99 20 D2 FF E8 88 10 F6 89
84D8:60 05 AD 05 02 85 18 AD 5D
84E0:06 02 85 19 20 00 C1 20 54
84E8:B7 E9 A9 00 85 B5 85 B7 43
84F0:85 B8 85 B9 A9 04 85 B6 56
84F8:A5 18 8D 00 04 A4 19 8C FD
8500:01 04 A2 FC 85 06 84 07 05
8508:A9 80 85 00 A5 00 30 FC 43
8510:C9 01 D0 43 A0 02 AD 00 F6
8518:03 48 08 20 6A 06 AD 01 81
8520:03 20 6A 06 A8 E6 B9 28 DE
8528:F0 09 8A 20 73 06 68 A2 68
8530:FE D0 D1 68 A6 B9 CA D0 32
8538:02 88 88 88 88 98 20 73 5A
8540:06 4C 83 06 91 B5 E6 B5 19
8548:D0 02 E6 B6 60 18 65 B7 6A
8550:85 B7 90 02 E6 B8 60 A9 C2
8558:00 85 B7 85 B8 4C AE E9 52
8560:A2 0F FC A2 02 4C C6 FF 19
8568:A2 0F FC A2 02 4C C9 FF 27
8570:A9 31 FC A9 32 8D 7F 85 23
8578:20 68 85 20 FE 80 55 31 36
8580:3A 32 2C 30 AC A6 AA 20 33
8588:A8 85 A9 2C 20 D2 FF A6 34
8590:AB 20 A8 85 4C CC FF 20 9C
8598:68 85 20 FE 80 42 2D 50 E4
85A0:3A 32 AC A6 9B 4C 91 85 0C
85A8:A9 00 4C CD BD A9 12 85 2D
85B0:AA A9 00 85 AB A9 A2 85 A2
85B8:9B 20 C8 85 20 F8 85 20 1B
85C0:70 85 20 97 85 4C 26 86 13
85C8:A9 01 A2 3A A0 A0 20 BD 66
85D0:FF A9 02 4C FF 85 20 51 F2
85D8:82 F0 30 20 F8 85 20 68 EF
85E0:85 20 C8 80 F0 06 20 D2 8A
85E8:FF 4C E1 85 20 D7 AA 20 71
85F0:CC FF 4C 0B 86 4C D5 80 2E
85F8:A9 00 20 BD FF A9 0F A8 26
8600:20 06 86 4C C0 FF A2 08 87
8608:4C BA FF 20 CC FF 20 F8 8B
8610:85 20 D7 AA 20 60 85 20 3B
8618:CF FF 20 D2 FF C9 0D F0 70
8620:03 AA D0 F3 F0 41 A5 90 1B
8628:29 6F D0 DF 60 86 C1 84 E2
8630:C2 20 6A 86 38 A5 C1 E5 1E
8638:C3 85 C3 A5 C2 E5 C4 85 18
8640:C4 A5 9E C5 C3 A5 9F E5 23
8648:C4 60 20 2D 86 B0 29 F0 E0
8650:27 20 FE 80 0D 3F 20 49 CF
8658:4E 56 41 4C 49 44 20 41 EB
8660:44 44 52 45 53 53 8D 4C 8E
8668:D5 80 A5 B0 18 65 BE 85 99
8670:C3 A5 B1 65 BF 85 C4 60 53
8678:A9 FC 8D A6 86 A9 9C 85 4F
8680:A9 A2 00 A5 C3 C9 FC B0 55
8688:18 A5 C4 D0 14 AE 01 9A A8
8690:A9 9A 85 A7 A9 00 85 F7 94
8698:A5 C3 18 69 04 AC 00 9A 70
86A0:60 E8 A5 C3 38 E9 FC A0 0D
86A8:FE 8C A6 86 85 C3 B0 02 34
86B0:C6 C4 A5 C4 D0 EB A5 C3 98
86B8:C9 FE B0 E5 8A C5 9C 90 14
86C0:02 D0 8E 0A AA A0 9A 90 13
86C8:01 C8 84 C2 8A 85 C1 85 B8
86D0:F7 A5 C2 85 A7 A0 01 B1 67
86D8:C1 AA 88 B1 C1 A8 A5 C3 5D
86E0:18 69 02 60 20 4A 86 86 58
86E8:AB 84 AA 85 9B 60 A9 01 4D
86F0:A0 60 20 06 86 A2 00 A0 2A
86F8:02 A5 11 20 BD FF 20 D5 98
8700:F3 A5 BA 20 49 87 20 13 87
8708:EE A6 90 F0 03 4C 0B 86 3F
8710:20 13 EE 20 D7 AA 20 13 90
8718:EE 20 13 EE F0 25 20 13 67
8720:EE AA 20 13 EE 20 CD BD D7
8728:20 4C 82 20 13 EE F0 E3 C6
8730:20 D2 FF 20 EA 88 F0 0B 6C
8738:90 F1 20 EA 88 B0 EC F0 90
8740:02 90 F7 20 EF ED 4C D5 1B
8748:80 20 09 ED A5 B9 4C C7 14
8750:ED 8A 38 E5 B0 AA 98 E5 A5
8758:B1 A8 60 A5 C1 38 E5 C3 4F
8760:85 3C A5 C2 E5 C4 05 3C AA
8768:60 20 6C 87 A0 00 C6 B4 FC
8770:38 F1 B4 B0 02 C6 40 60 C5
8778:A5 D6 A2 FF C9 16 90 DA 07
8780:20 FE 80 0D 01 0D 20 12 CE
8788:20 50 52 45 53 53 20 53 D5
8790:50 41 43 45 A0 A9 00 85 06
8798:C7 A4 B4 38 A5 3F E5 3D 02
87A0:99 00 9D E6 B4 20 03 89 54
87A8:C5 C6 F0 FC 20 E4 FF 85 54
87B0:B2 C9 85 D0 72 A5 B4 C9 A6
87B8:02 90 EA A5 3F 48 A5 40 4B
87C0:48 A0 00 A5 3F 20 69 87 4B
87C8:85 3F A4 3B F0 30 B9 00 6E
87D0:9F AA B9 01 9F A8 20 51 D2
87D8:87 84 C2 86 C1 A6 3F A4 59
87E0:40 20 51 87 EA EA 84 C4 8B
87E8:86 C3 20 5B 87 F0 0F 90 94
87F0:0D 68 85 40 68 85 3F E6 14
87F8:B4 E6 B4 4C A5 87 68 68 FB
8800:A4 40 A6 3F 20 4A 86 85 F8
8808:9B 85 A8 A9 00 85 FE E4 F0
8810:AB D0 04 C4 AA F0 0A 86 AB
8818:AB 84 AA 20 70 85 20 DF 31
8820:8F 20 97 85 4C E5 88 C9 21
8828:87 D0 06 20 73 94 4C E5 60
8830:88 C9 8D D0 16 A0 00 84 6E
8838:3B 84 B4 AE 00 9F 86 3F 54
8840:AC 01 9F 84 40 20 B7 95 AB
8848:4C E5 88 C9 0D D0 32 A5 5C
8850:3B F0 A8 A5 3F 20 6C 87 85
8858:85 3F A4 3B B9 00 9F C5 17
8860:3F D0 EC B9 01 9F C5 40 D0
8868:D0 E5 C6 B4 C6 3B C6 3B 6B
8870:A4 3B B9 00 9E 85 3F AA 0E
8878:B9 01 9E 85 40 A8 4C 45 55
8880:88 C9 8C D0 14 A9 01 85 B5
8888:B3 A9 91 20 D2 FF 20 D2 BB
8890:FF 20 FD 88 A2 00 4C D7 77
8898:AA C9 8A D0 05 A2 01 4C D0
88A0:77 96 C9 8B D0 34 A9 00 AF
88A8:85 3B A5 3F A6 40 38 E5 80
88B0:3D B0 01 CA A5 3D 8D 00 96
88B8:9F 8E 01 9F A4 B4 88 B9 1A
88C0:00 9D 8D 00 9D A9 01 85 06
88C8:B4 EE 20 D0 A5 A2 69 18 A3
88D0:C5 A2 D0 FC CE 20 D0 4C 3C
88D8:A5 87 C9 03 D0 03 4C D5 09
88E0:80 C9 20 D0 F2 A2 01 A4 7E
88E8:B2 60 20 03 89 A5 C5 C9 D7
88F0:3C D0 06 C5 C5 F0 FC 38 95
88F8:60 C9 3F 18 60 A5 C5 C9 05
8900:40 D0 FA A9 00 85 C6 60 65
8908:A9 90 FC A9 08 85 12 20 E8
8910:57 81 20 2B 90 20 51 82 10
8918:F0 04 C9 2C D0 09 20 6A F5
8920:86 A8 A5 C3 4C 2C 89 20 D7
8928:D8 82 A4 FD 85 3F AA 84 BF
8930:40 20 E4 86 24 12 30 1A 54
8938:20 C2 80 F0 0E C9 2C D0 EB
8940:07 20 C2 80 C9 53 F0 06 C2
8948:4C F8 80 A9 00 FC A9 01 B2
8950:85 F8 20 5C 8A 20 D7 AA 5D
8958:20 63 85 A6 40 A5 3F 20 A6
8960:9A 82 24 12 10 07 20 4C 30
8968:82 A0 10 D0 09 A0 08 24 F2
8970:12 30 03 20 4C 82 20 CF 77
8978:FF 99 3C 03 24 12 30 03 76
8980:20 A0 82 88 08 E6 9B F0 A8
8988:64 28 D0 E3 24 12 10 22 DB
8990:A0 10 B9 3C 03 20 65 8A E0
8998:88 D0 F7 A9 90 20 D2 FF 68
89A0:20 FE 80 2D 85 A0 10 B9 EE
89A8:3C 03 20 4E 8A 88 D0 F7 93
89B0:F0 1A A9 27 20 D2 FF A0 57
89B8:08 B9 3C 03 A6 F8 F0 06 F6
89C0:20 4E 8A 4C C9 89 20 65 A7
89C8:8A 88 D0 ED 20 EA 88 F0 EA
89D0:5D 90 46 20 EA 88 F0 56 33
89D8:B0 3F AE 77 02 E0 86 D0 D2
89E0:0E 24 12 30 0A A5 F8 49 6B
89E8:01 85 F8 10 2C F0 42 E0 88
89F0:8A D0 17 A2 00 86 3B A5 C0
89F8:3F 8D 00 9F A5 40 8D 01 53
8A00:9F 20 D7 AA 20 D7 AA 4C 94
8A08:2F 8D E0 85 D0 C5 A5 12 87
8A10:30 03 A9 90 FC A9 08 85 60
8A18:12 18 A5 12 29 1F 65 3F E1
8A20:85 3F 90 02 E6 40 20 DA 4D
8A28:8C B0 03 4C 55 89 4C D5 14
8A30:80 98 48 A4 F7 B1 A6 85 58
8A38:AA C8 B1 A6 85 AB C8 A9 8B
8A40:02 85 9B 20 5C 8A 20 63 DD
8A48:85 68 A8 4C 89 89 AA 98 74
8A50:48 A4 D3 8A 91 D1 C8 84 BF
8A58:D3 68 A8 60 20 B9 85 20 9F
8A60:0F 90 84 F7 60 C9 20 90 2C
8A68:0C C9 22 F0 08 C9 80 90 42
8A70:06 C9 A0 B0 02 A9 2E 4C 79
8A78:D2 FF 20 57 81 20 2B 90 E3
8A80:20 51 82 A0 00 C9 22 F0 B0
8A88:1E 20 FE 82 90 03 4C F8 DE
8A90:80 20 DD 82 99 3C 03 C8 5E
8A98:C0 14 B0 F2 20 51 82 F0 94
8AA0:19 C9 2C D0 EC F0 13 E6 7F
8AA8:7A 20 C8 80 C9 22 F0 0A E6
8AB0:99 3C 03 C8 C0 14 90 F1 F7
8AB8:B0 D4 8C 3B 03 98 18 69 B4
8AC0:08 85 F9 20 C2 80 C9 2C 54
8AC8:D0 31 20 51 82 C9 2C D0 10
8AD0:0E 20 6A 86 85 FA A5 C3 D1
8AD8:85 3C 20 C2 80 D0 10 20 77
8AE0:D8 82 85 3C A5 FD 85 FA A2
8AE8:20 C2 80 C9 2C D0 15 20 5A
8AF0:D8 82 85 FF A5 FD 85 FC F0
8AF8:4C 14 8B 20 6A 86 85 FA 20
8B00:A5 C3 85 3C 20 6A 86 A5 AC
8B08:C3 18 65 9E 85 FF A5 C4 D9
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8B10:65 9F 85 FC A6 3C 8E 37 BC
8B18:03 A4 FA 8C 38 03 20 4A 5A
8B20:86 8C 34 03 8E 35 03 38 DB
8B28:E9 02 8D 36 03 A6 FF A4 21
8B30:FC 8E 39 03 8C 3A 03 20 34
8B38:4A 86 A9 03 8D 34 99 A2 8E
8B40:D8 A0 8B 20 7E 84 20 68 0E
8B48:85 A0 04 A2 00 20 CE 84 97
8B50:A4 F9 A2 00 BD 34 03 20 71
8B58:D2 FF E8 88 D0 F6 20 CC ED
8B60:FF C8 D0 FD 2C 00 DD 70 31
8B68:FB 20 D7 AA A9 05 A0 02 CF
8B70:A2 00 8D 3B 99 8C 3C 99 4F
8B78:8E 3A 99 20 73 84 20 C6 4F
8B80:8B A4 C3 F0 3E 84 FB C0 CA
8B88:FF D0 01 C8 98 38 E9 02 FB
8B90:85 C1 F0 16 20 73 84 20 52
8B98:C6 8B A6 C4 A5 C3 20 9A 2E
8BA0:82 20 4C 82 C6 C1 C6 C1 3F
8BA8:D0 EA E6 FB D0 12 20 FE 8D
8BB0:80 0D 0D 42 55 46 46 45 A6
8BB8:52 20 46 55 4C 4C 21 8D 82
8BC0:4C D5 80 4C F8 80 20 60 B2
8BC8:85 20 CF FF 85 C3 20 CF EF
8BD0:FF 85 C4 A0 02 4C 5C 84 6A
8BD8:08 20 B7 E9 A0 00 84 B5 55
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8BE8:B7 AD 09 02 85 B8 AD 06 F8
8BF0:02 85 09 AD 05 02 85 08 A9
8BF8:A2 04 86 BA E8 86 B6 AD 5B
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8C08:B9 A0 00 A2 05 A9 80 85 A5
8C10:01 A5 01 30 FC C9 02 90 D9
8C18:0A CA D0 F1 A9 00 85 BB 36
8C20:4C A5 03 AD 00 04 85 08 27
8C28:AD 01 04 85 09 A2 02 BD C5
8C30:00 04 9D FE 03 E8 D0 F7 43
8C38:B1 B9 D9 0D 02 F0 1F A0 57
8C40:00 E6 B7 D0 02 E6 B8 E6 1B
8C48:B9 D0 02 E6 BA 20 90 03 9B
8C50:A5 BA C9 04 D0 E2 A5 B9 7B
8C58:C9 FE D0 DC F0 A7 C8 CC 82
8C60:0C 02 F0 4E 20 86 03 98 BC
8C68:18 65 B9 C9 FE D0 C9 A5 2F
8C70:BA C9 04 D0 C3 A2 E0 BD 0F
8C78:00 04 9D 02 03 E8 E0 FE E2
8C80:D0 F5 C6 BA E6 B9 E6 B9 A9
8C88:4C 06 03 98 A6 B8 18 65 E0
8C90:B7 90 04 E8 FC A5 B7 CD 74
8C98:0A 02 D0 2D 98 F0 02 8A 3B
8CA0:FC A5 B8 CD 0B 02 D0 21 B8
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8CB8:C8 A5 B8 91 B5 C8 84 BB 65
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8CF8:04 C9 2C D0 09 20 6A 86 3D
8D00:A8 A5 C3 4C 0B 8D 20 D8 BD
8D08:82 A4 FD 85 3F 84 40 8D BF
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8D18:C2 80 F0 13 C9 2C F0 F7 DC
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8D30:9D 86 B5 A9 00 85 B4 85 12
8D38:FE 20 2B 90 A5 B3 D0 03 E9
8D40:20 C3 8D A6 3F A4 40 20 A5
8D48:E4 86 85 A8 A0 9C 84 A9 DC
8D50:4C 79 8D A5 F7 18 69 02 F0
8D58:85 F7 90 02 E6 A7 A9 02 91
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8DF8:CB 02 20 A0 82 20 4C 82 38
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8E90:9C 8D 01 9C 86 FE 38 60 4A
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8EA0:A6 40 A5 3F 20 9A 82 20 5A
8EA8:4C 82 20 50 8F 20 02 90 27
8EB0:A0 03 BD 65 98 20 D2 FF D7
8EB8:E8 88 D0 F6 20 4C 82 AD DA
8EC0:CB 02 20 2A 8F 85 C1 C9 CA
8EC8:02 90 52 AA BD 1F 99 85 23
8ED0:C3 A0 00 20 3D 8F C0 03 A6
8ED8:D0 F9 85 C2 A5 C1 C9 08 89
8EE0:F0 7B A2 01 20 4C 8F 9D A8
8EE8:CB 02 E8 EC C9 02 D0 F4 45
8EF0:CA BD CB 02 20 A0 82 CA CF
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8F10:20 3D 8F 4C 1D 8F 20 3D E9
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8F88:85 FC A5 FD E9 00 85 FD 96
8F90:A6 FD A5 FC 20 9A 82 4C C3
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8FB8:86 3B 86 B3 CA 86 B4 A2 72
8FC0:9D 86 B5 A5 3F 8D 00 9F 31
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9010:F7 20 14 90 C8 D0 02 E6 35
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9048:F6 20 FE 80 0D 20 3F 20 5C
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9070:24 B0 1F 86 AA 20 51 82 17
9078:C9 2C F0 2B 20 CD 82 86 1E
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9090:B0 87 20 FE 80 0D 3F 20 B6
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90B0:20 D7 AA A2 00 86 71 86 DA
90B8:49 86 F9 A9 A0 85 4A 20 C9
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90C8:A5 FD 8D 3A 03 A2 00 20 54
90D0:C2 80 C9 3A F0 04 C9 22 9D
90D8:D0 06 4C 01 93 20 C2 80 A0
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90E8:34 03 E8 E0 03 D0 EE A2 EB
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9170:00 A2 00 20 9B 91 C0 03 E5
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9190:E8 E8 D0 EB 68 68 A6 C2 30
9198:4C 40 91 4A 85 C4 90 09 32
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91B8:48 08 68 85 C3 68 20 CD 35
91C0:91 A0 03 A5 C3 48 71 20 D1
91C8:9C 91 4C EA 91 20 9B 91 AC
91D0:C0 07 D0 F9 60 AD 3B 03 03
91D8:D0 BC F0 38 A2 19 A9 00 02
91E0:9D 34 03 CA 10 FA 60 20 3A
91E8:CD 91 BD 3B 03 D0 A7 A6 14
91F0:FA AC C9 02 88 98 0A 85 56
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92B0:49 B0 07 C8 8A 91 49 20 61
92B8:BA 92 E6 49 D0 02 E6 4A F7
92C0:60 C6 F9 A9 00 8D C9 02 6D
92C8:4C 82 92 A5 49 F0 20 4C FB
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92D8:50 55 54 28 59 2F 4E 29 D5
92E0:20 BF 20 CF FF C9 0D F0 39
92E8:04 C9 59 F0 D3 68 68 4C 1A
92F0:D5 80 18 6D 39 03 85 C1 9D
92F8:AA A9 00 6D 3A 03 85 C2 60
9300:60 A0 00 AE 39 03 8E 40 9D
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9310:22 F0 16 20 51 82 D0 03 82
9318:4C C4 93 20 51 82 F0 16 97
9320:20 DD 82 99 43 03 C8 D0 41
9328:F2 20 C8 80 C9 22 F0 06 B0
9330:99 43 03 C8 D0 F3 98 F0 5A
9338:DF 8C 42 03 98 8C C9 02 77
9340:C8 C8 C8 84 FA 20 F2 92 30
9348:20 8D 93 B0 10 A2 00 BD 29
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9360:8D 3A 03 A5 C3 8D 39 03 61
9368:4C 43 91 85 C6 A5 C2 20 83
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9388:20 9D 7B 02 60 84 FB AC 70
9390:3A 03 AD C9 02 18 6D 39 6C
9398:03 AA 90 01 C8 8A D0 01 21
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93A8:39 03 AC 3A 03 20 2D 86 DF
93B0:B0 0E F0 0C AD 39 03 85 70
93B8:C1 AD 3A 03 85 C2 38 80 CB
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93C8:86 3F 84 40 86 3C 20 D2 CF
93D0:92 20 2B 90 A0 00 A9 36 46
93D8:85 01 B1 3F AA C8 B1 3F 48
93E0:84 FA A8 A9 37 85 01 20 AA
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93F0:AB D0 04 C4 AA F0 16 98 CC
93F8:48 8A 48 20 73 85 68 AA 1F
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9410:20 97 85 20 6B 85 A4 FA 97
9418:C8 A9 36 85 01 B1 3F AA 27
9420:C8 A9 36 85 01 B1 3F 48 CC
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9430:CA F0 2E E6 9B F0 07 C8 A6
9438:D0 E7 E6 40 D0 E3 98 48 34
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94B0:F0 2A 20 87 94 A5 3C 18 25
94B8:69 04 85 3C D0 1B A5 3C 86
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94C8:E9 04 85 3C 4C D9 94 4C 9B
94D0:78 95 20 CA 8D A9 00 85 E4
94D8:3C 20 87 94 20 03 89 20 A2
94E0:E4 FF F0 FB C9 03 F0 9C 33
94E8:C9 20 F0 E3 C9 91 F0 CE A0
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94F8:20 87 94 A2 27 A9 A0 9D 8F
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9538:14 D0 13 88 30 D4 84 FB 66
9540:A0 95 A9 4A 20 1E AB 4C 18
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9550:D0 21 C0 04 D0 C0 20 D8 27
9558:82 48 A4 FD AA 20 2D 86 02
9560:B0 04 F0 02 68 60 20 8F B7
9568:95 68 85 3F A5 FD 85 40 8D
9570:4C A9 95 C9 03 D0 9F 60 76
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9580:AA B9 53 03 A8 86 3F 84 6C
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95A0:C8 8A 99 00 9E C8 84 3B 62
95A8:60 A4 3B A6 3F 8A 99 00 56
95B0:9F A5 40 99 01 9F A8 20 AE
95B8:E4 86 85 A8 20 B9 85 4C 72
95C0:DF 8F A0 01 84 FA 88 84 89
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96A8:4C 4C 00 44 00 49 00 48 C0
96B0:00 40 00 43 00 58 00 24 A7
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9848:20 05 00 99 90 87 00 03 0A
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9950:56 31 2E 30 20 20 0D 20 7F
9958:20 20 42 59 20 56 2E 42 7A
9960:41 52 44 45 4C 4C 0D 00 53
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Vaughan Bardell said he had other features planned for DeMON, but space limitations prevented their inclusion. He lives in Hastings, New Zealand.

GEOS TEXT SCRAP MAKER

By Charles Kunz

Have you ever wanted to convert a SpeedScript document to geoWrite format? I can't tell you how many times I've wanted to do this. Gazette published geoWrite Converter (April 1990), but it only converts geoWrite documents to SpeedScript or ASCII. I needed something that would convert the other way around. Enter GEOS Text Scrap Maker.

I am the proud owner of geoWrite 1.1 and GEOS 1.2. (That's no typo folks; I've owned it since December 1986.) Probably many of you also have this early version of GEOS and are aware that it provides no utility for such conversions.

GEOS Text Scrap Maker runs like (and has many of its routines modified from) the Print Shop To GEOS converter (April 1987 Gazette).

Entering the Program

GEOS Text Scrap Maker is written entirely in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Before exiting Proofreader, be sure to save a copy of the program to disk. I like to keep Scrap Maker on my GEOS work disk with geoWrite and my geoWrite documents.

Scrap Maker writes to disk, so make sure it has been entered properly before you use it with important files. A syntax error could be fatal to your precious files. Caution: Scrap Maker creates a temporary file called S on your GEOS work disk. So if you already have a file on the disk with that name, be sure to rename it.

Converting

Before using Scrap Maker, make sure there's a Text Scrap file on your work disk; otherwise the conversion will not be complete. Create a Text Scrap if you don't have one. To do this, double-click the geoWrite icon and then cut or copy any text from a geoWrite file. Once you have a Text Scrap on disk, you can use Scrap Maker.

Load and run Scrap Maker as you would any BASIC program. If you are within the GEOS environment, just double-click on the Scrap Maker icon.

Scrap Maker first asks you to insert the disk that contains the file that you want to convert and then asks for the conversion type you want to execute. You have three conversion options: SpeedScript to GEOS, Commodore ASCII to GEOS, and true ASCII to GEOS. Next, Scrap Maker requests the name of the file to be converted. If the file is too large—the maximum size is about 6K—you'll get an overflow error, and Scrap Maker will restart.

