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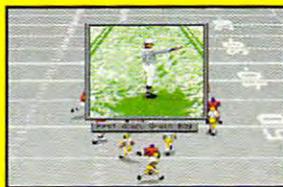
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