After the file loads, Scrap Maker translates the file in memory, reporting on the status as it converts and on how large the text will be. Scrap Maker then asks for a GEOS work disk (the one with the Text Scrap already on it), and it writes the new Text Scrap on it. Finally, Scrap Maker requests the GEOS master or boot disk. After GEOS boots up, you can paste the new Text Scrap into a Text Album or geoWrite file. The text you just pasted will be in the BSW font, so if you want a different font, make the change within geoWrite.

Helpful Hints

Since Scrap Maker can convert only 6K at a time, large documents will have to be broken down and saved as smaller ones. Convert each of these small documents one at a time, and after each conversion, paste the document into a geoWrite file. After all the conversions have been done, the end product will be in one geoWrite file.

Scrap Maker is written entirely in BASIC, so it is quite easy to modify. I have assumed that Commodore ASCII files and true ASCII files will be SEQ files, which covers most cases. You can change this to suit your needs if you have true ASCII files saved as PRG files. You can also add conversion options if you like, such as converting PaperClip III files.

Compatibility

I have tested this program with GEOS 1.2 and geoWrite 1.1. This is the only version of geoWrite available to me. Experiment with whatever version you have, but be sure to back up your disk just in case something goes awry.

SCRAP MAKER

```
EE 5 REM COPYRIGHT 1992 COMPUT
     E PUBLICATIONS INTL LTD -
     ALL RIGHTS RESERVED
PG 10 POKE52,32:POKE56,32:CLR:
     PRINT"{CLR}{7}{N}{H}";:P
     OKE53281,6:POKE53280,14:
     AD=8192
KJ 20 HD$="{CLR}{RVS} GEOS TEX
     T SCRAP MAKER (FILE CONV
     ERTER) ":MC=6000
QJ 30 PRINTHD$
DR 40 GOTO200
BH 50 REM ---- SEARCH DIR FOR
     {SPACE}TRACK AND SECTOR
SD 60 FF=0:PRINT#15,"U1:2 0"+S
     TR$(T)+STR$(S)
SS 70 GET#2,A$:TN=ASC(A$+CHR$(
     0)):GET#2,A$:SN=ASC(A$+C
     HR$(0))
DC 80 FORN=0TO7:PRINT#15,"B-P:
     2,"+STR$(32*N+2)
RQ 90 GET#2,A$:IFA$<>CHR$(131)
     THEN160
RP 100 GET#2,A$:TP=ASC(A$+CHR$
```


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```
      (Ø)):GET#2,A$:SP=ASC(A$
      +CHR$(Ø)):H$=""
GB 11Ø GET#2,A$:IFA$<>CHR$(16Ø
      )THENH$=H$+A$:GOTO11Ø
SD 12Ø IFH$<>DI$THEN16Ø
FR 13Ø FF=1:KP=N:N=7
MQ 14Ø PRINT#15,"B-P:2,"+STR$(
      32*KP+3Ø)
ER 15Ø GET#2,A$:SL=ASC(A$+CHR$
      (Ø)):GET#2,A$:SH=ASC(A$
      +CHR$(Ø))
DX 16Ø NEXT:IFTN=ØTHENRETURN
SC 17Ø IFFF=1THENRETURN
CB 18Ø T=TN:S=SN:GOTO6Ø
EF 19Ø REM ---- REQUEST FOR CO
      NVERSION TYPE
DH 2ØØ PRINT"{DOWN}INSERT DISK
       WITH FILE TO BE CONVER
      TED."
DP 21Ø PRINT"{DOWN}SELECT CONV
      ERSION:{DOWN}"
FS 22Ø PRINT" 1) SPEEDSCRIPT T
      O GEOS"
HD 23Ø PRINT" 2) COMMODORE ASC
      II TO GEOS"
CD 24Ø PRINT" 3) TRUE ASCII TO
       GEOS{4 UP}"
DS 25Ø GETZ$:IFZ$<"1"ORZ$>"3"T
      HEN25Ø
FA 26Ø IFZ$="1"THENX$=",P,R"
AR 27Ø IFZ$="2"THENX$=",S,R"
SS 28Ø IFZ$="3"THENX$=",S,R"
AC 29Ø FORN=1TOVAL(Z$):PRINT:N
      EXT:PRINT"*";:FORN=1TO4
      -VAL(Z$):PRINT:NEXT
FS 3ØØ REM ---- READ FILE INTO
       MEMORY
MQ 31Ø N$="":INPUT"{DOWN}FILEN
      AME";N$:IFN$=""THEN31Ø
HB 32Ø OPEN15,8,15:OPEN8,8,Ø,N
      $+X$:INPUT#15,EN,EB$,ET
      ,ES
MX 33Ø IFEN<>ØTHENCLOSE8:CLOSE
      15:PRINT"{DOWN}";EB$:N$
      ="":GOTO21Ø
DS 34Ø PRINTHD$:PRINT"{DOWN}LO
      ADING {CYN}";N$
CG 35Ø POKE185,Ø:POKE78Ø,Ø:POK
      E781,Ø:POKE782,32:SYS65
      493:CLOSE8:CLOSE15:SI=Ø
DP 36Ø EA=PEEK(781)+PEEK(782)*
      256:IF(EA-AD)>MCTHEN97Ø
PH 37Ø PRINT"{DOWN}{7}PLEASE W
      AIT, TRANSLATING":PRINT
      "{CYN}";N$;"{7} ...
      {DOWN}"
EP 38Ø PRINT" Ø%{3 SPACES}COMP
      LETE{UP}":FORN=ADTOEA-1
      :C=PEEK(N):ONVAL(Z$)GOT
      Ø39Ø,47Ø,52Ø
QK 39Ø IFC=ØTHENC=64:GOTO52Ø
BJ 4ØØ IFC>=1ANDC<=26THENC=C+9
      6:GOTO52Ø
GM 41Ø IFC=27THENC=91:GOTO52Ø
HG 42Ø IFC=29THENC=93:GOTO52Ø
PF 43Ø IFC=3ØTHENC=94:GOTO52Ø
SR 44Ø IFC=31THENC=13:GOTO52Ø
FM 45Ø IF(C>=32ANDC<=63)OR(C>=
      65ANDC<=9Ø)THEN52Ø
QA 46Ø GOTO53Ø:REM SPEEDSCRIPT
       CONTROL CODES CAN'T TR
      ANSLATE
AQ 47Ø IFC=13OR(C>=32ANDC<=64)
      OR(C>=91ANDC<=95)THEN52
      Ø
CS 48Ø IFC>=65ANDC<=9ØTHENC=C+
      32:GOTO52Ø
RD 49Ø IFC>=97ANDC<=122THENC=C
      -32:GOTO52Ø
MJ 5ØØ IFC>=193ANDC<=218THENC=
      C-128:GOTO52Ø
RD 51Ø GOTO53Ø:REM WEIRD COMMO
      DORE ASCII CAN'T TRANSL
      ATE
AP 52Ø POKEAD+SI,C:SI=SI+1
KJ 53Ø PRINTINT((N-AD)/(EA-1-A
      D)*1ØØ)"{LEFT}%{UP}":NE
      XT:SI=SI+4
FJ 54Ø PRINT"{DOWN}{CYN} TEXT
      {SPACE}SCRAP WILL BE"IN
      T(SI/1Ø24+.5)"{LEFT}K"
AH 55Ø REM ---- REQUEST FOR GE
      OS WORK DISK WITH TEXT
      {SPACE}SCRAP FILE
BB 56Ø PRINT"{DOWN}{7}INSERT G
      EOS WORK DISK IN DRIVE,
       HIT"
CE 57Ø PRINT"{RVS}RETURN{OFF}
      {SPACE}WHEN READY."
QG 58Ø GETA$:IFA$<>CHR$(13)THE
      N58Ø
CG 59Ø PRINT"{DOWN}SAVING
      {CYN}TEXT SCRAP{7} FILE
      ...{DOWN}":PRINT" Ø%
      {3 SPACES}COMPLETE{UP}"
DS 6ØØ REM ---- WRITE FILE CAL
      LED 'S'
JJ 61Ø OPEN15,8,15,"I Ø":INPUT#
      15,EN,EB$,ET,ES:IFEN<>Ø
      THEN94Ø
FG 62Ø OPEN2,8,2,"S,U,W":INPUT
      #15,EN,EB$,ET,ES:IFEN<>
      ØTHEN94Ø
BE 63Ø HS=INT(SI/256):LS=SI-HS
      *256:SF=HS
SP 64Ø PRINT#2,CHR$(LS)CHR$(HS
      )CHR$(23)CHR$(9)CHR$(Ø)
      CHR$(Ø);
KR 65Ø FORN=ØTOSI-5:PRINT#2,CH
      R$(PEEK(AD+N));:PRINTIN
      T(N/(SI-5)*1ØØ)"{LEFT}%
      {UP}"
DE 66Ø NEXT:CLOSE2
BQ 67Ø DATA84,1Ø1,12Ø,116,32,3
      2,83,99,114,97,112
CD 68Ø P$="":FORN=ØTO1Ø:READX:
      P$=P$+CHR$(X):NEXT
FF 69Ø OPEN2,8,2,"#":T=18:S=1:
      DI$=P$:GOSUB6Ø
RR 7ØØ IFFF=ØTHENPRINT"{DOWN}
      {RVS}NO TEXT SCRAP FILE
      ":GOTO87Ø
BE 71Ø T1=T:S1=S:FS=256*SH+SL-
      1:T2=TP:S2=SP:K1=KP
JD 72Ø REM ---- SWAP T/S POINT
      ERS AND DELETE 'S' FILE
QS 73Ø T=18:S=1:DI$="S":GOSUB6
      Ø
DK 74Ø PRINT#15,"B-P:2,"+STR$(
      32*KP+3)
CX 75Ø PRINT#2,CHR$(T2)CHR$(S2
      );
CD 76Ø PRINT#15,"B-P:2,"+STR$(
      32*KP+3Ø)
EF 77Ø FH=INT(FS/256):FL=FS-25
      6*FH
XQ 78Ø PRINT#2,CHR$(FL)CHR$(FH
      );
GC 79Ø PRINT#15,"U2:2 Ø"+STR$(
      T)+STR$(S)
QX 8ØØ PRINT#15,"U1:2 Ø"+STR$(
      T1)+STR$(S1)
HB 81Ø PRINT#15,"B-P:2,"+STR$(
      32*K1+3)
DH 82Ø PRINT#2,CHR$(TP)CHR$(SP
      );
XP 83Ø PRINT#15,"B-P:2,"+STR$(
      32*K1+3Ø)
JC 84Ø PRINT#2,CHR$(SF+1)CHR$(
      Ø);
KA 85Ø PRINT#15,"U2:2 Ø"+STR$(
      T1)+STR$(S1)
AR 86Ø PRINT#15,"S0:S"
EC 87Ø CLOSE2:CLOSE15
QK 88Ø PRINT"{2 DOWN}{7}DONE..
      . INSERT GEOS MASTER DI
      SK IN"
FS 89Ø PRINT"DRIVE THEN HIT
      {RVS}RETURN{OFF} TO BOO
      T."
AR 9ØØ GETA$:IFA$<>CHR$(13)THE
      N9ØØ
HE 91Ø PRINT"{CLR}"CHR$(142):L
      OAD"GEOS",8,1
XX 92Ø END
QK 93Ø REM ---- IN CASE OF DIS
      K ERROR....
KQ 94Ø PRINT"{CLR}";SPC(2Ø-LEN
      (EB$)/2)"{DOWN}{YEL}"+E
      B$
GG 95Ø PRINT"{DOWN}{GRN}
      {11 SPACES}RESETTING DR
      IVE...{7}"
MC 96Ø PRINT#15,"UJ":FORN=1TO1
      5ØØ:NEXT:CLOSE15:CLOSE2
      :GOTO59Ø
AQ 97Ø PRINT"{DOWN}"SPC(8)"
      {YEL}** OVERFLOW ERROR
      {SPACE}**{7}{DOWN}"
SD 98Ø PRINT"THE REQUESTED FIL
      E EXCEEDS THE"MC
KD 99Ø PRINT"CHARACTER MAXIMUM
      .{2 SPACES}PRESS {RVS}R
      ETURN{OFF} TO":PRINT"RE
      TRY."
CC 1ØØØ GETA$:IFA$<>CHR$(13)TH
       EN1ØØØ
DK 1Ø1Ø GOTO3Ø
```

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TACK TRUCK

By Scott Gifford

In the year 2000, the economy is in worse shape than it is now. Competition in the thumbtack delivery business is especially fierce. Drivers go to any length to be the first to deliver their tacks.

In this two-player arcade-style game for the 64, drivers duel to be the first out of the parking lot of an office supply store. In an attempt to gain an advantage, the drivers open the rear doors of their trucks, allowing a steady stream of thumbtacks to pour onto the pavement. Watch where you steer your truck; even the best tires can't survive passing over these tacks.

Typing It In

Tack Truck is written entirely in machine language. To enter it, you'll have to use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following values.

Starting address: C000
Ending address: C9F7

Be sure to save a copy of the program before you exit MLX.

Start Your Engines

Load Tack Truck with the ,8,1 extension, and then type *SYS 49152*. Before the game begins, you'll have a chance to change various options. You can select the number of games that must be won before a winner is declared. You can select the speed of the trucks (1 is very fast), and you can decide on the number of obstacles. These latter items are the remnants of previous duels.

Both players can use their joysticks to select truck colors. Both must press their fire buttons simultaneously to start the game.

At the beginning of each round, player 1's truck appears in the upper left corner; player 2's truck appears in the lower right. Trucks are moving as soon as the game starts, so be ready. Avoid the border of the parking lot, avoid your opponent's truck, and avoid the trails of tacks that litter the parking lot. The player who survives the longest wins the round and collects points. If both drivers crash at the same time, no points are awarded. Press both fire buttons to restart a game.

TACK TRUCK

```
C000:AD 0E DC 29 FE 8D 0E DC 31
C008:A5 01 29 FB 85 01 A9 00 05
C010:85 FB A9 38 85 FC A9 00 7F
C018:85 FD A9 D0 85 FE A2 04 8F
C020:A0 00 B1 FD 91 FB C8 D0 E6
C028:F9 CA F0 07 E6 FC E6 FE DF
C030:4C 22 C0 A5 01 09 04 85 8C
C038:01 AD 0E DC 09 01 8D 0E AA
C040:DC AD 18 D0 29 F0 18 09 F1
C048:0E 8D 18 D0 A9 D7 85 FB F7
C050:A9 38 85 FC A9 BC 85 FD 7E
C058:A9 C5 85 FE A0 28 B1 FD C7
C060:91 FB 88 D0 F9 A9 00 8D CB
C068:20 D0 8D 21 D0 8D B3 C5 DB
C070:8D B4 C5 A9 93 20 D2 FF FB
C078:A9 FF 85 9E A9 D7 85 9F C0
C080:A2 06 A9 07 8D 70 C9 20 5C
C088:55 C9 A9 18 85 9E A9 D9 B1
C090:85 9F A2 06 A9 02 8D 70 52
C098:C9 20 55 C9 A9 FF 85 FB A2
C0A0:A9 03 85 FC A9 E4 85 FD 22
C0A8:A9 C5 85 FE A2 0D A0 28 C3
C0B0:B1 FD 91 FB 88 D0 F9 18 10
C0B8:A5 FB 69 28 85 FB A5 FC 20
C0C0:69 00 85 FC 18 A5 FD 69 34
C0C8:28 85 FD A5 FE 69 00 85 FC
C0D0:FE CA D0 DA A9 99 20 D2 13
C0D8:FF 18 A0 0B A2 0F 20 F0 A7
C0E0:FF A0 00 B9 ED C7 20 D2 C7
C0E8:FF C8 C0 18 D0 F5 18 A0 65
C0F0:07 A2 11 20 F0 FF A0 00 8B
C0F8:B9 05 C8 20 D2 FF C8 C0 9C
C100:1C D0 F5 18 A0 02 A2 13 6B
C108:20 F0 FF A0 00 B9 21 C8 D3
C110:20 D2 FF C8 C0 21 D0 F5 07
C118:18 A0 02 A2 14 20 F0 FF 3D
C120:A0 00 B9 42 C8 20 D2 FF BB
C128:C8 C0 21 D0 F5 18 A0 09 CB
C130:A2 16 20 F0 FF A0 00 B9 D9
C138:63 C8 20 D2 FF C8 C0 1A 8F
C140:D0 F5 18 A0 06 A2 18 20 C1
C148:F0 FF A0 00 B9 7D C8 20 CD
C150:D2 FF C8 C0 1B D0 F5 20 8A
C158:7E C9 20 95 C9 20 AC C9 DC
C160:20 B3 C9 20 BA C9 A5 C5 2A
C168:C9 04 D0 2D AD 8D 02 F0 57
C170:06 CE B7 C5 4C 7A C1 EE BC
C178:B7 C5 AD B7 C5 C9 00 D0 A0
C180:05 A9 14 8D B7 C5 C9 15 C9
C188:D0 05 A9 01 8D B7 C5 20 F1
C190:7E C9 A9 08 20 D1 C9 A9 01
C198:00 C9 05 D0 2D AD 8D 02 79
C1A0:F0 06 CE B8 C5 4C AB C1 FB
C1A8:EE B8 C5 AD B8 C5 C9 33 09
C1B0:D0 05 A9 00 8D B8 C5 C9 B7
C1B8:FF D0 05 A9 32 8D B8 C5 AA
C1C0:20 95 C9 A9 08 20 D1 C9 BB
C1C8:A9 00 C9 03 D0 2B AD 8D A6
C1D0:02 F0 06 CE B9 C5 4C DC 99
C1D8:C1 EE B9 C5 AD B9 C5 C9 36
C1E0:15 D0 05 A9 01 8D B9 C5 D5
C1E8:C9 00 D0 05 A9 14 8D B9 2E
C1F0:C5 20 BA C9 A9 08 20 D1 D2
C1F8:C9 AD 00 DC 20 D4 C8 E0 61
C200:03 D0 19 CE B5 C5 AD B5 21
C208:C5 C9 00 D0 05 A9 0F 8D 6A
C210:B5 C5 20 AC C9 A9 10 20 E5
C218:D1 C9 A2 00 E0 04 D0 17 1D
C220:EE B5 C5 AD B5 C5 C9 10 86
C228:D0 05 A9 01 8D B5 C5 20 8B
C230:AC C9 A9 08 20 D1 C9 AD BD
C238:01 DC 20 D4 C8 E0 03 D0 67
C240:19 CE B6 C5 AD B6 C5 C9 D6
C248:00 D0 05 A9 0F 8D B6 C5 1F
C250:20 B3 C9 A9 08 20 D1 C9 D4
C258:A2 00 E0 04 D0 17 EE B6 03
C260:C5 AD B6 C5 C9 10 D0 05 9C
C268:A9 01 8D B6 C5 20 B3 C9 FF
C270:A9 10 20 D1 C9 AD 00 DC D1
C278:0D 01 DC 29 10 F0 03 4C 89
C280:66 C1 A9 93 20 D2 FF A9 0E
C288:04 8D B1 C5 A9 03 8D B2 2D
C290:C5 A9 00 8D 20 D0 8D BC 58
C298:C5 A9 FF 85 9E A9 D7 85 94
C2A0:9F A2 19 A9 07 8D 70 C9 75
C2A8:20 55 C9 A9 00 85 FC A9 21
C2B0:04 85 FD 20 A8 C8 A9 C0 D7
C2B8:85 FC A9 07 85 FD 20 A8 F2
C2C0:C8 A9 28 85 FC A9 04 85 8E
C2C8:FD 20 B2 C8 A9 4F 85 FC CA
C2D0:A9 04 85 FD 20 B2 C8 AD C7
C2D8:B8 C5 D0 03 4C 3E C3 8D E6
C2E0:BB C5 A9 9E 20 D2 FF A9 CA
C2E8:00 8D 18 D4 A0 00 B9 A1 3C
C2F0:C8 99 0E D4 C8 C0 06 D0 76
C2F8:F5 38 AD 1B D4 E9 15 B0 18
C300:FC 69 17 AA 38 AD 1B D4 71
C308:E9 25 B0 FC 69 27 A8 8A 77
C310:38 E9 0B B0 09 98 38 E9 9F
C318:0B B0 03 4C F9 C2 8A 18 7E
C320:69 F2 90 09 98 18 69 E3 97
C328:90 03 4C F9 C2 18 20 F0 89
C330:FF A9 5F 20 D2 FF CE BB FF
C338:C5 F0 03 4C F9 C2 A9 CE 01
C340:85 FB A9 04 85 FC A9 19 8B
C348:85 FD A9 07 85 FE 20 CB EB
C350:C8 AD 00 DC 20 D4 C8 E0 3C
C358:05 F0 03 8E B1 C5 A9 1F FE
C360:A0 00 91 FB 18 A5 FB 69 E2
C368:00 85 9E A5 FC 69 D4 85 3C
C370:9F A9 07 A0 00 91 9E A9 4A
C378:FB 85 9E A9 00 85 9F AD D0
C380:B1 C5 20 F5 C8 A0 00 B1 30
C388:FB C9 20 F0 05 A9 01 8D F1
C390:BC C5 8A A0 00 91 FB 18 99
C398:A5 FB 69 00 85 9E A5 FC 0E
C3A0:69 D4 85 9F AD B5 C5 A0 2D
C3A8:00 91 9E AD 01 DC 20 D4 D3
C3B0:C8 E0 05 F0 03 8E B2 C5 02
C3B8:A9 1F A0 00 91 FD 18 A5 4B
C3C0:FD 69 00 85 9E A5 FE 69 EC
C3C8:D4 85 9F A9 07 A0 00 91 F6
C3D0:9E A9 FD 85 9E A9 00 85 4B
C3D8:9F AD B2 C5 20 F5 C8 A0 59
C3E0:00 B1 FD C9 20 F0 08 AD B3
C3E8:BC C5 09 02 8D BC C5 8A F6
C3F0:A0 00 91 FD 18 A5 FD 69 97
C3F8:00 85 9E A5 FE 69 D4 85 DC
C400:9F AD B6 C5 A0 00 91 9E BE
C408:AD BC C5 F0 03 4C 19 C4 9F
C410:AD B7 C5 20 D1 C9 4C 51 B8
C418:C3 AD BC C5 C9 03 D0 33 12
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```
C420:18 A5 FB 69 00 85 9E A5 2E
C428:FC 69 D4 85 9F AD B5 C5 62
C430:A0 00 91 9E A9 56 91 FB EB
C438:18 A5 FD 69 00 85 9E A5 86
C440:FE 69 D4 85 9F AD B6 C5 7D
C448:A0 00 91 9E A9 56 91 FD 06
C450:4C 9F C4 C9 01 D0 23 18 C6
C458:A5 FB 69 00 85 9E A5 FC CF
C460:69 D4 85 9F AD B5 C5 A0 EE
C468:00 91 9E A9 56 91 FB AD 63
C470:B6 C5 8D 20 D0 EE B4 C5 EB
C478:A9 00 C9 02 D0 21 18 A5 11
C480:FD 69 00 85 9E A5 EE 69 AE
C488:D4 85 9F AD B6 C5 A0 00 BA
C490:91 9E A9 56 91 FD AD B5 BA
C498:C5 8D 20 D0 EE B3 C5 A9 F4
C4A0:40 20 D1 C9 AD B3 C5 CD BE
C4A8:B9 C5 D0 09 AD B5 C5 8D 88
C4B0:70 C9 4C 70 C5 AD B4 C5 89
C4B8:CD B9 C5 D0 09 AD B6 C5 8F
C4C0:8D 70 C9 4C 70 C5 A0 10 17
C4C8:A2 09 18 20 F0 FF 20 ED A0
C4D0:C9 A0 10 A2 0A 18 20 F0 75
C4D8:FF 20 ED C9 A9 99 20 D2 8B
C4E0:FF A0 10 A2 0B 18 20 F0 A8
C4E8:FF A9 20 20 D2 FF 20 D2 8C
C4F0:FF A9 5E 20 D2 FF A9 20 BC
C4F8:20 D2 FF AD B3 C5 20 71 88
C500:C9 8A 20 D2 FF 98 20 D2 B9
C508:FF A9 20 20 D2 FF 20 D2 AD
C510:FF A0 10 A2 0C 18 20 F0 E1
C518:FF A9 20 20 D2 FF 20 D2 BD
C520:FF A9 5E 20 D2 FF A9 20 ED
C528:20 D2 FF AD B4 C5 20 71 C1
C530:C9 8A 20 D2 FF 98 20 D2 E9
C538:FF A9 20 20 D2 FF 20 D2 DD
C540:FF A0 10 A2 0D 18 20 F0 1A
C548:FF 20 ED C9 A0 10 A2 0E CE
C550:18 20 F0 FF 20 ED C9 AD 08
C558:B5 C5 8D CA D9 AD B6 C5 47
C560:8D F2 D9 AD 00 DC 0D 01 14
C568:DC 29 10 D0 F6 4C 82 C2 6C
C570:A9 93 20 D2 FF A9 90 20 CE
C578:D2 FF AD 20 D0 8D 21 D0 F4
C580:A0 0F A2 0C 18 20 F0 FF 58
C588:A0 00 B9 98 C8 20 D2 FF 91
C590:C8 C0 09 D0 F5 AD 70 C9 EF
C598:CD B5 C5 D0 0A AD 00 DC 22
C5A0:29 10 D0 F9 4C 65 C0 AD A5
C5A8:01 DC 29 10 D0 F9 4C 65 7E
C5B0:C0 04 03 00 00 02 06 05 17
C5B8:00 01 40 00 00 00 3C 5A 5F
C5C0:7E 7E 3C 3C 3C 00 3C 3C 0D
C5C8:3C 7E 7E 5A 3C 00 10 5D E6
C5D0:EF E3 FF 36 00 00 08 3A FA
C5D8:F7 C7 FF 36 00 71 27 21 EA
C5E0:02 AE 42 20 04 20 20 20 64
C5E8:20 20 20 20 20 20 1F 1F 71
C5F0:1F 1F 1F 20 20 20 1F 20 99
C5F8:20 20 20 1F 1F 1F 1F 20 66
C600:20 1F 20 20 1F 20 20 20 45
C608:20 20 20 20 20 20 20 20 95
C610:20 20 20 20 20 20 20 20 9D
C618:1F 20 20 20 20 1F 20 1F 20
C620:20 20 1F 20 20 20 20 1F 8C
C628:20 1F 20 1F 20 20 20 20 65
C630:20 20 20 20 20 20 20 20 BD
C638:20 20 20 20 20 20 20 20 C5
C640:1F 20 20 20 1F 20 20 20 45
C648:1F 20 1F 20 20 20 20 20 35
C650:20 1F 1F 20 20 20 20 20 7D
C658:20 20 20 20 20 20 20 20 E5
C660:20 20 20 20 20 20 20 20 ED
C668:1F 20 20 20 1F 1F 1F 1F 66
C670:1F 20 1F 20 20 20 20 20 5D
C678:20 1F 1F 1F 20 20 20 20 95
C680:20 20 20 20 20 20 20 20 0E
C688:20 20 20 20 20 20 20 20 16
C690:1F 20 20 20 1F 20 20 20 95
C698:1F 20 1F 20 20 20 20 1F 84
C6A0:20 1F 20 1F 20 20 20 20 DD
C6A8:20 20 20 20 20 20 20 20 36
C6B0:20 20 20 20 20 20 20 20 3E
C6B8:1F 20 20 20 1F 20 20 20 BD
C6C0:1F 20 20 1F 1F 1F 1F 20 AF
C6C8:20 1F 20 20 1F 20 20 20 0E
C6D0:20 20 20 20 20 20 20 20 5E
C6D8:20 20 20 20 20 20 20 20 66
C6E0:20 20 20 20 20 20 20 20 6E
C6E8:20 20 20 20 20 20 20 20 76
C6F0:20 20 20 20 20 20 20 20 7E
C6F8:20 20 20 20 20 20 20 20 86
C700:20 20 20 1E 1E 1E 1E 1E 51
C708:20 1B 1E 1E 1E 20 20 1C E1
C710:20 20 20 1B 20 20 1D 1D 46
C718:1D 1D 20 20 1C 20 20 1E 43
C720:20 20 20 20 20 20 20 20 AF
C728:20 20 20 20 20 1B 20 20 A3
C730:20 1B 20 20 20 1C 20 1C 6A
C738:20 20 20 1B 20 1C 20 20 67
C740:20 20 1D 20 1C 20 1E 20 4B
C748:20 20 20 20 20 20 20 20 D7
C750:20 20 20 20 20 1B 20 20 CB
C758:20 1B 20 20 20 1C 20 1C 92
C760:20 20 20 1B 20 1C 20 20 8F
C768:20 20 20 20 1C 1E 20 20 CF
C770:20 20 20 20 20 20 20 20 FF
C778:20 20 20 20 20 1B 20 20 F3
C780:20 1B 1D 1D 1D 1C 20 1C 12
C788:20 20 20 1B 20 1C 20 20 B7
C790:20 20 20 20 1C 1E 1E 20 F3
C798:20 20 20 20 20 20 20 20 28
C7A0:20 20 20 20 20 1B 20 20 1C
C7A8:20 1B 20 20 1C 20 20 1C D2
C7B0:20 20 20 1B 20 1C 20 20 DF
C7B8:20 20 1D 20 1C 20 1E 20 C3
C7C0:20 20 20 20 20 20 20 20 50
C7C8:20 20 20 20 20 1B 20 20 44
C7D0:20 1B 20 20 20 1C 20 20 0F
C7D8:1E 1E 1E 20 20 20 1E 1E A0
C7E0:1E 1E 20 20 1C 20 20 1E CC
C7E8:20 20 20 20 20 53 50 45 CA
C7F0:45 44 20 3A 20 20 20 20 BD
C7F8:20 20 20 20 20 20 20 20 88
C800:20 28 46 31 29 4F 42 53 E5
C808:54 41 43 4C 45 53 20 3A 33
C810:20 20 20 20 20 20 20 20 A1
C818:20 20 20 20 20 28 46 33 29
C820:29 50 4C 41 59 45 52 20 9C
C828:31 20 43 4F 4C 4F 52 20 1C
C830:3A 20 5E 20 20 20 20 20 96
C838:20 20 20 20 20 20 28 4A 04
C840:31 29 50 4C 41 59 45 52 CF
C848:20 32 20 43 4F 4C 4F 52 4B
C850:20 3A 20 5E 20 20 20 20 4C
C858:20 20 20 20 20 20 20 28 F1
C860:4A 32 29 50 4C 41 59 20 08
C868:54 4F 20 3A 20 20 20 20 81
C870:20 20 20 20 20 20 20 20 02
C878:20 28 46 37 29 50 52 45 D4
C880:53 53 20 42 4F 54 48 20 35
C888:42 55 54 54 4F 4E 53 20 DA
C890:54 4F 20 53 54 41 52 54 F9
C898:47 41 4D 45 20 4F 56 45 4C
C8A0:52 64 19 00 00 81 09 81 31
C8A8:A0 28 A9 1F 88 91 FC D0 11
C8B0:FB 60 A0 00 A2 17 A9 1F 50
C8B8:91 FC A5 FC 18 69 28 85 13
C8C0:FC A5 FD 69 00 85 FD CA 6D
C8C8:D0 EC 60 A9 1F A0 00 91 B1
C8D0:FB 91 FD 60 A2 00 38 E8 F8
C8D8:6A 90 04 E0 05 D0 F8 60 10
C8E0:A0 00 A2 00 B1 FB C9 1F 47
C8E8:D0 02 A2 06 B1 FD C9 1F 50
C8F0:D0 02 A2 06 60 A8 18 69 5F
C8F8:1A AA 98 C9 01 D0 13 38 9B
C900:A0 00 B1 9E E9 28 91 9E B5
C908:C8 B1 9E E9 00 91 9E 4C AE
C910:54 C9 C9 02 D0 13 18 A0 3D
C918:00 B1 9E 69 28 91 9E C8 10
C920:B1 9E 69 00 91 9E 4C 54 55
C928:C9 C9 03 D0 13 38 A0 00 3B
C930:B1 9E E9 01 91 9E C8 B1 DB
C938:9E E9 00 91 9E 4C 54 C9 47
C940:C9 04 D0 10 18 A0 00 B1 C9
C948:9E 69 01 91 9E C8 B1 9E D8
C950:69 00 91 9E 60 A0 28 AD 38
C958:70 C9 91 9E 88 D0 FB 18 4A
C960:A5 9E 69 28 85 9E A5 9F AF
C968:69 00 85 9F CA D0 E6 60 23
C970:07 A2 30 38 E8 E9 0A B0 6D
C978:FB CA 69 3A A8 60 18 A2 27
C980:0F A0 13 20 F0 FF AD B7 C2
C988:C5 20 71 C9 8A 20 D2 FF 4C
C990:98 20 D2 FF 60 18 A2 11 8C
C998:A0 13 20 F0 FF AD B8 C5 42
C9A0:20 71 C9 8A 20 D2 FF 98 67
C9A8:20 D2 FF 60 AD B5 C5 8D 64
C9B0:0B DB 60 AD B6 C5 8D 33 C2
C9B8:DB 60 18 A2 16 A0 13 20 F8
C9C0:F0 FF AD B9 C5 20 71 C9 79
C9C8:8A 20 D2 FF 98 20 D2 FF EE
C9D0:60 8D BB C5 A0 08 A2 00 36
C9D8:A5 C5 C9 06 D0 03 4C 65 DA
C9E0:C0 CA D0 F4 88 D0 F1 CE 2B
C9E8:BB C5 D0 E8 60 A2 07 A9 B9
C9F0:20 20 D2 FF CA D0 FA 60 E6
```

Scott Gifford is a GEOS fan who lives in Flushing, Michigan.

HAM ANTENNAS

By Clifford Hudson

Designing antennas can be a complex yet important part of receiving and transmitting radio frequency signals for ham radio operators and shortwave listeners. This article won't go into the theory of antenna design, but it will help hams and SWLs when it comes to constructing a variety of popular antenna types.

Entering the Program

Ham Antennas is a menu-driven program for six different antenna designs.

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It is written entirely in BASIC. To help avoid typing errors, use The Automatic Proofreader; see "Typing Aids" elsewhere in this section.

Note that lines 3032 and 3034 contain more than 80 characters. To enter these lines, use the BASIC shorthand ?TAB instead of PRINTTAB and omit spaces following the line number. List the line, place your cursor anywhere on the line, and then press Return to get the correct Proofreader checksum. Be sure to save a copy of the program before exiting Proofreader.

A Few Terms

Before we get into the program itself, let's clarify a few abbreviations that are used in Ham Antennas.

REF = Reflector. The longest element on quads or Yagis.
DE = Driven Element. The element where coax is attached.
DR# = Directors 1–4. DR#1 is the element directly ahead of the driven element.
Z = Impedance. Refers to the impedance at the feed point.
RF = Radio Frequency. The power out of the final network.
FMHZ= Frequency in megahertz.

The Menu

When you load and run Ham Antennas, you'll be presented with the following menu. Press the number next to the type that you want to construct.

1. Quad
2. Yagi
3. Spacing
4. Dipole
5. Folded Dipole
6. Long Wire
   A. Number of 1/2 wavelengths in antenna.
   B. Length of 1/2 wave coax at design frequency.

After you select any antenna type, you'll be asked for the desired operating frequency (FMHZ). Enter the frequency in megahertz and press Return. Ham Antennas will take the calculations from there and print the results.

Antenna Tips

Here's a brief rundown of each antenna. For more detailed information, consult the *American Radio Relay League (ARRL) Antenna Handbook*. It is available through the ARRL at 225 Main Street, Newington, Connecticut 06111.

The driven element for a quad antenna can be used for loop calculations. The impedance (Z) of a loop is about 100 ohms, so you could use 75-ohm coax for feedline and have a transfer of 1.5 : 1—not bad. The antenna can be mounted either vertically or horizontally. Feed at the side is vertical polarization; feed at the bottom is horizontal. Use at least 13-gauge wire or larger to compensate for skin effect. Larger wire also broad-bands the antenna.

When designing quads or Yagis, use the Spacing selection for all your element spacing needs. The program handles only one input calculation at a time. Here are some figures to use as a reference.

From the reflector to the driven element (REF to DE), the spacing should be .15 to .25 wavelengths. From the driven element to the first director (DE to DR#1), correct spacing is .1 wavelengths. From the second director to the fourth director (DR#2 to DR#4), spacing should be .2 wavelengths, with .4 for every additional director. These values appear onscreen when you run the program. For reference purposes, Ham Antennas uses 984 times the wavelength divided by the frequency.

The dipole is the easiest and most simple antenna to build. Using 468 divided by the frequency gives us a half wavelength. Cut that figure in half and attach coax; now jump to selection 6 (use the B section) to figure the half-wave of coax feedline for your dipole. Use even numbers of half-wavelengths to connect to your radio. It's convenient to insert coils on each side and make a dipole a dual-bander. I recommend Gazette's CoilCalc (June 1991) as an excellent program for making coils. I've used it to extend my 75-meter loop for the 160-meter band.

Folded dipoles are full-wavelength antennas. These are monoband antennas only, usually cut from 300-ohm television lead or 75- or 50-ohm coax for impedance matching.

For the long wire antenna selection, two inputs are required. The first is the odd half-waves followed by the frequency. Enter them and press Return. Ham Antennas will also give you the half-wavelengths in phase at the design frequency.

In closing, keep in mind that what looks good on paper isn't always what works exactly best in the real world. Ham Antennas calculations will be close, but you should then fine-tune your actual lengths with a standing wave ratio bridge. Have fun and 73 (best regards).

HAM ANTENNAS

```
ME 0 REM COPYRIGHT 1992 COMPUT
     E PUBLICATIONSINTL LTD -
     {SPACE}ALL RIGHTS RESERVE
     D
BB 1 GOSUB2075:GOTO900
MM 2 PRINT"{CLR}":GOSUB2070:GO
     SUB4091
JQ 3 PRINTTAB(14)"{3 DOWN}<<-Q
     UAD->>"
GG 4 PRINT:PRINT:PRINT:PRINT:P
     RINT:PRINT
RB 10 INPUT"{RVS}{6}CENTER FRE
     Q. DE";F
DA 20 W=1005/F
QH 25 PRINT"{DOWN}ONE WAVELENG
     TH DE":GOSUB4092
AS 30 X=W/4
ED 40 GOSUB4094:GOSUB4093
XF 45 GOSUB4095:GOSUB4096
AK 75 INPUT"{2 DOWN}CENTER FRE
     Q. REF.";F
KH 85 W=1035/F
QS 90 PRINT"{DOWN}ONE WAVELENG
     TH REF.":GOSUB4092
AA 100 X=W/4
DJ 110 GOSUB4094:GOSUB4093
JC 120 GOSUB4095:GOSUB4096
XJ 200 INPUT"{4 DOWN}CENTER FR
     EQ. DR#1";F
SH 210 W=995/F
XJ 215 PRINT"{DOWN}ONE WAVELEN
     GTH DR#1":GOSUB4092
XJ 220 X=W/4
FA 230 GOSUB4094:GOSUB4093
PM 240 GOSUB4095:GOSUB4096
GB 300 INPUT"{2 DOWN}CENTER FR
     EQ.DR#2";F
XR 310 W=895/F
KA 315 PRINT"{DOWN}ONE WAVELEN
     GTH DR#2":GOSUB4092
CS 320 X=W/4
AM 330 GOSUB4094:GOSUB4093
GQ 340 GOSUB4095:GOSUB4096
AB 364 INPUT:PRINT"{CLR}"
GR 380 GOSUB4098:PRINT"
     {5 DOWN}CHOOSE 1,2"
DQ 381 GETA$:IFA$=""THEN381
FM 382 Q=VAL(A$):IFQ<1ORQ>2THE
     N381
XH 383 ONQGOTO2,900
AF 386 IFQ=2THEN ONVGOTO900
XC 600 REM ELM SPACING
```


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```
PH 601 PRINT"{CLR}":PRINTTAB(1
       1)"{DOWN}<- ANT. ELM SP
       ACING ->"
QB 602 PRINT "{DOWN}1.YAGI REF
        TO DE USE .15 OR .25":
       PRINT "{DOWN}2.DE-DR#1
       {SPACE}USE .1"
AP 603 PRINT "{DOWN}3.DR'S 2,3
       ,4, USE .2":PRINT "
       {DOWN}4.EA ADD DR'S, US
       E .4"
HQ 604 PRINT "{DOWN}5.EA ADD D
       R'S 1% LESS THAN PRECEE
       DING DIRECTOR"
SG 610 INPUT"{3 DOWN}CHOICE OF
        SPACING";A
RB 620 INPUT"{DOWN}DESIGN FREQ
        MHZ.=";F
HH 630 K=984
KJ 640 W=(K/F)*A
SX 650 PRINT W"FEET":PRINT W*1
       2"INCHES"
MR 655 FORT=1TO1000:NEXT
JG 660 GOSUB4097
MF 665 INPUT
AJ 670 GOSUB 4098
AM 675 GOSUB4099
HK 680 GETA$:IFA$=""THEN680
QA 685 X=VAL(A$)
GA 690 ONXGOTO600,900
JQ 700 GOSUB 2010
AJ 705 PRINT"{CLR}":GOSUB04091
DP 710 PRINTTAB(11)"{1}
       {3 DOWN}<- YAGI ELEMENT
       S ->"
EJ 715 INPUT"{3 DOWN}CENTER FR
       EQ REF:";F
XA 720 W=510/F
BQ 725 PRINT"{2 DOWN}LENGTH OF
        REF ELM:":PRINTW"FEET"
       :PRINTW*12"INCHES"
GD 730 PRINT"{2 DOWN}FROM CENT
       ER OF BOOM:":PRINTW"FEE
       T":PRINTW*12/2"INCHES"
SP 735 X=W
AA 740 INPUT"{3 DOWN}CENTER FR
       EQ DE:";F
HG 745 W=473/F
DP 750 PRINT"{2 DOWN}LENGTH OF
        DE:":PRINTW"FEET":PRIN
       TW*12"INCHES"
AD 752 PRINT"{2 DOWN}FROM CENT
       ER OF BOOM:":PRINTW/2"F
       EET":PRINTW*12/2"INCHES
       "
GQ 755 X=W
PQ 765 INPUT"{3 DOWN}CENTER FR
       EQ DR#1:";F
QH 770 W=445/F
HH 771 PRINT"{DOWN}LENGTH OF D
       R#1:":PRINTW"FEET":PRIN
       TW*12"INCHES"
KK 772 PRINT"{DOWN}FROM CENTER
        OF BOOM:":PRINTW"FEET"
       :PRINTW*12/2"INCHES"
PS 774 GOSUB4097
FQ 775 INPUT
BH 777 GOSUB4098:GOSUB4099
QA 780 GETA$:IFA$=""THEN780
KG 785 X=VAL(A$)
GP 790 ONXGOTO700,900
AQ 800 GOSUB2015:PRINT"{CLR}":
       GOSUB4091
QB 820 PRINTTAB(13)"{3 DOWN}<-
        DIPOLE ->"
AK 824 INPUT"{5 DOWN}CENTER FR
       EQ MHZ:";F
KR 825 W=468/F
HH 830 PRINT"{DOWN}ONE HALF WA
       VE DIPOLE:":GOSUB4092
FA 835 PRINT"{DOWN}1/4 WAVE EA
        SIDE:":PRINTW/2"FEET":
       PRINTW*12"INCHES"
HS 840 X=W/2
GX 845 GOSUB4097:INPUT:PRINT"
       {CLR}"
CD 860 GOSUB4098:GOSUB4099
MG 875 GETA$:IFA$=""THEN875
MR 880 X=VAL(A$)
XC 885 ONXGOTO800,900
HQ 900 GOSUB 2050
SB 905 PRINT"{CLR}":PRINTTAB(1
       2)"{BLK}{DOWN}< MAIN ME
       NU > ":PRINTTAB(10)"
       {DOWN} ANTENNA BUILDER
       {2 SPACES}"
CK 910 PRINTTAB(11)"{DOWN}PROG
       RAM CHOICES":PRINTTAB(5
       )"{8}{DOWN}1.QUAD":PRIN
       TTAB(5)"2.YAGI"
HP 915 PRINTTAB(5)"3.SPACING":
       PRINTTAB(5)"4.DIPOLE":P
       RINTTAB(5)"5.FOLDED DIP
       OLE"
KP 917 PRINTTAB(5)"6.LONG WIRE
       "
GG 918 PRINTTAB(6)"A.# 1/2 WAV
       ES IN PHASE"
MJ 919 PRINTTAB(6)"B.LENGTH OF
        1/2 WAVE COAX"
BK 920 PRINTTAB(6)"{DOWN}USE #
       3 FOR ALL ANT"
FA 921 PRINTTAB(6)"SPACING CAL
       ULATIONS"
MH 925 PRINT"{3 DOWN}CHOOSE 1,
       2,3,4,5,6"
RF 926 GETA$:IFA$=""THEN926
DH 927 X=VAL(A$):IFX<1ORX>6THE
       N926
PQ 928 ONXGOTO2,700,600,800,30
       00,4000
BF 930 IFX=1 GOTO 2{3 SPACES}:
       REM QUAD
KC 935 IFX=2 GOTO 700 :REM YAG
       I
JR 940 IFX=3 GOTO 600 :REM SPA
       CING
RK 945 IFX=4 GOTO 800 :REM DIP
       OLE
JJ 950 IFX=5 GOTO 3000:REM FOL
       D DIPOLE
PB 955 IFX=6 GOTO 4000:REM LON
       G WIRE
HF 2010 POKE 53281,PEEK(53281)
        AND248 OR 233:PRINT"
        {BLK}":RETURN
SC 2015 POKE 53281,PEEK(53281)
        OR 7:PRINT"{BLK}":RETU
        RN
DB 2040 POKE 53281,PEEK(53281)
        AND 328 OR 233:PRINT"
        {WHT}":RETURN
FR 2050 POKE 53280,14:POKE5328
        1,14:PRINT"{CLR}{WHT}"
        :RETURN
FJ 2070 POKE53280,PEEK(53281)A
        ND248OR233:PRINT"{6}":
        RETURN
CF 2075 POKE 53281,PEEK(53281)
        AND402 OR 160:RETURN
SP 3000 GOSUB2040:GOSUB4091
XP 3005 PRINT"{CLR}":PRINTTAB(
        11)"{2 DOWN}<<<-WIRE A
        NTENNAS->>>"
GR 3006 PRINTTAB(9)"{3 DOWN}<-
        FOLDED DIPOLE ->"
MS 3009 INPUT"{5 DOWN}CENTER F
        REQ MHZ:";F
DP 3010 W=1005/F
HK 3015 PRINT"{DOWN}ONE WAVE L
        ENGTH OVER ALL":GOSUB4
        092
KK 3020 PRINT"{DOWN}1/4 WAVE E
        A SIDE:":PRINTW/2"FEET
        ":PRINTW/2*12"INCHES"
RG 3021 X=W/2
FX 3024 GOSUB 4097
MP 3030 INPUT:PRINT"{CLR}"
FD 3032 PRINTTAB(2)"{DOWN}1.WI
        RE ANT WORK WELL AT 30
        FT. BEST AT{4 SPACES}
        THEIR RESONANT FREQ.
PK 3033 PRINTTAB(4)"1/2 WAVE A
        BOVE GROUND."
PQ 3034 PRINTTAB(2)"{DOWN}2. M
        ULTIBAND ANT'S 1/2 WAV
        E AT LOWEST{4 SPACES}F
        REQ. OPEN WIRE FEED"
GR 3036 GOSUB4097:INPUT:PRINT"
        {CLR}"
EQ 3040 GOSUB4098:GOSUB4099
SA 3055 GETA$:IFA$=""THEN3055
RB 3060 X=VAL(A$)
FA 3065 ONXGOTO3000,900
RG 4000 GOSUB 2075:GOSUB4091
DH 4005 V=2:PRINT"{CLR}":PRINT
        TAB(10)"{DOWN} - WIRE
        {SPACE}ANTENNAS -"
EE 4006 PRINTTAB(11)"{DOWN}
        {3 SPACES}- LONG WIRE
        {SPACE}-{3 SPACES}"
QA 4007 PRINTTAB(7)"{DOWN}
        {2 SPACES}- HARMONIC A
        NTENNAS -{2 SPACES}"
HG 4010 PRINT "{DOWN}1.CUT WIR
        E ODD 1/2 WAVES AT LOW
        EST{8 SPACES}FREQ YOU
        {SPACE}WILL WORK"
EC 4013 PRINT "{DOWN}2.HAVE GO
        OD EARTH GND AND A 4:1
        BALUM{5 SPACES}IN TUN
        ER"
KS 4015 PRINT "{DOWN}3.ELECTRI
        AL LENGTH OF HARMONIC
```


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```
        {SPACE}ANTENNAS"
EK 4020 PRINT"{DOWN}1/2 WAVELE
        NGTH COAX"
QD 4023 PRINT"{DOWN}1.ALL BAND
         INVERTED VEE'S.":PRIN
        T"{DOWN}2.LONG WIRES,
        {SPACE}HAVE VERY HI Z.
        "
JQ 4024 PRINT"{DOWN}WHERE Z IS
         IN REFERENCE TO IMPED
        ANCE"
GM 4025 PRINT"THE LOAD GIVES T
        O THE FEEDLINE AT A FR
        EQ"
PA 4027 GOSUB4097:INPUT:PRINT"
        {CLR}"
KP 4028 INPUT"{RVS}{CYN}
        {3 DOWN}NUMBER OF ODD
        {SPACE}1/2 WAVELENGTH=
        {2 SPACES}";N
PB 4029 INPUT"{RVS}{GRN}{DOWN}
        LOWEST FREQ IN MHZ.
        {2 SPACES}";F
XK 4030 K=492
GC 4035 W=(K/F)*N-.05
XQ 4037 PRINT"{RVS}{YEL}{DOWN}
        LENGTH OF LONG WIRE":G
        OSUB4092
KE 4045 PRINT"{RED}{RVS}{DOWN}
        FREQ IN MHZ. " F
MX 4047 K=984
QD 4048 L=W
PJ 4049 X=F*(L)+.025
AC 4050 PRINT"{RVS}{1}{DOWN}LE
        NGTH OF WIRE IN FEET"
        {SPACE}W
FX 4058 PRINTX/936"NUMBER OF W
        AVELENGTHS":PRINTX/468
        "NUMBER OF 1/2 WAVELEN
        GTHS"
BG 4059 INPUT"{RVS}{6}COAX VEL
        OCITY FACTOR"; V
EC 4060 PRINT"{DOWN}"492/F*V/1
        2"{10 LEFT}{DOWN}=1/2
        {SPACE}WAVE COAX AT DE
        SIGN FREQ IN FEET"
GC 4062 GOSUB4097:INPUT:PRINT"
        {CLR}"
ES 4065 GOSUB4098:GOSUB4099
MG 4080 GETA$:IFA$=""THEN4080
PG 4085 V=VAL(A$)
MH 4090 ONVGOTO4000,900:END
SE 4091 PRINT"{CLR}":RETURN
JE 4092 PRINTW"FEET":PRINTW*12
        " INCHES":RETURN
XR 4093 PRINT"{DOWN}1/4 WAVE E
        A SIDE":PRINT W/4"FEET
        ":PRINT W*12/4"INCHES"
        :RETURN
ES 4094 L=SQR((X*X)+(X*X)/X*X)
        :RETURN
DQ 4095 PRINT"{DOWN}TOTAL WIDT
        H ACROSS SPREADERS":PR
        INTL"FEET":PRINTL*12"I
        NCHES":RETURN
MF 4096 PRINT"{DOWN}DRILL HOLE
         FRM CNTR BOOM":PRINTL
        /2"FEET":PRINTL*12/2"I
        NCHES":RETURN
RF 4097 PRINT" {DOWN}{RVS} {6}
         PRESS RETURN ":RETURN
XA 4098 PRINT"{CLR}":PRINTTAB(
        8)"{DOWN}1.CALC AGAIN?
        ":PRINTTAB(8)"{DOWN}2.
        MAIN MENU":RETURN
FX 4099 PRINT"{4 DOWN}CHOOSE 1
         OR 2":RETURN
KK 5010 END
```

Clifford Hudson, KG6PD, is a ham radio operator in Hesperia, California.

BATTLESHIP 128

By Donald G. Klich

Probably every schoolchild has played the game Battleship using grids drawn on a piece of paper. The object of the game is to place four ships secretly on your grid while your opponent does the same. Then by alternately calling out salvos of three grid locations, you try to sink your opponent's navy.

Problems with the paper version can occur when an opponent sneaks a look at the other's grid. Another problem comes when an opponent scores a hit and the other person winces, unintentionally giving away a ship's location. Battleship 128 is a computerized version for the 128 that updates the old pencil-and-paper favorite.

Typing It In

Battleship 128 is written entirely in BASIC 7.0. To help avoid typing errors, enter the program with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. REM instructions starting with line 180 are included for those readers who enjoy program analysis. These remarks can be omitted if desired.

Battleship 128 remembers where the players locate their ships and produces separate screens depicting each player's progress. When a hit is scored, the program doesn't reveal exactly where it occurred, but displays the entire salvo as possible hits. This makes the game more interesting. When a ship is sunk, it is identified and displayed in red.

Some simple sounds and colors have been added to make the computer version more appealing. As an aid to your gunnery, listen carefully to the sounds of your hits and use them with some basic reasoning to gain a slight advantage over your opponent.

BATTLESHIP 128

```
FK 10 REM COPYRIGHT 1992 - COM
      PUT PUBLICATIONS INTL LT
      D - ALL RIGHTS RESERVED
AQ 20 REM BY DONALD G. KLICH
SP 30 GRAPHIC0,1:PRINTSPC(12)"
      {5 DOWN}SETTING UP"
BS 40 DIM B1(2,2),B2(2,2,2),B3
      (2,3,2),B4(2,4,2),S$(2,4
      5,2),SH(3),G(2,4),T(45,4
      ):ENVELOPE9,0,4,4,10,3:V
      OL9
QS 50 FORI=1TO2:FORJ=1TO45:S$(
      I,J,1)=" ":S$(I,J,2)=" "
      :NEXT:NEXT
PA 60 FORI=0TO4:FORJ=1TO9:T(I*
      9+J,1)=1+4*J:T(I*9+J,2)=
      4*I+4:T(I*9+J,3)=6+16*J:
      T(I*9+J,4)=32*I+36:NEXT:
      NEXT
DP 70 GRAPHIC0,1:PLAY"V1O2T0HC
      QEG.AIEQARO3HCQDO2GO3HCR
      ":VOL0:VOL10:FORP=1TO2
KS 80 GRAPHIC0,1:COLOR0,1:COLO
      R1,2:COLOR2,4:COLOR3,3:C
      OLOR4,1
CA 90 PRINT"{DOWN}{GRN}
      {13 SPACES}BATTLESHIP 12
      8{2 DOWN}"
FK 100 PRINT"{WHT}PLAYER{YEL}"
       P"{WHT}ENTER YOUR BOAT
       {SPACE}POSITIONS.":PRIN
       T"{2 DOWN}EXAMPLES:":PR
       INTSPC(9)"BOAT 1 = D,4
       {5 SPACES}OR":PRINTSPC(
       9)"BOAT 3 = C,3,D,4,E,5
       "
MA 110 PRINT"{DOWN}USE RETURN
       {SPACE}AFTER ENTERING E
       ACH BOAT":PRINT"EVEN TH
       OUGH ENTRIES ARE BLANKE
       D OUT":PRINT"{DOWN}BOAT
       S ARE LENGTHS 1 TO 4 AN
       D CAN BE"
MX 120 PRINT"VERTICAL, HORIZON
       TAL, OR DIAGONAL":PRINT
       :PRINT"SHOTS ARE MADE S
       IMILAR TO BOAT3 ABOVE."
QC 130 PRINT"THOSE THAT ALL MI
       SS ARE SHOWN AS {RVS}WH
       ITE{OFF}":PRINT"IF ANY
       {SPACE}ARE HITS, ALL AR
       E SHOWN AS {RVS}{CYN}BL
       UE{OFF}{WHT}"
FR 140 PRINT"SUNK BOATS ARE SH
       OWN IN {RVS}{RED}RED
       {WHT}{OFF}"
RG 150 PRINT"{3 DOWN}
       {3 SPACES}HIT ANY KEY W
       HEN READY TO START"
XG 160 GETA$:IFA$=""THEN160
QS 170 GOSUB590
SF 180 REM LOAD BOAT LOCATIONS
        FOR EACH PLAYER
```


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```
AK 190 INPUT"{WHT}ENTER LOCATI
       ON OF BOAT 1{BLK}";H$,V
       :GOSUB500:IFE=1THEN190:
       ELSEB1(P,1)=L
HJ 200 PRINTSPC(18)"{WHT}BOAT
       {SPACE}2{BLK}":INPUTH$,
       V,B$,B:GOSUB500:IFE=1TH
       EN200:ELSEB2(P,1,1)=L:H
       $=B$:V=B:GOSUB500:IFE=1
       THEN200:ELSEB2(P,2,1)=L
GC 210 PRINTSPC(18)"{WHT}BOAT
       {SPACE}3{BLK}":INPUTH$,
       V,B$,B,C$,C:GOSUB500:IF
       E=1THEN210:ELSEB3(P,1,1
       )=L:H$=B$:V=B
MP 220 GOSUB500:IFE=1THEN210:E
       LSEB3(P,2,1)=L:H$=C$:V=
       C:GOSUB500:IFE=1THEN210
       :ELSEB3(P,3,1)=L
HJ 230 PRINTSPC(18)"{WHT}BOAT
       {SPACE}4{BLK}":INPUTH$,
       V,B$,B,C$,C,D$,D:GOSUB5
       00:IFE=1THEN230:ELSE:B4
       (P,1,1)=L:H$=B$:V=B:GOS
       UB500
MF 240 IFE=1THEN230:ELSEB4(P,2
       ,1)=L:H$=C$:V=C:GOSUB50
       0:IFE=1THEN230:ELSEB4(P
       ,3,1)=L:H$=D$:V=D:GOSUB
       500:IFE=1THEN230
SM 250 B4(P,4,1)=L:NEXTP:P=1:Q
       =2:PRINT"{WHT}"
CP 260 REM ACCEPT 3 SHOTS AND
       {SPACE}STORE IN TEMP AR
       EA "SH(3)"
MQ 270 GOSUB590:GOSUB530:CHAR1
       ,14,0,CHR$(48+P)
FF 280 PRINT"PLAYER "+CHR$(48+
       P)+", TAKE 3 SHOTS";:IN
       PUTH$,V,B$,B,C$,C:GOSUB
       500:IFE=1THEN280:ELSESH
       (1)=L:H$=B$:V=B:GOSUB50
       0:IFE=1THEN280
RX 290 SH(2)=L:H$=C$:V=C:GOSUB
       500:IFE=1THEN280:ELSESH
       (3)=L
CC 300 REM CHECK BOATS FOR HIT
       S
SH 310 HT=0:FORI=1TO3:IFSH(I)=
       B1(Q,1)THENB1(Q,2)=1:HT
       =1:PLAY"T9G"
FB 320 NEXT:FORI=1TO3:FORJ=1TO
       2:IFSH(I)=B2(Q,J,1)THEN
       B2(Q,J,2)=1:HT=1:PLAY"T
       9G"
XF 330 NEXT:NEXT:FORI=1TO3:FOR
       J=1TO3:IFSH(I)=B3(Q,J,1
       )THENB3(Q,J,2)=1:HT=1:P
       LAY"T9G"
QQ 340 NEXT:NEXT:FORI=1TO3:FOR
       J=1TO4:IFSH(I)=B4(Q,J,1
       )THENB4(Q,J,2)=1:HT=1:P
       LAY"T9G"
MS 350 REM CHANGE SHOTS TO POS
       SIBLE HIT COLOR IFA HIT
        RECORDED
MR 360 NEXT:NEXT:IFHT=1THENFOR
       I=1TO3:S$(P,SH(I),1)="2
       ":S$(P,SH(I),2)="?":NEX
       T
XB 370 IFHT=0THENFORI=1TO3:S$(
       P,SH(I),1)="1":S$(P,SH(
       I),2)="-":NEXT
KD 380 REM CHECK IF ANY BOAT C
       OMPLETELY SUNK, TURN BO
       AT SQUARES RED
AJ 390 IFB1(Q,2)=1THENS$(P,B1(
       Q,1),1)="3":S$(P,B1(Q,1
       ),2)="1":G(Q,1)=1
MB 400 IFB2(Q,1,2)=1ANDB2(Q,2,
       2)=1THENFORI=1TO2:S$(P,
       B2(Q,I,1),1)="3":S$(P,B
       2(Q,I,1),2)="2":NEXT:G(
       Q,2)=1
DG 410 IFB3(Q,1,2)=1ANDB3(Q,2,
       2)=1ANDB3(Q,3,2)=1THENF
       ORI=1TO3:S$(P,B3(Q,I,1)
       ,1)="3":S$(P,B3(Q,I,1),
       2)="3":NEXT:G(Q,3)=1
CE 420 IFB4(Q,1,2)=1ANDB4(Q,2,
       2)=1ANDB4(Q,3,2)=1ANDB4
       (Q,4,2)=1THENFORI=1TO4:
       S$(P,B4(Q,I,1),1)="3":S
       $(P,B4(Q,I,1),2)="4":NE
       XT:G(Q,4)=1
GJ 430 REM CHECK IF ALL BOATS
       {SPACE}SUNK
HP 440 GOSUB530:IFG(Q,1)+G(Q,2
       )+G(Q,3)+G(Q,4)<>4THEN4
       60
KX 450 PLAY"V103T8ICCCDCQDWE":
       PRINT"PLAYER "+CHR$(48+
       P)+" HAS WON THE WAR!..
       ..AGAIN?":GETKEYA$:IFA$
       ="Y"THENRUN:ELSEEND
MQ 460 PRINT"{6 SPACES}PRESS A
       NY KEY TO CONTINUE"
SX 470 GETA$:IFA$=""THEN470
FQ 480 IFP=1THENP=2:Q=1:GOTO27
       0:ELSEP=1:Q=2:GOTO270
AJ 490 REM CONVERT HOR AND VER
       T TO SQUARE #
QQ 500 E=0:IFH$>"I"ORH$<"A"ORV
       <1ORV>5THENE=1:SOUND1,4
       000,10:RETURN
KG 510 L=((V-1)*9)+ASC(H$)-64:
       RETURN
JC 520 REM PRINT GAME RECORD I
       N GRID
DC 530 FORI=1TO45
DD 540 IFS$(P,I,1)=" "THEN570
KF 550 CHAR1,T(I,1),T(I,2),S$(
       P,I,2)
DF 560 CIRCLEVAL(S$(P,I,1)),T(
       I,3),T(I,4),5,,,,,90
FS 570 NEXT:RETURN
FH 580 REM DRAW GRID
MD 590 GRAPHIC4,1,23:FORI=0TO8
       :CHAR1,5+(I*4),1,CHR$(6
       5+I):NEXT:BOX1,14,20,15
       8,180:FORI=0TO4:CHAR1,1
       ,4+(I*4),CHR$(49+I):NEX
       T
HG 600 FORI=52TO148STEP32:DRAW
       1,14,ITO158,I:NEXT:FORI
       =30TO142STEP16:DRAW1,I,
       20TOI,180:NEXT:CHAR1,6,
       0,"PLAYER #"+CHR$(48+P)
       +"'S SCREEN":RETURN
```

Donald G. Klich, the author of Railroad Solitaire (Gazette Disk bonus, July 1992) lives in Mt. Prospect, Illinois.

SPEEDRAM-64

By Frank Gordon

Wouldn't it be convenient if you could use SpeedScript with the 1764 RAM expansion unit (REU) or two drives? Well, you can with Speedram-64.

This BASIC utility converts COMPUTE's word processor into Speedram-64, allowing you to change the drive number from within the program to either 8 or 9. You can also customize the program to run SpeedScript with your favorite background and text colors already loaded.

Typing It In

To help avoid typing errors, enter the BASIC loader with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Numerous REM statements help explain the program, but they may be omitted if you prefer. Be sure to save a copy of the converter (Speedram.cvt) before you exit Proofreader.

Creating Speedram-64

In order to modify your version of SpeedScript, follow these steps.

1. Load and run SpeedScript.
2. Select your favorite background and text colors with Ctrl+B and Ctrl+L.
3. Exit SpeedScript by tapping the Restore key and responding to the prompt by pressing Y.
4. Type POKE44,40: POKE10240,0: NEW and press Return. This will protect SpeedScript's BASIC area.
5. Load but don't run Speedram.cvt with a ,8 extension.
6. Insert a work disk onto which you want to store Speedram-64. Enter *RUN* and press Return.

The converter will run and save the modified version of SpeedScript to disk with the filename Speedram-64. When the utility finishes saving the program, turn your computer off and then back on before using Speedram.

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Using Speedram-64

If you have a 1764 REU, install it and initialize it as drive 9. At this point you may also wish to copy any SpeedScript programs to the 1764. If not, return to the 1764 menu and quit. Now load and run Speedram-64 like any BASIC program. Your familiar SpeedScript screen should appear in the colors that you selected.

You can test Speedram-64 by pressing Ctrl+N (for drive 9) and then Ctrl+4 for a directory. You should get a rapid listing of any files stored in the REU (or on drive 9, if you have two drives). Press Ctrl+Y (for drive 8), and Ctrl+4 will list programs from that drive. Also, when you press Ctrl+N or Ctrl+Y, the drive number appears on the command line. Shift from one drive to the other in this rapid manner to load or save SpeedScript files.

How Speedram-64 Works

You may be interested in knowing how Speedram-64 works. I used the list of pokes that change the drive number in "Modifying SpeedScript" (July 1992) and followed Jonathan Bell's machine language notes in his Word Count program on COMPUTE's SpeedScript disk.

Bell describes how to create new SpeedScript utilities that rely on unimplemented Ctrl+*key* combinations. POKE2854,114: POKE 2855,36 will shift control to 9330 ($2472) for unused Ctrl+*key* combinations, and here the ASCII value of the accumulator can be compared to the new Ctrl+*key*.

For example, 14 and 25 in line 60 are the ASCII values of Ctrl+N and Ctrl+Y. You can replace these with your own Ctrl+*key* combinations if these are not used by SpeedScript.

It is important that any section of a new routine end with JMP 2665 ($0A69) to return control to SpeedScript. To keep the drive number on the command line, however, I inserted another wedge from 2665 to 2670 (JMP 9395:NOP:NOP) into SpeedScript's main loop and ended each new section with a JMP back to 2670 ($0A6E).

SPEEDRAM.CVT

```
EQ 10 REM COPYRIGHT 1992 - COM
      PUTE PUBLICATIONS INTL L
      TD - ALL RIGHTS RESERVED
BS 15 FOR I=9330 TO 9411:READA
      :POKEI,A:B=B+A:NEXTI
PA 20 IFB<>7836 THEN PRINT"ERR
      OR IN DATA STATEMENTS":S
      TOP
DQ 25 REM - INSERT JMP 9330 ($
      2472) -
AK 30 POKE2854,114:POKE2855,36
      :POKE9070,0
BX 35 REM - INSERT WEDGE AT 26
      65-2670 ($0A69-$0A6E) -
CE 40 POKE2665,76:POKE2666,179
      :POKE2667,36:POKE2668,23
      4:POKE2669,234
AJ 45 REM - RETURN TO BASIC AR
      EA AND SAVE MODIFIED SPE
      EDCRIPT -
AS 50 POKE43,1:POKE44,8:POKE45
      ,196:POKE46,36:SAVE"SPEE
      DRAM-64",8
CP 55 REM - COMPARE ACC TO CTR
      L-KEY VALUES AND BRANCH
      {SPACE}TO EIGHT OR NINE
EF 60 DATA 201,25,240,7,201,14
      ,240,16
AQ 65 REM - IF NO MATCH JUMP T
      O WEDGE
DP 70 DATA 76,187,36
RR 75 REM - IF EIGHT, LDA #8 A
      ND JSR TO STORE, PRINT 8
       THEN JUMP TO WEDGE -
QC 80 DATA 169,8,32,151,36,169
      ,56
DR 85 DATA 141,39,4,76,187,36
AF 90 REM - IF NINE, LDA #9 AN
      D JSR TO STORE, PRINT 9
      {SPACE}THEN JUMP TO WEDG
      E -
MS 95 DATA 169,9,32,151,36,169
EF 100 DATA 57,141,39,4,76,187
       ,36
EG 105 REM - STORE VALUES OF E
       IGHT OR NINE -
JB 110 DATA 141,235,18,141,44
GM 115 DATA 19,141,154,20,141,
       241
CP 120 DATA 22,141,79,23,141,2
       23
JC 125 DATA 24,141,227,26,141,
       91
CG 130 DATA 27,141,161,27,96
FK 135 REM - GET LAST DEVICE A
       ND PUT ON COMMAND LINE
       {SPACE}-
PE 140 DATA 165,186,24,105,48,
       141,39,4
EH 145 REM - WEDGE, INSERT COM
       MANDS REPLACED AT 2665-
       2670 AND RETURN TO 2670
       -
FC 150 DATA 160,0,140,113,36
PJ 155 DATA 76,110,10,0
```

Frank Gordon is the author of Graphos (April 1992). He used MetaBASIC to help develop Speedram-64, and he lives in Orono, Maine. ❐

ONLY ON DISK

Here are the bonus programs that you'll find on this month's Gazette Disk.

Lodraw
By Robert Quinn
Wagga Wagga, NSW
Australia

Lodraw is a full-featured low-resolution drawing and painting program that uses all of the 64's alphanumeric and graphic keyboard characters. Much more.

SpeedCalc Help
By Randy Clemmons
San Diego, CA

Have you ever run SpeedCalc, Gazette's spreadsheet, only to realize that you've forgotten several of its important commands? SpeedCalc Help displays those commands on the spreadsheet screen.

The December Gazette Disk is only $9.95 plus $2.00 shipping and handling. Order it by writing to Gazette Disk, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

TYPING AIDS

MLX, our machine language entry program for the 64 and 128, and *The Automatic Proofreader* are utilities that help you type in Gazette programs without making mistakes. To make room for more programs, we no longer include these labor-saving utilities in every issue, but they can be found on each *Gazette Disk* and are printed in all issues of *Gazette* through June 1990.

If you don't have access to a back issue or to one of our disks, write to us, and we'll send you printed copies of both of these handy programs. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope. Send a self-addressed, stamped disk mailer to receive these programs on disk.

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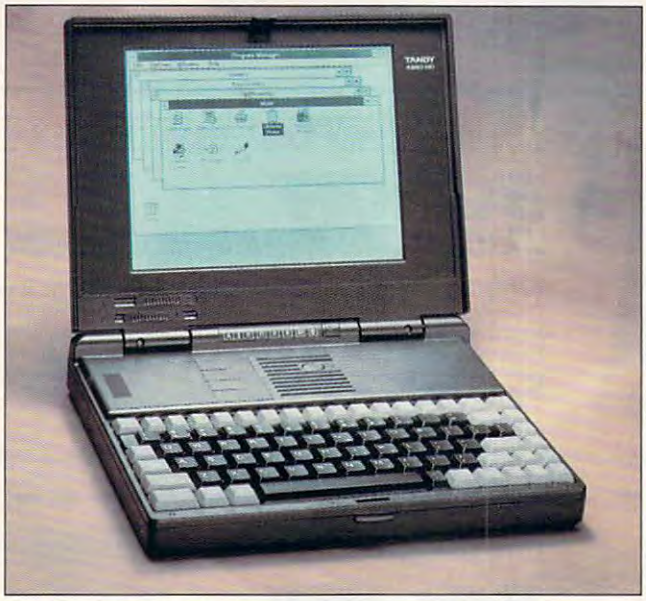
TANDY 4860HD NOTEBOOK

If I were asked to describe the Tandy 4860HD Notebook computer in only two words, I would call it a mighty mite. That really sums up what this nifty little machine is all about: lots of power in an incredibly small package.

Featuring an Intel 80486DX CPU running at a crisp 33 MHz as its heart and soul, the 4860HD gives up nothing in the way of performance to similarly equipped, full-size PCs. The real beauty of this machine is the compact size in which it delivers all this computing power; the diminutive machine is only 8¾ inches deep by 11 inches wide by 1½ inches thick when closed. It weighs only five pounds and seven ounces when the battery's in place and it's ready for work—truly a miniature marvel.

Viewing text or graphics on the 4860HD's hi-res backlit LCD screen is a pleasure, thanks to a 10-inch nonglare display which delivers 9½ inches of viewable area (measured diagonally). The standard resolution for the display is 640 × 480, and slider controls for adjusting contrast and brightness are conveniently located just under the display itself on the left side of the unit.

The hinge that connects the main body of the computer to the lid with the VGA display also provides a nestling place for the illuminated indicators which monitor the system status. Illuminated icons are used to signify Caps Lock, Num Lock, Scroll Lock, hard and floppy drive activity, power on, and other system conditions. The power switch is flush mounted on the body of the computer itself, just below the hinge, and its design and placement make it virtually impossible to turn the system off accidentally. While this might seem like a minor point, it's surprising how many other notebook computers put the power switch in a jeopardizing position for such accidents, so it's refreshing to see it so well protected in the 4860HD.



The Tandy 4860HD Notebook offers fine graphics, blazing speed, and excellent battery life in a very small package.

The machine's standard configuration is 4MB of RAM. This can be boosted to either 8MB or 20MB depending on your needs. Performance of the 4860HD supplied for review (with 4MB of RAM) can best be summed up with the words *blazing speed.* The 33-MHz 486DX CPU, coupled with 4MB of RAM and aided by the instantaneous refresh speed of the VGA LCD, makes this one of the fastest notebooks I've ever used.

A 60MB hard drive is the standard bill of fare on this machine, and it comes with MS-DOS 5.0 and Windows 3.1 preinstalled (the floppy disks are also included, along with the manuals). A high-density 1.44MB 3½-inch floppy drive is mounted at the right side of the machine toward the front of the unit. Twin panel doors at the rear of the machine conceal the I/O connectors. A proprietary expansion connector is provided for adding Tandy peripherals, while the other panel houses a parallel port, a single 9-pin serial port, and a 15-pin D connector for using an external monitor. A mini-DIN port is also provided for attaching an external keyboard. You'll find the connector for attaching the AC power adapter and battery charger to the notebook between these two panels.

Battery life is excellent, yielding usable times of three to four hours on the average between charges. The battery recharge time is only about two hours, so there's plenty of power to keep you computing between charges. Of course, the 4860HD can be used while it's recharging, so there's no interruption of your productivity.

An optional minitrackball is available in case you don't wish to use an external device, and a 2400-bps modem with 9600-bps fax capability can be mounted internally in the 4860HD.

The Tandy 4860HD Notebook computer is an excellent choice for any user who wants maximum productivity in a case that's smaller than the average three-ring binder. This mighty mite proves that good things can indeed come in small packages.

TOM BENFORD

Tandy 4860HD Notebook—$2,999

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NORTON DESKTOP FOR WINDOWS

Norton Desktop for Windows is a comprehensive file management and utilities package that greatly enhances and expands the capabilities of Windows.

NDW replaces Windows' Program Manager as the default shell and, upon installation, automatically converts all Program Manager groups to Quick Access groups. NDW then allows you to create new groups and add group items to them simply by dragging files from the directory tree to the newly created group window. Nested subgroups are also easily created under NDW, and group items can be dropped directly onto the desktop where

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REVIEWS

they're available for easy access.

This system is quite flexible. It allows you to group applications and files into whatever configuration you feel most comfortable working with. Each group can be viewed in three ways—as a collection of labeled icons, as a vertical list of icons, and as a toolbox. In the toolbox view, group items are displayed as unlabeled icons neatly packed together to save space. Custom menus and dialog boxes can be added using NDW's Batch Builder and Macro Builder tools. On a smaller scale, NDW comes with a powerful icon editor that lets you create custom icons from scratch for your non-Windows applications. If you prefer, you can modify any of the 150 icons that are included with the program.

With NDW as your shell, you can launch applications simply by dropping one icon onto another. The first icon need not be related to the application you are launching. However, if you launch an application—a word processor, for example—by dropping an associated document onto it, the document will automatically be opened along with the word processor so you can begin editing that document right away. In addition, several types of files can be printed directly by dragging them onto any printer icon.

Text and system files such as autoexec.bat can be edited using NDW's powerful Desktop Editor. Although Desktop Editor won't substitute for a comprehensive word-processing package, it does offer several useful features, including the ability to edit multiple files at one time, a file comparison option that alerts you to differences between similar text files, global search across multiple files, the ability to create macros to automate repetitive editing tasks, and automatic saving of your documents at regular intervals (based on time or number of characters) that you specify.

If you just want to view the contents of a file without editing it or opening its associated application, you can use NDW's File Viewer. More than 45 file types from various popular applications are supported, including those created by Microsoft Word, WordPerfect, Lotus 1-2-3, Excel, Paradox, Quattro, and dBASE. CompuServe TIF and BMP graphic files, as well as ZIP, ZOO, and ARC compressed files, are also supported. Again, the file viewer can be activated simply by dropping onto it any file you wish to view.

If after viewing a file you decide you want to trash it, you can either drag its icon over to SmartErase or put it through the Shredder. Files deleted with SmartErase are easily recovered, while shredded files are gone for good. According to Symantec, Shredder meets Department of Defense security standards for data destruction.

Another of NDW's useful accessories is Sleeper, a screen saver that displays moving graphics to keep the screen image from burning itself into your monitor while you're away from the computer for extended periods. Sleeper comes with several animated images and even recognizes image files from Windows 3.1, Intermission, and After Dark.

Add power to your desktop with Norton Desktop for Windows.

With NDW's SuperFind, you can quickly scan your entire system for a specific file or all files matching a specific criterion, such as all ARC files. If what you're looking for is a special character to include in a text document, KeyFinder shows you at a glance the complete character sets of any fonts installed on your system. NDW also gives you instant access to 14 screens full of system information describing your CPU speed, hardware interrupts, memory allocation, graphics and printer setups, and a lot more.

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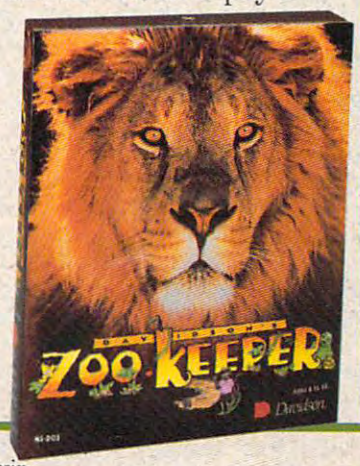

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comes with an uninstall program should you ever want to remove NDW from your system. I can't imagine that you will ever need it!

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A-TRAIN

When you hear the lonesome whistle of a freight train, do you *(a)* start humming "New River Train" or *(b)* speculate on how long railroad freight carriers will be able to compete economically with their counterparts in the trucking industry?

If you answered *(a)*, chances are A-Train isn't the train game for you. If you answered *(b)*, on the other hand, A-Train could be the diesel engine that pulls the profit-making train of your dreams.

Presented by Maxis, the company that created SimCity, A-Train is actually the second sequel to an "award-winning, number-one selling game in Japan," according to a blurb on its box. (The only previous U.S. release was a version of A-Train II called Railroad Empire.) If A-Train is half as popular in Japan as Maxis claims, it's no wonder Japan consistently wipes the floor with America economically. This is a highly complex, intensely challenging game that requires you to be railroad CEO, urban planner, stock speculator, and major contractor all at once.

At this point, gamers familiar with Sid Meier's Railroad Tycoon may be wondering whether there's any difference between that game and A-Train. On a fundamental level, there are many similarities. Both games employ railroads as a means to economic expansion, allowing you to rake in (or bleed out) large sums of money as you build an empire. A-Train lacks both the broad geographical and historical scope of Railroad Tycoon and the computer-generated competition, however, making it more focused.

Instead of taking your railroad and its environs cross-country over the course of decades, A-Train moves along a day at a time, staying focused on a predetermined geographical area set by selecting one of the game's six scenarios. You can start off with a single rail line running through a rural area or multiple lines already encircling a large city.

On a more superficial level, A-Train simply looks better than Railroad Tycoon. You view your geographical area from an oblique angle rather than from the side or directly overhead, giving you a better perspective. A-Train

Take the A-Train to corporate success—if you can keep your empire on track.

has easily accessible pull-down menus in a frame around the playing field, allowing you to check with your broker about buying stock, build an amusement park, or obtain a satellite view to survey other areas of your burgeoning empire.

There are plenty of nice graphic touches, from the darkness-to-daylight change that washes over the screen every few minutes as a new day comes and goes, to the figure of Santa Claus flying over on Christmas Eve. The sound effects are pleasant but nothing special.

The ribbon rails and crossties were awash in red ink about a month into my game of A-Train, which goes a long way toward explaining why I'm a freelance writer instead of a railroad CEO. I found A-Train's hardcore economic emphasis awfully tedious, to be honest; I suspect CEO wannabes or diversion-seeking business devotees will enjoy it a lot more than I did. And while there are some elements of A-Train that will appeal to diehard railfans—you can set switches and buy better engines, for instance—you'll spend more time dealing with cold economic reality, such as determining whether to risk borrowing a few hundred thousand dollars for a new factory to be built along your latest spur track.

Ironically, there's more for railfans in the user manual than in the game itself: Not only does it include trivia and examples of railroad slang, but it also

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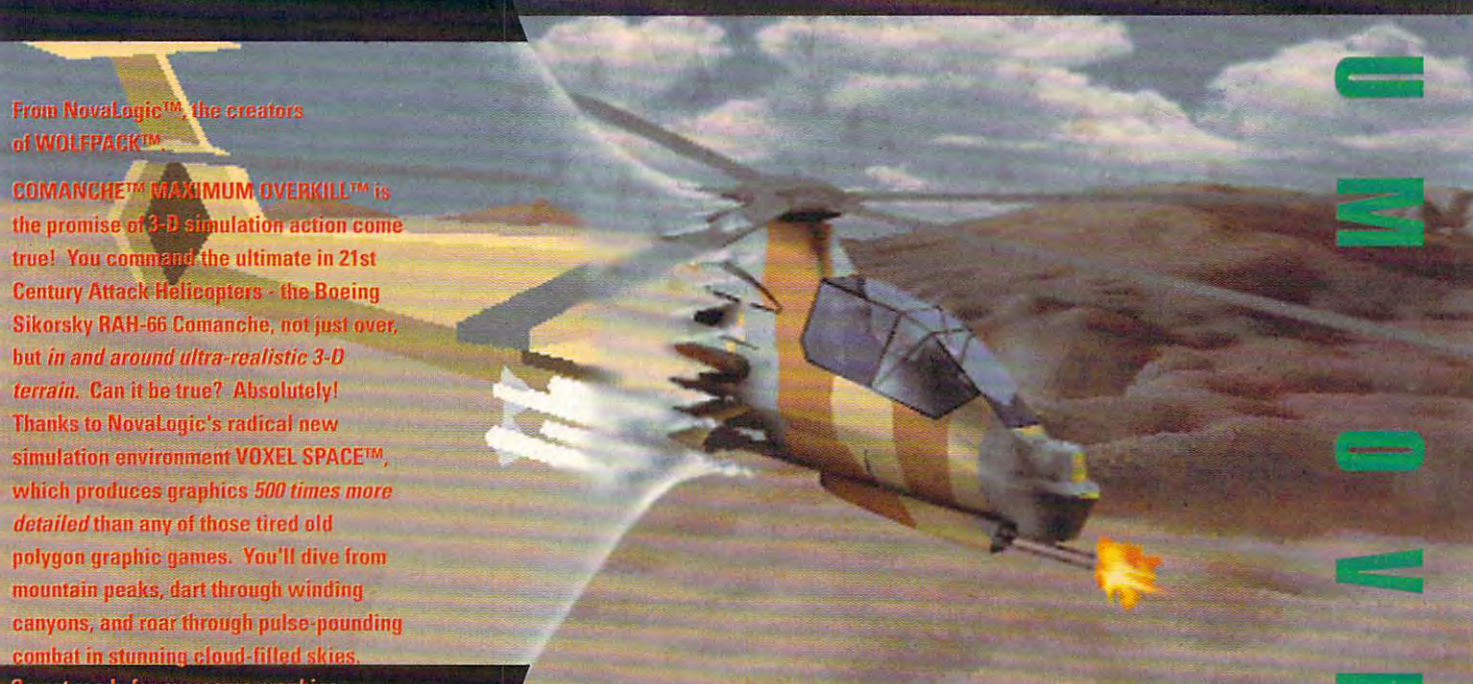

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REVIEWS

offers a concise, well-written history of railroading around the world.

If you're looking for a break from landscaping your model railroad layout, you'd be much better off with something like Abracadata's Design Your Own Railroad. But A-Train could provide you with a perfect coupling if you think you'd enjoy running an expanding railroad as a substantial challenge to your corporate skills.

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NEC SILENTWRITER MODEL 95

PostScript Level II and HP LaserJet III emulations are just two of the long list of features that make the NEC Silentwriter Model 95 a truly outstanding laser printer. Besides being easy to operate, it offers plenty of RAM memory and internal fonts.

Many features which are options on other comparably priced laser printers are standard on the Silentwriter. Standard RAM memory, for example, is 2MB—a "real-world" amount for most graphics and PostScript work. Additional RAM can be added up to a maximum of 5MB total. The unit I tried was outfitted with the standard 2MB of RAM.

Internal fonts are abundant in the Silentwriter, with 35 PostScript typefaces augmenting the LJ III mode's 8 scalable and 14 bitmap fonts. If that isn't enough, you can also add HP-compatible downloadable soft fonts or cartridge fonts, as well.

The Silentwriter weighs about 37.5 pounds and measures 18.6 × 15 × 9.5 inches, so it can nestle on a desktop as well as on a printer stand. As much as it weighs, however, it isn't a printer you'd like to carry around the workplace frequently. If you desire mobility, a rolling printer stand would be a useful accessory.

The Silentwriter can output up to six pages of 16- to 24-pound paper per minute when feeding from its 250-sheet cassette; it can also handle paper and cardstocks in the 16- to 41-pound weight range when they're fed in manually. The multipurpose tray supplied can also accommodate up to 15 envelopes at a time. Finished output is delivered facedown to the stacker, which can hold up to 150 sheets of 20-pound bond at a time. An optional faceup accessory stacker can hold up to 50 sheets.

Interfacing on the Silentwriter covers all bases, with Centronics parallel, RS-232C serial, RS-422 serial, and Local-Talk (AppleTalk) all featured as standard equipment on the unit. The LocalTalk interface is only available in PostScript mode, and the active interface setting can be selected via the control panel.

The NEC Silentwriter Model 95: Impressive emulations, easy operations.

The control panel is easy to understand and very simple to operate. Six push buttons control the printer's functions and step you through the menu selections, while a 16-character LCD provides prompts as well as status indications.

A thorough user's guide more than 200 pages thick provides detailed information on using, maintaining, and upgrading the printer, in addition to accessing all of its features. The manual's excellent organization makes finding any desired topic a very simple task, and the clear writing style and generous use of illustrations, diagrams, and tables aids comprehension of the material about the printer.

It should be noted, though, that most people probably won't need to refer to the manual at all after the initial installation, since the control panel's menu options are easy to understand and logically arranged.

PostScript and HP LJ III emulations, 6-ppm print speed, and rich interfacing flexibility all combine with the printer's aforementioned attributes to make the NEC Silentwriter Model 95 a uniformly excellent laser printer.

TOM BENFORD

NEC Silentwriter Model 95—$1,749

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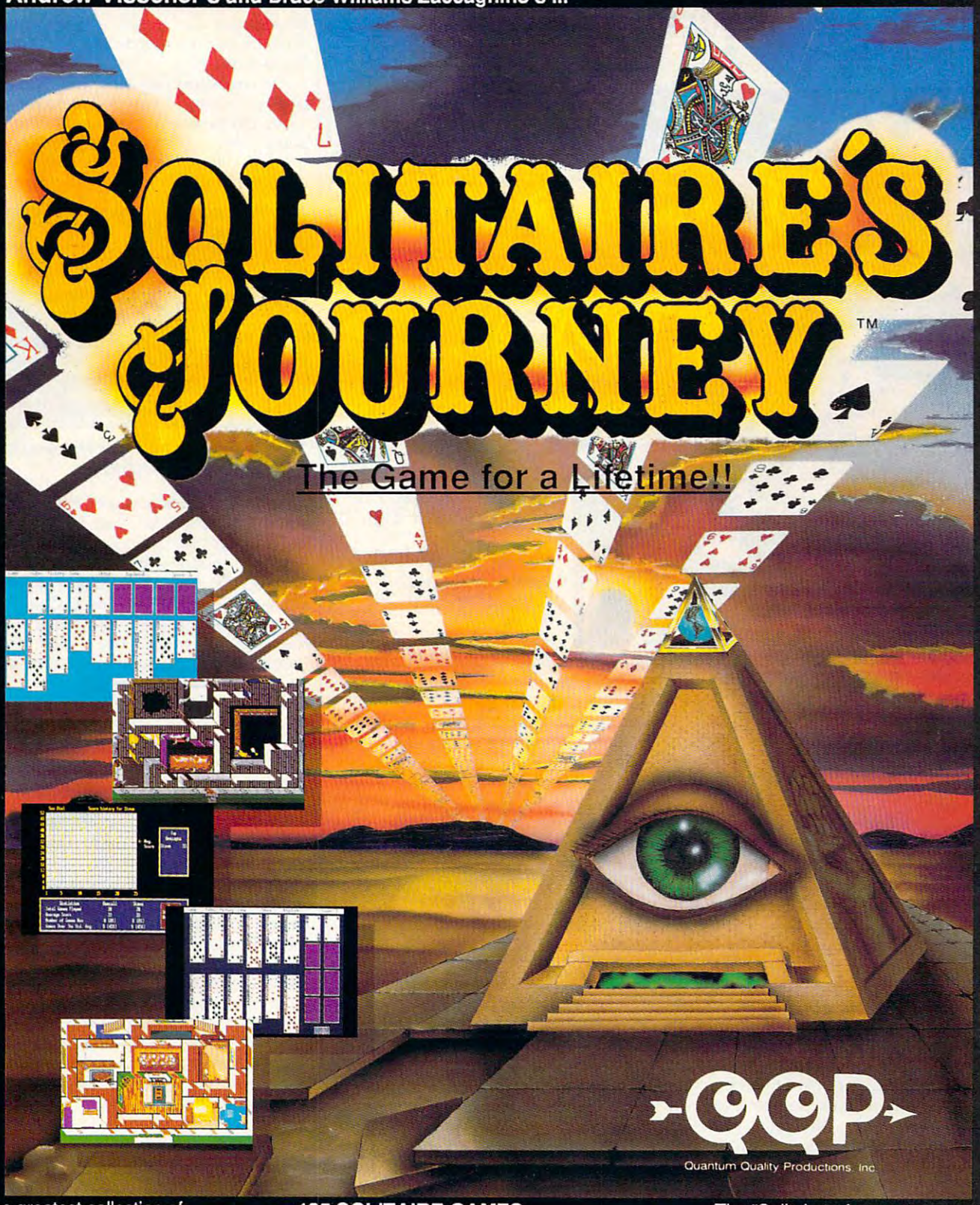

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JACK NICKLAUS GOLF & COURSE DESIGN— SIGNATURE EDITION

There's an old pro on the fairway, flaunting a brand-new image. Accolade's premier sports simulation gets a 256-color facelift with the Signature Edition of Jack Nicklaus Golf & Course Design. The Golden Bear has never looked better.

Few entertainment products have enjoyed the player admiration and corporate support of Ned Martin's long-running golf series. Backed by thoughtful revisions, numerous data disks, and the kind of publicity money can't buy—freely accessible user-designed courses—Jack Nicklaus Golf & Course Design ranks among the best in its genre.

The growing high-end market, as well as competition from such games as Access Software's Links, has prompted a complete overhaul of Accolade's best-selling product. The results are phenomenal. Created expressly for fast VGA systems, this latest incarnation features almost completely digitized courses, golfer animation, and full sound board support. The package also includes the first 256-color course designer, and the course designer itself has been redesigned for even greater flexibility. For many fans, this feature alone is worth the price of admission.

Graphic improvements are immediately apparent in the game's slick new front-end system. Dithered 3-D selection buttons almost seem to jump off the screen, and they're set against colorful, full-sized background photos. This clean, sharp quality of the images extends throughout the program.

Human players must first register as club members, designating gender, golfer animation, tee designation, and skill level. The club also contains a well-stocked roster of computer players, each boasting unique abilities. You can now create customized opponents, fine-tuning such attributes as swing, distance, and accuracy.

Up to four club members—human or computer-controlled—can compete in either Skins or Stroke play. The Skins game has been enhanced to allow players to change the total prize money and cash amounts for individual holes. Stroke play now features a one-to-five-game tournament option. Up to 72 golfers, including a maximum of four club members, may participate. Although the program maintains detailed scorecards and statistics, there's still no provision for hardcopy printouts. Maybe next time.

The package includes two 18-hole courses based on real-life Nicklaus designs. Sherwood Country Club in Thousand Oaks, California, is a favorite on the PGA Tour. The scenic fairways stretch along the base of the Santa

The Signature Edition of Jack Nicklaus Golf & Course Design is the best yet.

Monica Mountains and are dotted with waterfalls, streams, and rock-lined pools. Don't let the course's beauty fool you, though—this one's a killer. Keeping dry is a major concern at New Orleans's English Turn Golf & Country Club, a unique course completely surrounded by water. The holes are tough but fair, assuring equal challenge to players of all skill levels.

Two new courses are available for the game through Jack Nicklaus Signature Tour, Volume 1. It features The Links of Muirfield in Scotland, which recently hosted the British Open, and Muirfield Village Golf Club in Ohio, which hosts Nicklaus's annual Memorial Tournament. The Signature Tour package retails for $24.95.

Martin's aptly named Sculptured Software continues to perfect the art of contoured course mapping, including mounds, slopes, bunkers, and multitiered greens. Almost all terrain features are now digitized, from foreground objects (trees, shrubs, and boulders) to the 360-degree scrolling backdrops. Of special note are the fully animated golfers, captured from videotaped images. Even the water moves, thanks to rudimentary color cycling.

Despite all this attention to detail, the graphics still suffer from "chunky" low-resolution VGA. Considering the program's already high system requirements, bumping the resolution up to 800 × 600 would seem only reasonable. The game allows minor adjustments of graphic detail to speed screen redraws on slower machines. On a 25-MHz 386 at the highest resolution, each screen update takes 15 seconds. Although this isn't blindingly fast, if you perceive it to be slow, per-

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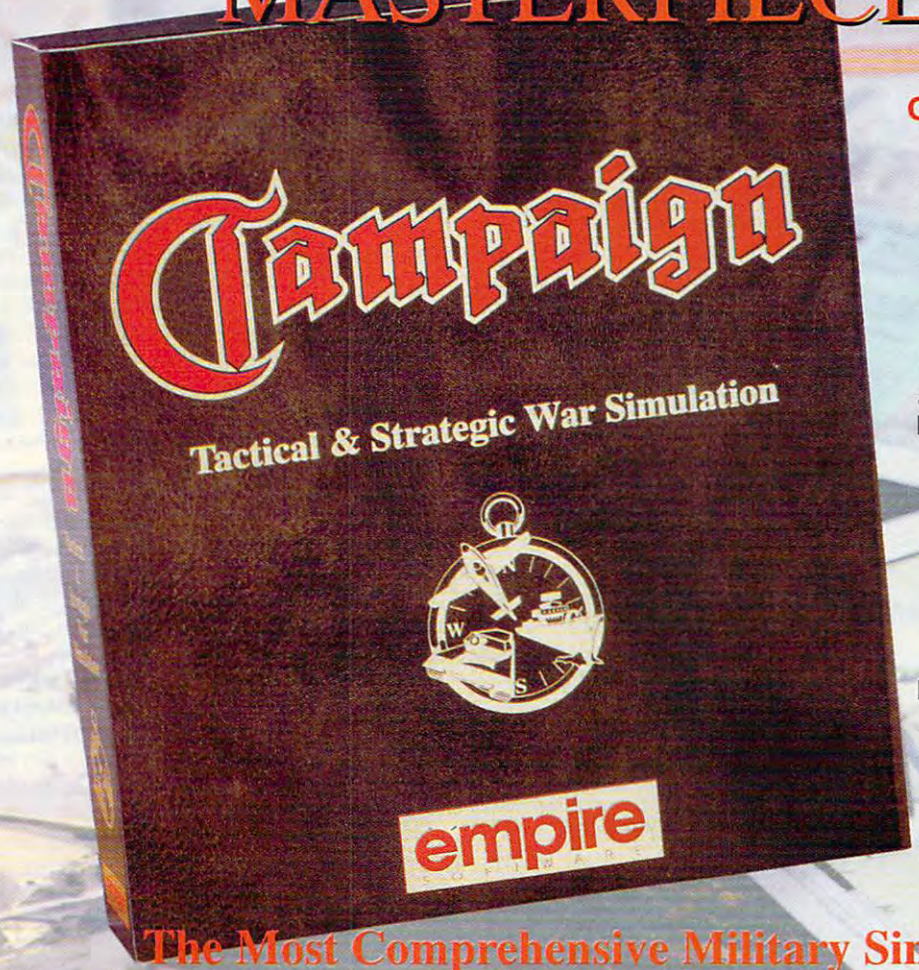

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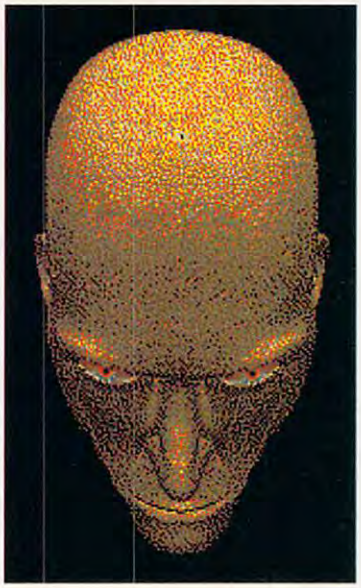

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REVIEWS

haps golf isn't your game.

Short of converting 16-color to 256-color palettes, the program is completely compatible with courses created for all previous versions—good news for players sitting on a virtual gold mine of commercial and public domain courses. Given Accolade's track record with the Jack Nicklaus series, additional course disks are probably already in development.

The icing on the cake is a completely revamped course designer—the first of its kind to utilize a full color spectrum. One of the best new features of this stand-alone program is the ability to plot and play a hole instantly, without having to exit and reload the game. Another new feature allows you to import PCX or LBM art files into the object editor. This option opens untold possibilities for personalized course design.

Hampered only by low-end video limitations, Jack Nicklaus Golf & Course Design—Signature Edition represents the continuing evolutionary progress of a remarkable product.

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UNICOM 3.0G

As an avid BBS-er, I find that one of the most-used applications on my system is my communications program. I've used the same one for the last four years, but when I started using Microsoft Windows, it didn't feel like it belonged anymore.

My first instinct was to try Windows' Terminal. It works well as a phone dialer, but it's sorely lacking in many of the features to which I've grown accustomed—namely, good scripting language, host mode, terminal emulations, and, most important, my favorite file transfer protocols.

So I began to look for a new communications program. As usual, I started looking on BBSs for a good shareware program. To my surprise, I found very few, but in these few I found a gem: Unicom 3.0g.

Unicom is a full-featured, Windows-based terminal and communications program. It supports ten different transfer protocols, including ZMODEM and CompuServe Quick B. It has a well-developed, easy-to-use script language. It allows you to change all colors and font sizes. It also has a speed bar menu and a function key menu. It has batch dialing, timed redialing, and call-waiting protection. It will fully multitask in the spirit of Windows, and it has a configurable utility feature that can launch any Windows application.

I installed and set up the program in about ten minutes. I then installed the phone numbers of all my favorite BBSs. The only problem I had was on one particular BBS, where reading messages produced overrun and framing errors. I turned off reporting of these errors and had no more problems whatsoever.

Unicom comes with some script files that are really great starting points for writing some of your own. I just replaced the name and password in the CompuServe script and was able to log on. The manual devotes 57 pages to the script language. This language is packed with Windows power beyond your wildest imagination. It will manipulate Windows and even access the GDI.

It has full implementations of WHILE, IF, GOTO, GOSUB, and SWITCH constructs. A full set of arithmetic and logical operators are provided, as well, making it a true scripting language! Of course, it will also wait for an expected string and send a response, which is most of what my script writing does.

Unicom supports the following protocols: XMODEM Checksum, XMODEM CRC, XMODEM 1K, YMODEM Batch, YMODEM G, ZMODEM, ZMODEM Resume, CompuServe B, CompuServe Quick B, Kermit, and ASCII. Although officially they're "not recommended or guaranteed," Unicom can also be scripted to use external protocols. ZMODEM and CompuServe Quick B transfer protocols will do automatic downloading. ZMODEM Resume provides for recovery after an interrupted download.

Speaking of interruptions: One of the neatest features on the dialing options is call-waiting protection. It protects the session from being interrupted. The terminal itself is fully configurable. It provides for changing both foreground and background colors, and it offers destructive backspace and carriage return linefeed controls. It will emulate VT-102, ANSI-BBS, VT-52, or TTY terminals.

One of the problems that should be noted here is that Windows has a different character set than DOS. Some of the ANSI graphics done on BBSs will be missing certain characters. This is not a fault specifically of Unicom, but rather a

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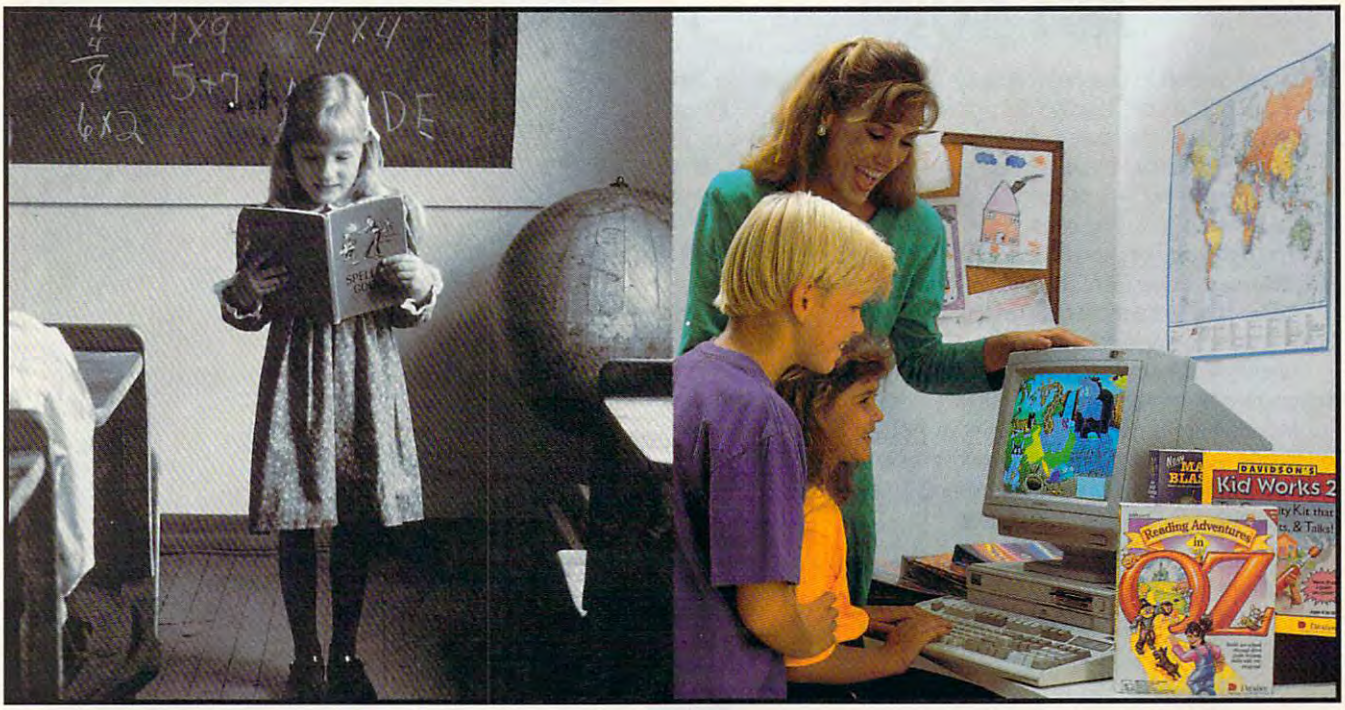

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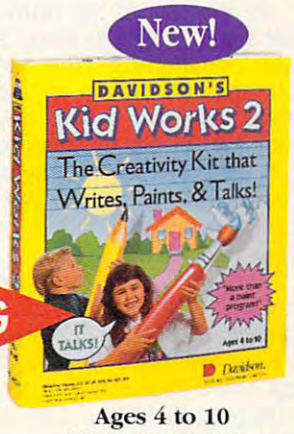

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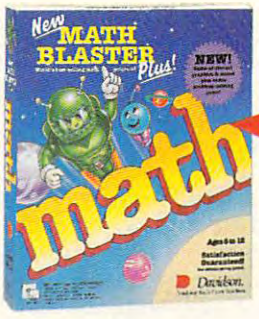

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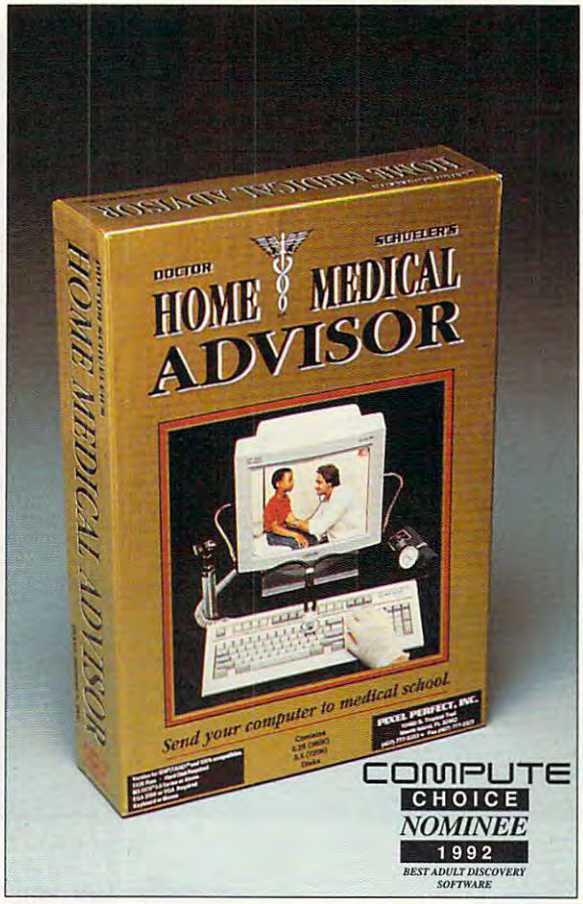

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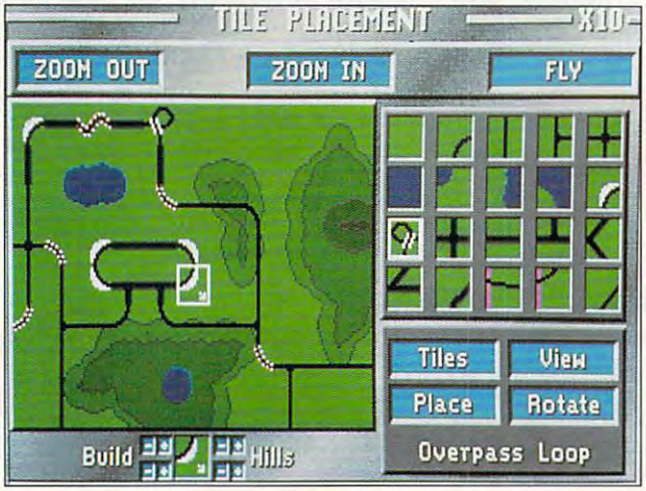
shortcoming of working within the Windows environment.

In addition to the terminal, the function key menu is also configurable. You can change the labels on the keys, assign them to any function, or assign them to run scripts. They can even be used as hot keys for Windows programs listed in your utility menu.

The utility menu can be set up to contain any programs that you have on your hard drive. It should be noted that running any other applications during downloads or uploads will slow down the process and may cause errors. But I've had no problem whatsoever using Windows' File Manager to locate a file that I wanted to ASCII upload into a message.

On the downside, the unregistered version has a very irritating, timed random pop-up registration screen. This, of course, is easily resolved by registering the package.

BRADLEY M. SMALL



Grand Prix Unlimited is another fine simulation from Accolade—if only the sound effects didn't resemble radios and hamsters.

IBM PC or compatible (80386DX compatible recommended), 2MB RAM available to Windows after SmartDrive and RAMDrive, Hayes or compatible modem, serial communications port (if using an external modem)—$69.95 (shareware registration fee)

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GRAND PRIX UNLIMITED

If Accolade is conspiring to put together the most impressive collection of high-quality sports simulations on the planet, it's well on its way to achieving that goal. One thing's for sure: With titles like Mike Ditka Ultimate Football, Winter Challenge, and Hard Ball II already under its belt, the quality of Grand Prix Unlimited will be no surprise to Accolade's fans.

As with most of Accolade's sports simulations, Grand Prix Unlimited offers virtually complete control over the sporting experience, which in this case is Formula One racing. On the macro scale, you can choose a practice session or a single race, or you can take to the road in a battle for the World Championship. As you dig deeper into the game, however, you'll discover a plethora of options, including the ability to modify your car's attributes, the track's weather conditions, and your skill level. There's even a built-in track architect program for constructing your dream racing environment, piece by piece.

Because Grand Prix Unlimited is a fairly complicated simulation, you'll need to spend time in the practice or single-race mode before

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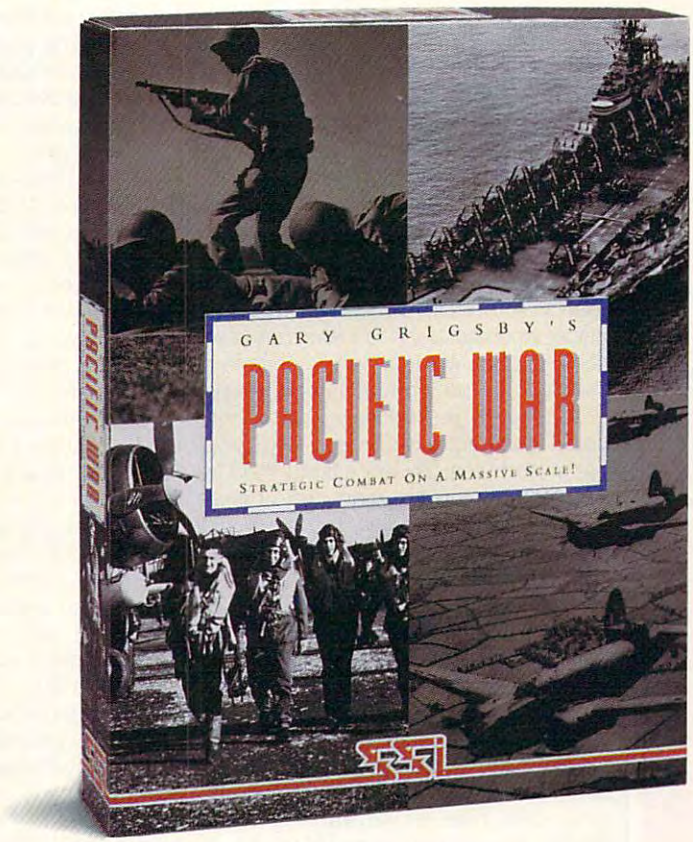
LAND! AIR! SEA!



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REVIEWS

joining the circuit for the World Championship. In these modes, you start by selecting your car and track, and then move to the starting line for your first-person-perspective race. For each race, you can set the number of laps, the weather conditions, and the number of opponents.

During a race, the game controls are sensitive and quick to react. It takes skill on the joystick or keyboard to keep your car screaming down the blacktop. Luckily, novice drivers have a number of helpful options from which to choose, including automatic shifting and steering. You can also set the skill level to one of five levels, which determine the speed and aggressiveness of the other drivers. On the Novice level, just keeping your car on the road is all that's required to take first place, whereas at the Pro level only awesome joystick wizards have a chance of making it to the World Championship.

After you get the hang of driving, you'll want to experiment with your car's attributes. By accessing the Car Adjustments screen, you can change the height of your view, the sensitivity of your brakes and steering, tire types, and more. These options allow you to fine-tune your car's performance to a specific track, a skill that must be mastered by any Grand Prix champion.

If Grand Prix Unlimited has a failing, it's the program's cheesy sound effects. Even on a Sound Blaster card, the car's engine sounds more like someone tuning a shortwave radio than it does the roar of screaming steel. Worse, the screeching-tire sound effect is not unlike the squealing of a distressed hamster. The music, too, is so intrusive that you'll turn it off before you even finish your first race.

Bad sound effects aside, Grand Prix Unlimited is a solid—albeit not groundbreaking—racing simulation. With its fully configurable cars, tracks, and racing circuits, it certainly has more features than can be described in a short review. (I didn't even mention the wonderful, VCR-like instant-replay feature.) If nothing else, all those options will keep race fans happily burning up the track.

CLAYTON WALNUM

IBM PC or compatible; 640K RAM; MCGA or VGA; hard disk; joystick recommended; supports Ad Lib, Sound Blaster, and Roland sound—$59.95

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WINDOW PHONE

Call me a gadget freak, but I just love caller ID. As soon as my local phone company offered the caller ID service, I signed right up. And it's been useful, too: A psycho ex-girlfriend started making middle-of-the-night hang-up calls, but my caller ID box told me who had called, so I was able to resolve the problem immediately. On the lighter side, when my friend Rob calls me, I see his number on the caller ID box before I pick up the phone. I answer, "Hi, Rob," and he wonders how I know. "You just have a distinctive ring," I tell him.

For a while, I fiddled around with my caller ID box, trying to figure out how to get the information from the box into some kind of format that my PC could use—a serial port or something like that. My idea was that when the phone would ring, a little box would appear on my Windows screen saying *Joe Smith is calling*. I never got far with the project.

Imagine my delight, then, when AG Communications Systems came out with Window Phone, the answer to my prayers. This $495 package is a combination circuit board and software that basically does all that I wanted—and more. You pop the board into your PC, connect it to your phone, and install the software.

When you run Window Phone, it shows you a screen with a speed dialer and a Who Has Called window. The speed dialer looks like the one that's on many phones; you have a bunch of buttons with names next to them, and you just click on one of the buttons to make Window Phone dial that number from your telephone (it works on any touch-tone phone). The window on the right side of the screen shows the phone numbers from which you've received calls recently and, if the numbers are in your on-disk phone directory, the names of the incoming callers. For example, you might see *Susan Stathoplos—unanswered call* or *Andy Kydes—20 minutes*. Window Phone can tell you not only which calls were not answered but also how long you talked. This is, then, a database that consultants could use for billing clients.

Window Phone will also pop up a box in front of any Windows application when the phone rings, telling you who's calling. It supports a database of information about callers, so I might see *Gerry Manginelli is calling*. I could then open up the Gerry Manginelli record on my database, where I would see Gerry's birthday, topics of last conversation, hobbies, or whatever I'd put in the database. If I had a scanned picture of Gerry, I could even put

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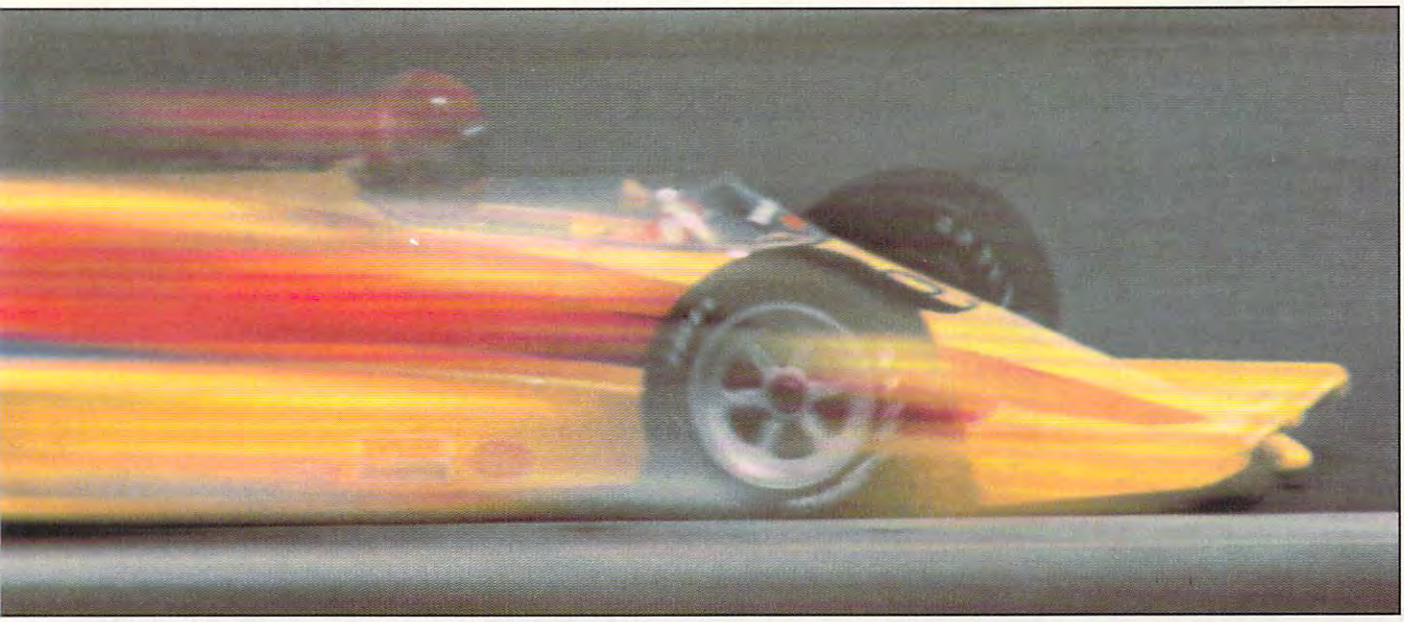
If it were any faster, it'd be a flight simulator.



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that in the record.

Window Phone is nearly perfect. If it has a flaw, it's the price tag: nearly 500 bucks. That's way too much. The price should be more in line with that of phones that display caller ID information—in the $150 range, with another $100 for the software itself.

MARK MINASI

IBM PC or compatible (80286 compatible), 2MB RAM, EGA or better, hard drive, 5¼- or 3½-inch floppy drive, Windows 3.0 and higher, available expansion slot, Windows-compatible pointing device, standard analog phone line—$495

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THE COMPLETE COMMUNICATOR

If I didn't have a PC, I'd buy one just so I'd have something to plug The Complete Communicator into. Talk about a perfect communications solution for home businesses: In one package you get a modem, a fax machine, and a voice mail system. At a reasonable price—$499 list—the software that drives it adds features with which dedicated machines can't compete. And it runs in the background so you can use your computer, even while it's busy working.

While you don't have to be a technician to install the hardware and software, a little practical experience will come in handy. I tried it on three different systems: a 286, a 386, and a 486. Only my 486 wouldn't cooperate. That's because The Complete Communicator needs to be set to COM1 or COM2. The 486, a newer computer, has two serial ports built into the motherboard, and they can't be disabled or changed. If you've got a newer model computer, this might be a problem that only a technician can solve. Fortunately, there's an included program called COMCHECK, which looks at your system and tells you which ports are taken. That takes the guesswork out of the installation.

If you run a small business or a home office, you'll probably find that The Complete Communicator lives up to its name.

There are two versions of the software, DOS and Windows. In my opinion, they're a study in contrasts. They have all the same stuff; even the structure of menus and program flow are the same. But the DOS version uses function and cursor key menus and dialogs. That kind of interface went out five years ago. It beeps at you and flashes messages when you do something wrong.

The Windows version of the software is slick and state-of-the-art. Everything takes advantage of what Windows is good at—making user interfaces seem natural. All you do is pull down a menu or click on a button for almost every selection.

I loved setting up voice mail. It's about a million times more professional than an answering machine, in my opinion. After I figured out how to make it work, I set up mailboxes for my wife and two kids. They had a blast. For about two hours they called from our second phone, left each other messages, and then went to the computer and listened.

You can set up as many mailboxes as you need. They're configurable for a variety of situations. They can have password protection and can be limited to a fixed number of messages and greetings so that you don't run out of storage space if you've got a lot of mailboxes.

Beyond all of the basics, there's some real power. Any of the mailboxes can forward messages to another number. The mailboxes can also be accessed from remote locations—not just to listen to messages, but to update greetings, too.

If your company board meeting is next week, you can set the voice mail for outbound reminders to the members. Using the phone book option, you can enter the names and numbers, then set the date and time. The software will call everyone in your phone book group and deliver your message.

The Complete Communicator significantly simplified my fax work. Every time I send a fax at work, I have to go through several steps. First, I write a document with a word processor. Then, I print it on my printer. Finally, I walk upstairs and fax it to its destination. Well, those days are over. Using RapidFAX from inside Windows rolls all of those steps into one. I simply write documents with Microsoft Write (any Windows word processor will do) and configure the printer for the fax board. Then, every time I print, it's sent out over the fax board.

One nice thing about RapidFAX is that I didn't need the manual to figure out how to use it. I did, however, have to read the manual to find out about the advanced features. Just as with voice mail, you can send groups of faxes automatically. This is a telemarketer's dream.

Incoming faxes are received automatically. You might hear some noises from the board; otherwise, it works in the background. It does occasionally slow things down during disk access. Once the fax has been received, it can be viewed on the screen to save trees or printed on your printer for a hardcopy.

There's nothing remarkable about the modem feature, except that it's part of the package. That means you won't have to occupy another slot in your computer or worry about another COM port. I'm online almost every night, so this part of the board gets a real workout. It performs flawlessly.

The Complete PC recently introduced a separate ver-

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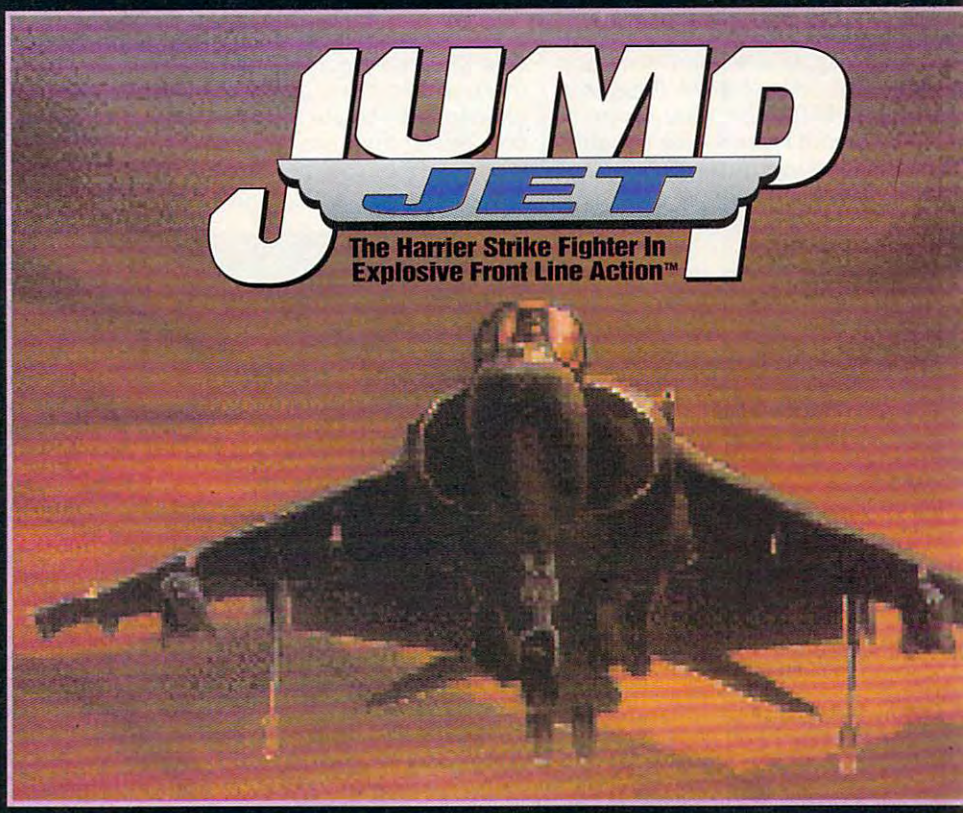

Actual screen shown.

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sion of The Complete Communicator called The Complete Communicator Gold, which does everything the original does and more at a list price of $699. It features a 9600-bps data modem, and it includes the capability to use caller ID, displaying the number of an incoming caller on your computer screen.

The Complete Communicator has an appropriate name. It's a comprehensive package for home and small business communications. If you're trying to run a business out of your home or your business is growing, seriously consider this small piece of hardware for a big-time boost.

RICHARD C. LEINECKER

IBM PC or compatible; 640K RAM; CGA, EGA, VGA, or Hercules; hard drive with 2MB free; 5¼-inch high-capacity floppy drive; standard analog telephone line (Windows version requires 80386 compatible, 2MB RAM, Windows 3.0–compatible monitor, hard drive with 4MB free, 5¼-inch high-capacity floppy drive, Windows 3.0 or higher)—$499 (package includes DOS and Windows versions)

THE COMPLETE PC
1983 Concourse Dr.
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(408) 434-0145

Circle Reader Service Number 351

UTOPIA

When you first see Utopia's main screen, you're likely to say, "Look! It's a combination of SimCity and Populous!" You won't be far wrong.

Add SimCity's creative city-building charm to the challenge of manufacturing and deploying weapons for an unavoidable war. Then present it onscreen in the Populous-style, one-square-at-a-time elevated view, and you have Utopia. Using proven principles from those two games, Utopia then carries the simulation several steps further.

As the administrator of a new planetary colony, you make all decisions and single-handedly create the colony. Select from two dozen types of buildings and place them on the map, one by one. It's already more complex than SimCity—on a new planet, you need life-support systems, hydroponics labs, mines, and refineries, as well as weapon emplacements and tank and spaceship factories.

Controlling a planet in Utopia can be an administrative nightmare, but it's a rewarding administrative nightmare.

Once the buildings are up, you staff them by setting employment quotas for the mines, labs, and factories. If you put too many into technical work, general construction slows. Throughout the game, you're balancing resources and needs.

If you lose the balance, all kinds of things go wrong. Your objective is twofold: Avoid destruction by the enemy and sustain a Quality of Life (QOL) of 80 percent or better. You need defense spending to avoid annihilation, but without social spending your QOL hits the skids, crime skyrockets, and, if things get bad enough, you may even face assassination.

Oops, the oxygen level is low, and citizens are dying. Build more life-support units. Food levels are low; build hydroponics domes. Morale is low. Build hospitals and hire medics, put in a sports complex and hold a few sporting events, and be sure to have enough living quarters for everyone. (They hate doubling up in their apartments.) And through it all, keep the tax rate down.

You get the idea. You must skillfully balance these and many other factors. As the colony grows, the citizen's demands come faster and faster. Eventually, you're doing nothing but responding to emergencies, building apartments willy-nilly on the nearest plot of empty land, and losing control in the rush to keep things from falling irretrievably apart.

Imagine your consternation when, in the midst of all this, the enemy attacks. If you've prepared well, you can handle it.

The number of factors to control seems overwhelming. (Did I mention setting research grant levels, trading commodities in interstellar markets, spying on the enemy, and keeping your mobile defenses in constant motion?) Surprisingly, it doesn't take long to achieve a satisfying degree of control. Once you gain control, it's exhilarating to master the planetary administrator's job.

This well-balanced challenge takes only about 1MB of hard disk space, a welcome change in a field dominated by 10- to 15MB monsters. Konami did this by resisting the temptation to provide unnecessary state-of-the-art graphics and sound. Instead, graphics and sound are simple but effective.

You won't build a true utopia—a place of ideal perfection in law, government, and social conditions—the first time out, but you may eventually get tantalizingly close. If so, move up to the next of the ten increasingly difficult scenarios. Utopia's challenge will bring you back again and again, seeking to make each new colony a little better than the last one.

RICHARD O. MANN

IBM PC or compatible (16-MHz 80286 or faster), 640K RAM, mouse; hard disk recommended, supports all major sound cards—$49.95

KONAMI
900 Deerfield Pkwy.
Buffalo Grove, IL 60089-4510
(708) 215-5100

Circle Reader Service Number 352

dBASE IV 1.5

Which is the better car, a Mazda Miata or a Volvo four-door? Who was the more important baseball player, Hank Aaron or Babe Ruth? Whose music is better, Crowded House's or Philip Glass's? And, towering in importance over the aforementioned trivia—is dBASE IV better than FoxPro?

The answer, he hedged, is that it depends on what you're looking for. If FoxPro is the Miata of databases—fast, new, and flashy—then dBASE IV 1.5 is the Volvo sedan: built for reliability, more comprehensive in some ways but less nimble in others, and a solid if con-

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servative choice by anyone's standards.

Installing dBASE IV 1.5 is easy and swift. It runs in a lean 450K of RAM and weighs in at a svelte 4.5MB of disk space with all example files loaded. It begins by showing you the Control Center, a deceptively simple screen from which you can create or modify any of the following: database files, queries, data entry forms, reports, labels, or applications (which manage combinations of the aforementioned objects).

Borland's manuals stress the use of the applications generator, and it's no wonder. Not very sexy but written in an accessible and well-documented template language, it's an extremely powerful applications generator and able to do a tremendous amount of work for you. FoxPro's is a glittering bauble by comparison—prettier but far less capable.

The report writer that comes with dBASE IV 1.5 doesn't appear to have changed since 1.1, but it didn't need to. The 1.1 report writer was immediately, justly famous, and the tradition continues. (If you have version 1.0 but not 1.1 and are thinking of upgrading, note that PostScript support is finally here.)

If you're a dBASE III Plus user who has avoided upgrading to version IV until Borland got hold of the product, now's the time to move up. Indeed, dBASE IV is rock-solid and a huge improvement from version III. You've probably guessed already that the Control Center is an industrial-strength replacement for the wimpy Assist. Other giant-step improvements include (but are by no means limited to) multiple-tag index files that speed file I/O by orders of magnitude, much better support for arrays, 254 fields per record (but still only 4000 bytes total), support of more than one printer, data encryption, keyboard macros, international currency and date support, and—at long last—a full set of user-interface controls.

dBASE IV 1.5 is the Volvo sedan of databases, combining lean, solid, and practical aspects with innovative new features.

The dBASE IV language has menu and window control in spades, implemented in a very dBASE-like fashion. It's very easy to pick up and really fun to use in your applications.

Language improvements since version 1.1 are rather few in number, but they'll warm the cockles of any C programmer's heart. Eleven functions for low-level file access let you do what dBASE should have done five years ago and were added only perhaps because Clipper has already done it. Functions that mimic the file I/O routines provided with ANSI C include FCREATE(), FOPEN(), FREAD(), FWRITE(), and others. This means that for the first time, you can create text files from a dBASE application! It's one of those things that's so obvious, you assumed it was possible all along but were just too embarrassed to ask.

The other new routines give you the size, date, and time of a file. Although these have always been fairly easy to implement in bin files, it required knowledge of 8088 assembly and MS-DOS system internals that most dBASE programmers would rather not have to know. Another relief is the inclusion of procedure libraries—you can now have more than one procedure in a file. A Set Library command supplements Set Procedure, which can now be reserved for local operations.

And if you were worried about how the language would deal with multiuser environments after fiddling with network kludges in III Plus, you can breathe a sigh of relief: Everything is well designed and well documented; this is one of the few database products with documentation that doesn't seem to assume you've been a network administrator for years and know exactly what to look for in the reference section.

However, the Getting Started manual just doesn't go far enough. The dBASE language tutorial could've been written for III Plus and ignores such fundamental issues as user interface. You should expect to spend several weeks on Using dBASE IV, which has extensive tutorials on the Control Center's applications. You can save a tremendous amount of time using the Control Center, and many job descriptions for dBASE programmers require that they know it—for good reason. I'm not convinced that generating dBASE applications without resorting to coding is as easy as it should be to learn, but once you know how, you can crank out impressive turnkey applications with almost no handcoding at all. One manual I miss dearly from 1.1 was a tutorial that took you step by step through the creation of a substantial application using relational databases, the applications generator, and a touch of handcoding. I'm not sure why it was left out, but I'd like to see it reappear in a later version.

If you're sure you want to stay with dBASE, upgrading from II or III Plus is a mere $175. The choice between dBASE IV and FoxPro, however, might be a bit tougher. There are certain applications for dBASE IV that the celebrated FoxPro simply cannot handle, and if your needs lie in this area, there's no contest. First, dBASE supports Commit and Roolback. These are mainframe-style commands that ensure you can save or restore the state of the database at will. While disk-intensive and not to be used casually, they are the only way you can guarantee data integrity—and FoxPro doesn't support them. Second, dBASE IV's applications generator is less attractive than FoxPro's, but it can create

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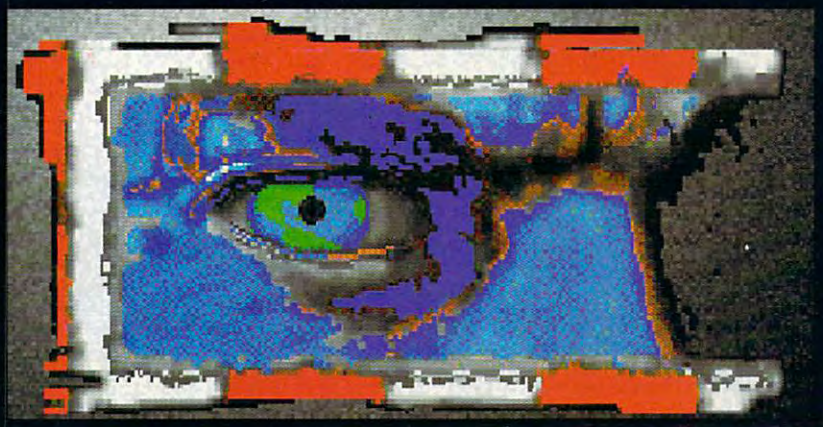

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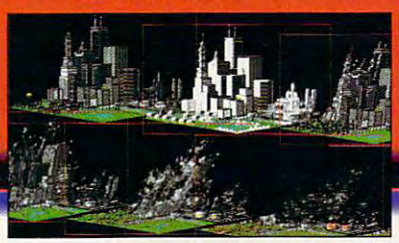

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applications that use several databases at once; FoxPro's can handle only one. Since virtually all serious applications require more than one database to be opened simultaneously, it's worth your time and money to get dBASE IV just for that. Finally, it's guaranteed dBASE compatible—and in these days of fragmenting language standards, that's not a bad thing at all.

TOM CAMPBELL

IBM PC or compatible, 640K RAM, hard drive with 3.5MB free (5MB recommended), 1.2MB 5.¼-inch or 720K 3.½-inch floppy drive—$795.00; upgrade from dBASE III—$99.95 plus $9.00 shipping and handling

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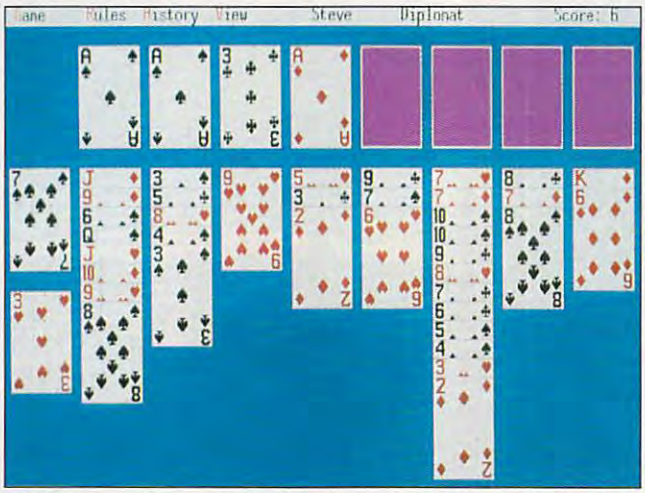
Circle Reader Service Number 353

SOLITAIRE'S JOURNEY

Some I enjoy; some I don't. Some are easy to learn; others more difficult. Some are challenging; others are nearly impossible. But with 105 different versions of solitaire, Quantum Quality Productions' Solitaire's Journey includes solitaire games for everyone.

Solitaire's Journey is a straightforward approach to electronic solitaire. If you play a variety of traditional solitaire games, you'll probably find an electronic version of each of them included. And if you enjoy exploring and mastering new and different games of solitaire, you'll find hours of enjoyment here.

Solitaire's Journey includes not only 105 games but also instructions for each built right into the program. Simply select the game you want to play and pick Rules from the pull-down menu or hit the R key, and you'll see a summary of rules on an easy-to-follow layout of the game board. If you need more detailed instruction for any of the games (and beginners to Solitaire's Journey will almost certainly need more details), they're available also.



Solitaire fans should get their fill with the games in Solitaire's Journey, although the journey itself can be tedious.

Don't like the backs of your cards and want a different style? Or maybe the screen background color is not to your liking? Changing either is simple enough, because Solitaire's Journey offers ten different decks and 240 backgrounds.

Another interesting feature of Solitaire's Journey is its history function. Here the program keeps track of your average score for each specific game you've played, graphs your scores so you can see your improvement, and tells you the standard average score, which serves as a benchmark for comparison.

Although solitaire players will enjoy the plethora of games and find the simple, friendly interface easy to use, the built-in Journey and Quest alternatives are mere attempts to unnecessarily add new dimensions to an already complete package.

In Journey, the player must move across a map of North America between predetermined starting and ending cities. As the player moves from city to city, he or she must select which of three solitaire games to play. An amount of money is received or given up depending on the score achieved. Quest is similar, except that the player moves from room to room in a house. These attempts at adding a new objective strike me as tedious at best, since they require that I play solitaire games I don't particularly enjoy. Solitaire's Journey also includes a tournament scenario that suffers from the same monotonous problem.

The strength of Solitaire's Journey is its variety of games and its clear and concise instructions. If you've ever tried to learn new solitaire games from a book, you'll be impressed with the ability of Solitaire's Journey to explain the rules of each game. What Solitaire's Journey doesn't do is explain the strategy needed for any of the games, although there are some general tips in the manual. You'll just have to master each game by experience—a challenge that enhances the value and appeal of this collection of games.

Although the manual is complete, you'll find the on-screen instructions more functional. The manual does contain an overview of each game. But what's most helpful is the list of games by category—a good way to find out which games are easiest to win! You'll also need the manual for the off-disk copy protection.

Although many players will want to turn off the sound, Solitaire's Journey does support the Ad Lib and Sound Blaster sound cards. For me, the music is more of a distraction than an enhancement.

One improvement I'd like to see in future releases is the ability to use either keyboard or mouse at any time. As it stands, if you have a mouse driver installed, you must use a mouse to play any of the games. Although the games are quicker if you have a mouse, keyboard players will have no trouble controlling play.

If you like solitaire and enjoy a variety of games, you'll find Solitaire's Journey to be a well-designed game pack that will fill your needs and offer challenge and fun.

STEPHEN LEVY

IBM PC or compatible, 640K RAM, EGA or VGA, hard drive; mouse recommended, supports Ad Lib and Sound Blaster—$59.95

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Ultima® VII

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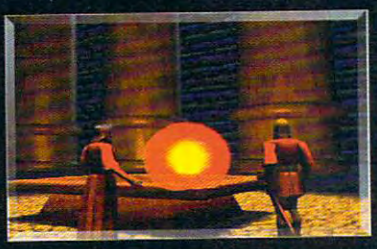

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NEWPOINT

Boy, you just can't beat competition. Microsoft releases the BallPoint mouse (which is actually a trackball, but let's not get picky) for laptops, and I think it's the greatest thing since sliced bread. Sure, it has problems: I can't close the laptop's cover with it attached, and the cord is so long that it often gets in my way. It sure beats using the arrow and Tab keys, though. I'm happy, right?

I thought so, until I saw Mouse Systems' NewPoint trackball, which turns out to be the greatest thing since hot cinnamon rolls. If you're looking for a pointing device for your portable computer, you'd be hard-pressed to find a better choice. Shaped like a ¼-pie wedge, this little trackball has one wraparound button on the outer edge and a second button on top, next to the ball itself. The control panel software, included in both DOS and Windows versions, lets you select which button will be used as the primary button, equivalent to the left button of a two-button mouse. It also offers adjustable sensitivity and four acceleration speeds: Docking, Cruising, Warp Speed, and Hyperspace. Lefties will be happy to know that you can adjust the orientation—which way is up—so the Newpoint can be used on either side of the laptop.

You can hold the NewPoint in your hand or clamp it to your keyboard. The clamp is a work of genius. You simply slide back a small section, place the lip over the edge of your keyboard, and let the sliding section go. There are no little screws to adjust. Also, the lip that secures the clamp to the keyboard is flat, so you can close your laptop's cover without removing the clamp. This feature alone was enough to make me switch permanently to the NewPoint. The trackball slides easily on and off the clamp; however, unlike with the BallPoint, you can't adjust the angle of the trackball. (I never used this feature anyway—why would anyone want a trackball sitting at a 90-degree angle to the keyboard?)

The NewPoint only misses in one area: The cord is too short. I thought I'd like the shorter cord, as the BallPoint's longer one constantly got in my way. The built-in cord is only about 9 inches long, however, and most laptop computers are about 11 inches wide. You'll be able to use the built-in cord with laptops that have their serial ports on the back. It wasn't long enough, though, to use with the Gateway Nomad or my Texas Instruments TravelMate 2000, which have their serial ports on the left side. If Mouse Systems had only made the cord 2 or 3 inches longer, it would've been perfect. Now I'm forced to use its three-foot extension cord, which is even more troublesome than the BallPoint's coiled cord.

The NewPoint I tested was fully compatible with a Microsoft serial mouse. Mouse Systems doesn't include a bus mouse adapter, so you can't attach it to a PS/2-style bus mouse port. It does come with a nice wallet-style carrying case.

Even with my few complaints, I still think the NewPoint is a winner. Probably the best evidence of this is the fact that my BallPoint and Thumbelina trackballs haven't left my desk drawer since the day I unpacked the NewPoint.

DENNY ATKIN

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Home Alone (the game) bring Home Alone *(the movie) to the small monitor, offering many ways for Kevin to foil the bad guys.*

HOME ALONE

Your name is Kevin. You're eight years old. Your family went on a trip, and you got left behind. To top it all off, there are two bumbling burglars named Harry and Marv hovering outside of the house . . . and you're home alone. You've probably seen the movie by now, but let's go over this just one more time.

Your mission is to keep yourself and your house safe—by any means necessary—until the family gets back to protect you.

Although the designers probably had children in mind when they turned *Home Alone* into a videogame, adults can get a kick or two out of it, as well. The concept is fairly simple: You know that Harry and Marv plan to break in at nine o'clock. In an imaginary hour, you, as little Kevin, run around the house setting traps which, you hope, will foil the robbery, stop the robbers from catching you, and keep you safe until the family comes home.

After Kevin's traps are complete or when he runs out of time (whichever comes first), in come Marv and Harry. You then guide the burglars throughout the house, making sure that they fall into the traps. The more Harry and Marv trip on marbles, slip on banana peels, and fall over bags of flour, the more points you earn. And if you're wise enough to add Kevin's BB gun to his arsenal, you can release traps that can only be set off by BB gun shots.

The game is easy to play once you learn your way around the house, but it's not so easy that it becomes boring. I had a heck of a time trying to find Kevin's room, where he hid his BB gun. After a day or two, I found the gun, but I still haven't figured out how to shoot the traps. As a result, my games always end with Harry and Marv saying, "We gotcha, ya little squirt!!!"

Home Alone sports graphics and sound effects that

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definitely add to the game's playability. The graphics are more cute than anything else, which I'm sure will have kids eyeballing the screen with enjoyment. They'll especially like the tarantula, because as soon as it's set down, it starts crawling across the floor. The sound effects aren't extravagant, but they get the job done. You can hear Kevin picking up and setting down objects, and you get an earful when Harry and Marv encounter his traps.

Regardless of the game's technological capabilities, the bottom line is that if you liked the movie, you'll probably like the game, too. It's a good family-oriented game that everyone from Grandma to Junior can enjoy. It might take a little while to learn your way around, but after you do you won't have a hard time playing Home Alone.

DANIELLE BEST

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Circle Reader Service Number 356

IBM PS/1

IBM designed the PS/1 as therapy for the computerphobic. Two years later, PS/1 purchasers talk like computer scientists on Prodigy's PS/1 User's Club bulletin boards. With their increased knowledge, many are venturing into areas the PS/1 wasn't designed to handle.

Many want faster speeds and more memory. So IBM introduced a new PS/1: a 386SX 16 MHz (up from a 286 10 MHz) with 2MB RAM expandable to 6MB or 16MB with an additional adapter unit (up from 1MB expandable to 2.5MB or 7MB) and a 40MB or 80MB hard disk, depending on your style number, expandable to more than 200MB (up from 30MB with no room to grow). Other original PS/1 features remain the same.

The IBM PS/1 represents a step up from its predecessor, but don't expect it to be more than a good starter machine.

A muscular child could probably set up the compact system faster than he could build a Lego house, with about as much instruction required.

The colorful Startup System menu shows off one of the machine's best features—its crisp, bright video screen. Beneath the system menu sits an introductory world of computing: preloaded software programs, including Microsoft Works (word-processing, spreadsheet, database, and communications software all in one), DOS 4.1 (5.0 with some machines), the Prodigy and Promenade online networks, and, with my model B82, Windows 3.0.

The DOS Shell program, while less frightening than the C prompt, is very cumbersome and limited. Unfortunately, the PS/1 doesn't come with a DOS manual, making it even more difficult to do anything outside of the shell if you don't know the commands or even the options you have.

In fact, my biggest complaint about the machine is its lack of documentation. At first, you may not want to wade through technical mumbo jumbo. But after you know the basics, it's hard to go further.

Apparently, the slightly sluggish mouse can't have settings changed to better operate games and applications, because there's no mention of it anywhere.

The modem section of the technical reference guide (only 138 pages for the entire system, software and adding hardware!) took up barely five pages. That makes it difficult to fully use the modem with any other communication software or to connect to anything other than IBM's prepackaged Prodigy or Promenade.

The tightness of the keyboard makes you feel like you're doing something, but the Caps Lock key sits dangerously close to the left Shift key. With my long fingernails, I typed in all caps half the time and muttered about time wasted retyping the other half of the time.

The new basic 2MB RAM gives enough room for most home and small business programs, as well as Windows applications. Once your needs exceed the machine's initial capabilities, it's best to graduate to a build-your-own system, because while the PS/1 is expandable to a certain degree, it has its limitations. After all, it's meant to be that way.

All in all, IBM delivers what it promises: a small package with enough power and room for moderate expansion. Sure, there are other things I would've liked, but it's a starter machine. Think of it as a mother teaching her youngsters the ways of the world: She'll let them try out new things, but not too much too soon.

If you outgrow the PS/1, you'll know enough to venture out into the cold computer world and put together your own package. Pass the PS/1 experience on to a younger sibling, instead of trying to make it fit. As Thomas Wolfe said, "You can't go home again."

AUTUMN MILLER

IBM PS/1 386SX C42: 386SX-16 MHz, 2MB RAM, 3½-inch 1.44MB disk drive, 40MB (21-ms) hard disk, 12-inch VGA IBM Photo Graphic Display, IBM mouse (two-button), 2400-bps modem, preloaded software including DOS and Microsoft Works—$1,699

PS/1 386SX B82: all of the above plus 80MB hard disk, Microsoft Windows 3.0, and Productivity Pack for Windows—$2,199

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LABELS UNLIMITED

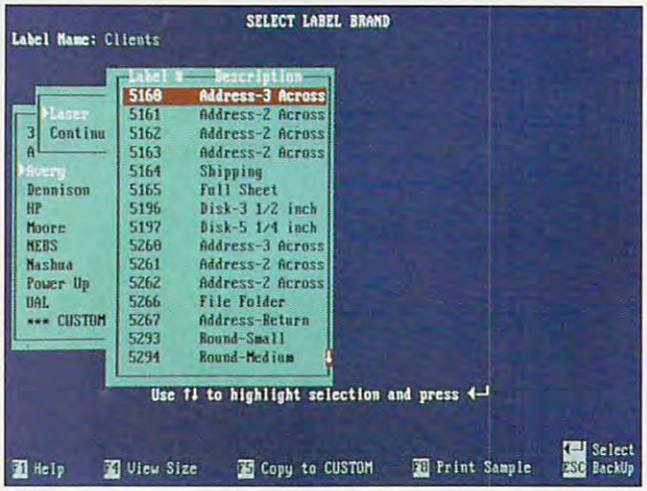
This program's title might convey the impression that it's just another program to produce mailing labels. Not so! In fact, using this program just for mailing labels would be like killing a fly with a baseball bat. Actually, Labels Unlimited is a powerful and versatile program that allows you to create a wide variety of professional-looking disk labels, name tags, tickets, coupons, product or inventory labels, binder covers, and labels for audio- and videocassettes, as well as plain or fancy mailing labels.

Instead of being limited to the few fonts provided by typical printers, you can choose from two different typefaces, point sizes from 4 to 144, and regular, bold, italic, and bold-italic styles. Further variety can be added with horizontal, vertical, and even upside-down text! If that isn't enough, additional typefaces (the same used with Power Up's popular Express Publisher program) are available.

Labels Unlimited lets you add PCX graphic clip art, and more than 40 such images are included. An on-screen preview before printing is available if you have a graphic (CGA, EGA, VGA, or Hercules) display. The printing can be up to 300 dots per inch on laser, ink-jet, and most dot-matrix printers.

You can create product tags and sequentially numbered admission tickets or coupons. Enhancements include boxes, borders, shading, and dingbats. In effect, Labels Unlimited is a desktop publishing program designed to produce multiple copies of the same or similar layout and copy.

To make things simple, you can print directly on label stock from Avery, 3M, Moore, Dennison, and others, since templates for their most popular stock labels are provided in the program. If you choose, you can customize to any size from ¼ × ¼ inch to 11 × 13 inches. If you select a standard label, the dimensions and number on a page are defined.



True to its name, Labels Unlimited lets you print many different kinds of labels enhanced by plenty of fonts and graphics.

Each label can be divided into up to six printing areas called zones, with 18 zone layouts provided within the program. You really don't need imagination as much as the ability to make a choice and follow program prompts.

Labels Unlimited lets you create templates to import data from ASCII text files, as well as delimited or fixed file structures. Similarly, you can export all the data from an existing Labels Unlimited file to a comma-delimited ASCII text file, which can then be imported by most database programs.

The program's 150+-page manual is very detailed, well indexed, and liberally illustrated. A tutorial takes you through creating and printing a videocassette label with two fonts and a graphic. A handy two-sided quick-reference card summarizes the instructions, the keyboard shortcuts, and the most important commands. This card will be all you'll need after a couple of hours of practice, with the manual as backup for further details.

Labels Unlimited is very powerful and versatile, with so many features that you can easily get confused. If you only need to print out labels from a mailing list, get a mailing-list program. For special labels of all sorts with jazzy printing and graphics, however, it will be worth a few hours of practice to use Labels Unlimited.

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LOGICAL

It would challenge Mr. Spock. It could test Mother Teresa's patience. It could be the leading cause of mouse abuse.

It is Logical, an arcade game with a deceptively simple premise. The action takes place in a mechanical ant farm that contains tunnels with four-pod wheels blocking every intersection. You coax and force little colored balls into matching groups to explode the pods. If you blow up all the pods before the hourglass drains, you receive a password to the next level.

While you methodically sort balls, Logical fiendishly floods more balls into the bottleneck entries, fatally clogging initial pods. Color-stoppers block conflicting hues. Color-changers tint others into conformity. Direction-switchers repel everything. Spock's favorites—the teleporters—transport balls into the nether regions.

One minute mistake or brief pause for panic has lethal results. Logical can be quite unforgiving. Close doesn't count, even if one failure uses more energy than ten wins.

If you don't have a darn good mouse, don't bother with the frustration. Beyond the rudimentary levels, winning is improbable for the mouseless. The crisp, vibrant graphics with four choices of marbled backgrounds encourage staring at the screen for hours. I couldn't get the monochrome option to work on the mono screen I tried, although it did work on color screens. Odd. Sound cards are supported but not essential. Logical creates wonderfully interesting sound effects and tunes for the PC

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speaker, including a little "Nyeah, nyeah, nyeah" ditty to accompany the frequent *YOU FAILED* screens.

Masters of all 99 hair-tearing designs crafted by Logical's German programming wizards are rewarded with the final password. It provides the key to the secret development tools allowing victims to design their own torture chambers. Logical is the perfect game for masochists, in more ways than one.

Infinite possibilities await the easily addicted. When my mouse hand became a cramped contortion, I still found myself playing Logical in my dreams at night.

AUTUMN MILLER

IBM PC or compatible, 512K RAM, EGA or VGA, 5¼-inch floppy drive; joystick and mouse optional, supports Ad Lib—$30

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Kaarst, Germany 4044
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The new Windows version of PGA Tour Golf includes several challenging courses, functional graphics, and clean simulation.

PGA TOUR GOLF FOR WINDOWS

As if there weren't enough distractions from the daily grind, Electronic Arts fans the flames of procrastination with the best-selling PGA Tour Golf, newly revised for Windows. Productivity might never be the same.

The game opens into a window of fixed proportions, slightly smaller than a full screen. Allowed memory to spare, the program multitasks with ease. The game window's reduced size helps deliver the program's seven-second screen update, the fastest of any 256-color golf simulation.

Visit the Pro Shop to enlist golfers from the user-defined member list. Each player can choose his or her favorite club configuration and animated onscreen alter ego. You can practice technique on the driving range and putting green and then play through a single hole or an entire round.

Tournament play allows up to four golfers—human or computer-controlled—to compete against a leader board modeled after 60 nationally ranked contenders. Finish in the top 48 to advance to the second round and in the top 32 for the third and fourth rounds. As a member of the PGA entourage, your vital statistics—performance, standings, and winnings—are continually tracked, updated, and saved to disk. Major changes in the leader board are reported with optional onscreen, TV-style coverage.

The basic package offers three of the Tournament Players Club's best links, designed from original course blueprints. Sawgrass (Ponte Vedra, Florida) is home to the Players Championship and PGA Tour headquar-

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ters. Veteran players coined the term *target golf* to describe the pinpoint accuracy needed to survive this exquisite array of narrow fairways, wide bunkers, and merciless water hazards. PGA West Stadium Course (La Quinta, California), current site of the Skins Game, features enough challenging terrain—valleys, mounds, potholes, water, and sand—to fill a dozen minor courses. The gently rolling hills of Avenel (Potomac, Maryland) play host to the Kemper Open, the country's longest-running corporate-sponsored sporting event. A fourth fantasy course, Sterling Shores, was designed especially for the program.

Also available, and highly recommended, is the supplement course disk, featuring three additional TPC locales: Southwind (Federal Express St. Jude Open), Eagle Trace (Honda Classic), and Scottsdale (Phoenix Open).

Artist and animator Cynthia Hamilton's outstanding blend of polygon and bitmapped graphics lends the game its distinct personality. While other products sacrifice speed and gameplay for increasingly garish photorealism, Hamilton's high-resolution images are functional to a fault—almost architectural in design. On the downside, the solid-fill fairways lack the depth and character of textured terrain.

The simulation plays as clean as it looks, accurately portraying the cumulative effects on your performance of wind, ball lie, and swing. Several shot styles are available to rescue you from horrible lies: chip shots, punches, and blasts. Each club's distance potential can also be adjusted to fine-tune your swing.

The game's few shortcomings have no impact on gameplay, such as the inability to print golfer's stats or tournament outcomes. Another disappointment is the absence of the original's fly-by hole preview, replaced by the slow, virtually useless Hole Browser. There's also no course designer, although most users will hardly notice.

Electronic Arts picked a winner for its first foray into Windows entertainment. Let's hope it isn't the last.

SCOTT A. MAY

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Circle Reader Service Number 360

MAYNARD ARCHIVEXL 80

For computer users with large hard drives, a tape backup system has become the next must-have peripheral purchase. The Maynard ArchiveXL 80 is a tape backup unit that pulls its weight in making sure your data files are safely backed up.

The ArchiveXL 80 is designed as a low-cost backup device for personal use. It can pack up to 120MB of data (up to 250MB if you use compression) on a single extended-length tape. Several backups can be stored on the same tape, and when necessary, it's possible for your backups to span multiple tapes.

The ArchiveXL system uses what's become the industry standard: the quarter-inch cartridge (QIC). The device can read both QIC-80 and QIC-40 tapes.

I tried an external unit, dubbed the 5580e. Other drives in the series include the 5540e, a lower-capacity external unit, and the 5580i and 5540i, comparable internal drives. These drives are designed for AT or compatible computers. ArchiveXL models 5240i and 5240e are available for XT-class machines.

The 5580e measures 8½ inches long, 4½ inches wide, and 2¼ inches high. It can sit flat, or if desktop real estate is at a premium, it can be turned on its side like a tower case PC and inserted into a pedestal base provided for that purpose.

The system includes an interface card, which is placed in an empty slot in the computer, and all the cables necessary to hook the unit up to your computer.

The system comes packed with a copy of QICstream backup software, which is an adequate, but not flashy, performer. Although QICstream is compatible with DOS 5.0, it's not compatible with Microsoft Windows.

It can back up and restore full disks, changed files, or selected files. QICstream includes a macro capability and a scheduler to permit automated backups, but, unfortunately, it's not easy to figure out how to use these advanced features.

Both the written documentation and online help are cryptic and difficult to follow. Thankfully, though, the ArchiveXL 80 works well with other software, such as Central Point Backup, which scores much higher in the ease-of-use category.

With CP Backup configured to use QIC formatting, QICstream and CP Backup could be used interchangea-

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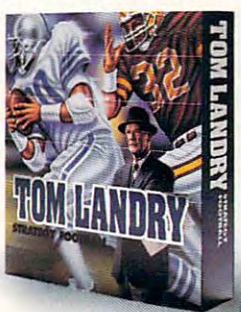

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bly for backups and restores. The ArchiveXL 80 drive also backed up and restored flawlessly using Central Point's proprietary CPS tape format, but tapes stored in that format lose their compatibility with the QICstream software.

By default, QICstream performs a backup with a verify. In more than 600MB of backups, only one file failed to verify.

The verification performed by QICstream checks the tape to make sure the data recorded there is readable. On the other hand, CP Backup and other specialized backup programs can perform a full file-by-file comparison of the files on tape and on disk.

Whether you verify a backup or do a full comparison, it adds significantly to the time required for the backup. But since you're not feeding floppies during the whole process, it doesn't really matter. The ArchiveXL 80 can do its work while you're out to lunch or after you've finished working for the day.

Backup speed varies from about 500K per minute to about 3MB per minute, depending on the speed of the machine being used and the type of data being backed up. Backup times also can be affected by the presence of another device—such as a scanner—on the same DMA channel as the ArchiveXL 80.

Although the manual provides no information about which DMA channel is used by the tape drive, experimentation showed that backups ran much more quickly once DMA conflicts were eliminated.

With a top tape capacity of 250MB, the ArchiveXL 80 has proved to be a solid contributor to data safety for both individual workstations and small networks. Backups across a network worked just as well, though a little more slowly, than backups of local drives.

In cases where a network is not available, the ArchiveLX 80 external unit can still be used for multisystem backups. Simply add an interface card to each of your computers, move the tape drive from computer to computer, plug in the data cable, and go.

I've always recommended daily backups of important data, but until I installed the Maynard ArchiveXL 80 system, I wasn't very good at taking my own advice. Now there are no excuses. With this system, it's no problem whatsoever to maintain full weekly backups along with a series of incremental daily backups.

TONY ROBERTS

Maynard ArchiveXL 80—$679

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PAPERBOY 2

Admit it. When you were a kid, you dreamed of that noble calling . . . that ultimate challenge . . . the thrill of being a paperboy!

Didn't you? I did. I dreamed of riding my bike through the neighborhood,

With Paperboy 2, you get points not only for delivering papers successfully but also for breaking windows.

launching papers with tactical precision toward each front porch. Now and then (heh-heh-heh!) I'd target a mud puddle or a roof—or (dare I say it?) maybe Mr. McGillicuddie's window!

But I never realized the dream. Just didn't have the right stuff, I guess. And I certainly lacked the nerve to launch one through Mr. M's front panes, whether he deserved it or not.

Till this morning.

Yes! This morning I cracked. Went absolutely nuts, I did. I splashed papers into Mr. Smithers' pool! And I blasted the news through McGillicuddie's window over and over again!

And thanks to Paperboy 2, new for PCs and compatibles, I was able to get away with it scot-free.

Paperboy 2, unlike its predecessor, is politically correct and lets you specify paperboy or papergirl. The object is simple: Deliver papers. Your BMX bike speeds up, slows down, and goes left, right, and straight ahead. That's fortunate, since the neighborhood is full of treacherous obstacles and bike-eating vehicles that must be jumped, dodged, or otherwise avoided. It's all under joystick or keyboard control for either one or two players.

Your basic score is tied to how many papers you deliver. But it's extra points that give this game its wholesome appeal. For example, using a paper to stop a runaway baby stroller earns 1000 extra points, while beaning the fat lady at the fair brings 250. You can also lay one on zombies, ghosts, and mummies at various theme houses, albeit for a paltry 50 points each.

The biggest thrill comes when you go for the breakage bonus. Wow—extra points for breaking things! You can break windows, of course, but beyond that the idea is interpreted pretty loosely. For example, breaking—and, in the process, freeing—a barbecuing pig earns 300 points (and the pig's undying gratitude), while breaking the garbage man only earns 200. You can also break baseball players, a waiter in a trendy restaurant, and a sunbather (with startling results). The list goes on and on.

At the end of your route, you can earn still more points on a bonus course complete with jumps, fancy turns, and all sorts of bicyclic derring-do. Who knows? Your initials might even make it to the coveted Top Ten.

Paperboy 2 is instantly

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playable. It'll take you all of five minutes to master the interface. Sound effects are effective even on the tiny PC speaker; with Ad Lib or Sound Blaster, they're great.

Is it fun? Yes! I found it vicariously thrilling. My nine-year-old, ordinarily well behaved, got a gleam in her eye as her papergirl roared through the neighborhood. Interestingly, though, some of the paperboy's all-in-fun destructiveness genuinely bothered my three-year-old—and I found it hard to explain to him why I was laughing so hard at something he really shouldn't find funny at all. Ah, parenting.

Child-rearing questions aside, Paperboy 2 is unexpectedly appealing. It's not educational or socially relevant or anything like that. But that's OK. Paperboys just want to have fun.

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BANNER BLUE MOVIE GUIDE

Picture your last trip to the video store. You thought you knew what you wanted—action, let's say. You agonized over the teeming racks of movies (most of which you felt certain you'd seen before) and read the blurbs on scores of boxes, only to select the very worst movie of Mel Gibson's career. How can this happen to an otherwise intelligent shopper? Banner Blue wants to play surrogate usher for your next video store outing and offers its Banner Blue Movie Guide, indispensable software for the true movie buff.

Thanks to data compression, more than 9000 movie profiles fit comfortably on your hard drive—that's more titles than most mom-and-pop stores carry. Floppy users can optionally install Movie Guide on two high-density disks; access time increases but remains tolerable. Within each profile you'll find the movie's director and stars, a rating, and a brief plot summary. Details available from a submenu include critics' opinions, the level of box-office success, country of origin, length, awards won, and video availability. Periodic updates will add the latest movies.

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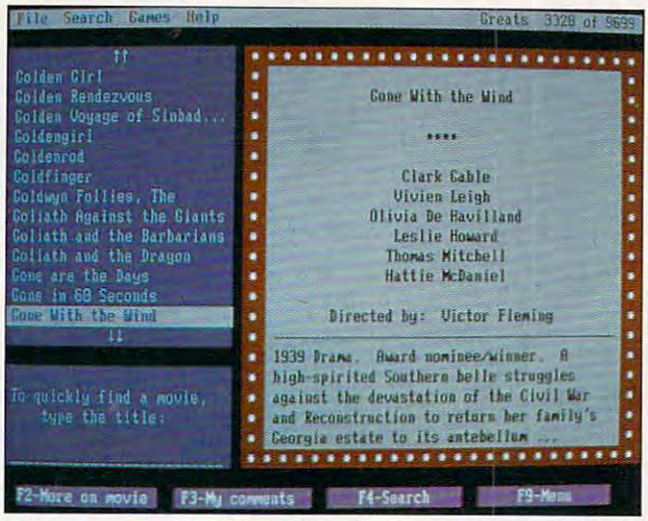

Before your next trip to the video store, consult the Banner Blue Movie Guide to help you decide what to rent.

As with any reference tool, search success often depends on your determination. Some stormy Tuesday may seem perfect for a horror flick, and you're in the mood for vampires. A search by subject unearths more than a few, but wait—*Dracula* isn't in the lineup. Search specifically for *Dracula* and the classic materializes, as well as *Dracula's Dog*. But where's *Dracula vs. Frankenstein?* This film's in the database, but requires a little more digging to discover. You might miss a few gems if you do only a quick search. On the other hand, the search options provide such easy access to data that anyone who loves movies will spend hours just browsing through.

The movie-trivia game built into Movie Guide can engage up to four players, but cinema historians won't miss many questions, even on the most difficult settings. You'll have just as much fun discovering what truly awful movies Kevin Costner had to make early in his career.

Obviously intended as a middle-of-the-road guide, this product seems a bit on the generic side. The plot summaries don't reveal enough for truly informed decision making, and the ratings for each film come from undisclosed critics. Some people disagree with Roger Ebert's every word, and he might've been a source for Movie Guide, for all we know. Of course, you should take most critics with a grain of salt anyway; Movie Guide gives Kenneth Branagh's *Dead Again* 4 stars, while granting his *Henry V* only 3½.

DAVID SEARS

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At first, I thought this would be quite a maze to wander through. After phoning for technical support and receiving relatively simple instructions, though, I got into the program. Then, I discovered the software's

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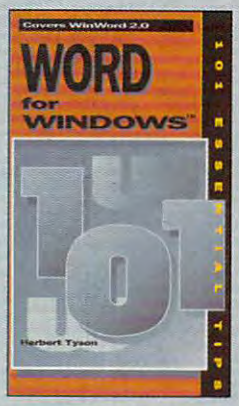

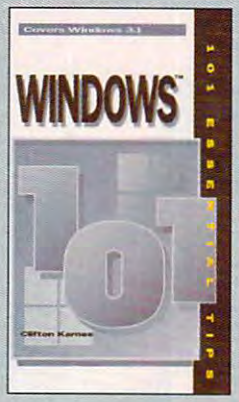

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best feature: its simplicity once you start using it.

You begin with a root person and work generations backward or forward. Individual records include fields for name, birth, christening, marriage, death, and burial information. You can also add people unlinked to anyone listed and import and export gedcom files, the standard format for exchanging genealogical information by computer. Or, to call up a specific person, just use the Search command. Because the entries appear in a tree-style format, the user can see the relationships on-screen.

Some links take more work than others to create. Stepsisters or stepbrothers, for example, are entered differently from full siblings. While full siblings are entered as children of the same set of parents, you change the parents' names of half sibs or stepsibs accordingly, and enter children under those parents' names. Selecting which brother or sister (and thus which parents) you view on-screen requires highlighting your choice and hitting Enter. The downside: You can't see full sibs with half sibs or stepsibs.

Ultimately, the software can maintain 225 databases with 30,000 people in each; any of the databases can be deleted or modified at any time. A notes-and-sources capability lets you record where you found facts, as well as give personal anecdotes or background information. I made notes ranging from where a husband and wife met to comments on an ancestor's land.

Once enough information is typed in, printed charts and reports allow for virtually any custom hard copy. From a summary of a certain family to an ancestry sketch to a special combination you create yourself, you can produce a document tailored to your needs. I tried all 17 options and was more than pleased. These documents could easily be

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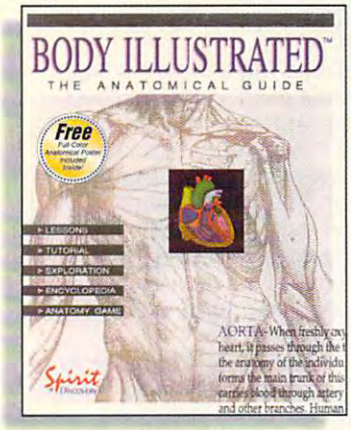

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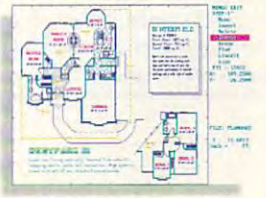

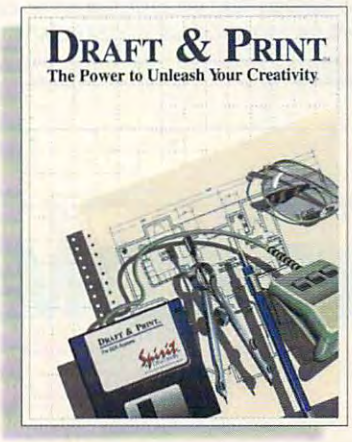

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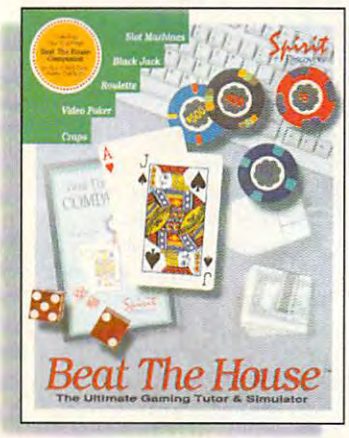

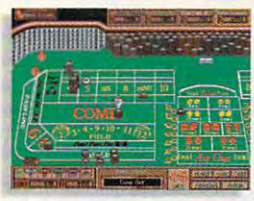

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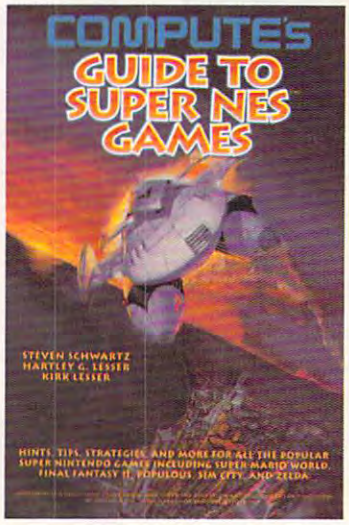

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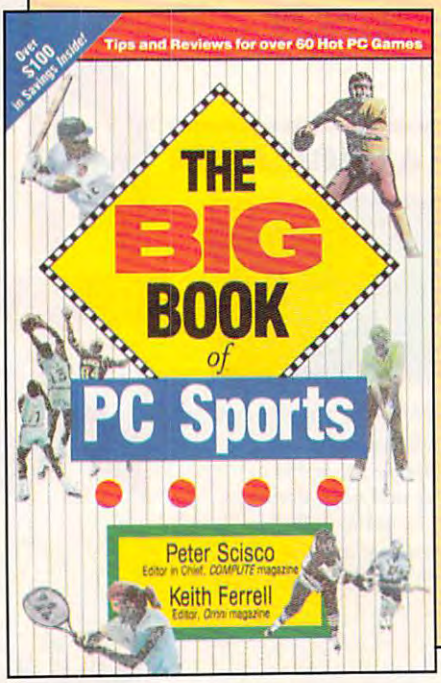

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REVIEWS

turned into gifts, given their variety and appearance.

Any faults (and there are a few) can be worked around. For example, choices under marriage information don't take account of a deceased spouse, offering only married, divorced, unmarried, and annulled as categories. But you can enter the date of death for an individual, then display it as part of the information under his or her name. Also, the system supports up to ten spouses per person.

If you're interested in tracing family roots and sharing that information with others, Family Origins makes that goal more fun and easier to reach. I expected that using this program would be hard, initially—but, much to my joy, it proved quite easy to figure out in a very short period of time.

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SPACEWRECKED

Maybe in space no one can hear you scream, but from even this far away, players of Konami's Spacewrecked: 14 Billion Light Years from Earth could raise a ruckus. With all the tasks you have to perform and all the angry aliens out for your blood, this intergalactic trek could take forever.

A routine exploratory mission turns tragic when you fly into the remains of a moon. Your damaged scout ship won't take you safely home; a long sleep in the cryotube seems the only option. Years later, you awaken, but not to the sounds of rescue. The ghostly—but of human design—Darwin Biological Survey Fleet awaits your inspection. The 20 scientific survey vessels need repair, and you need a lift.

Too bad the crews of the Darwin Fleet can't help you. Alas, the hapless spacemen left hyperspace at just the wrong moment and entered realtime at the heart of a supernova. Cryogenic suspension systems stayed online while most other on-board systems failed. In hopes of a rescue, the daring explorers dream their cold dreams; if anyone will fire up the engines again, it will be you. Oh, and hurry—the fleet could fall apart at any minute. Those poor sleepers! When the cryosystem

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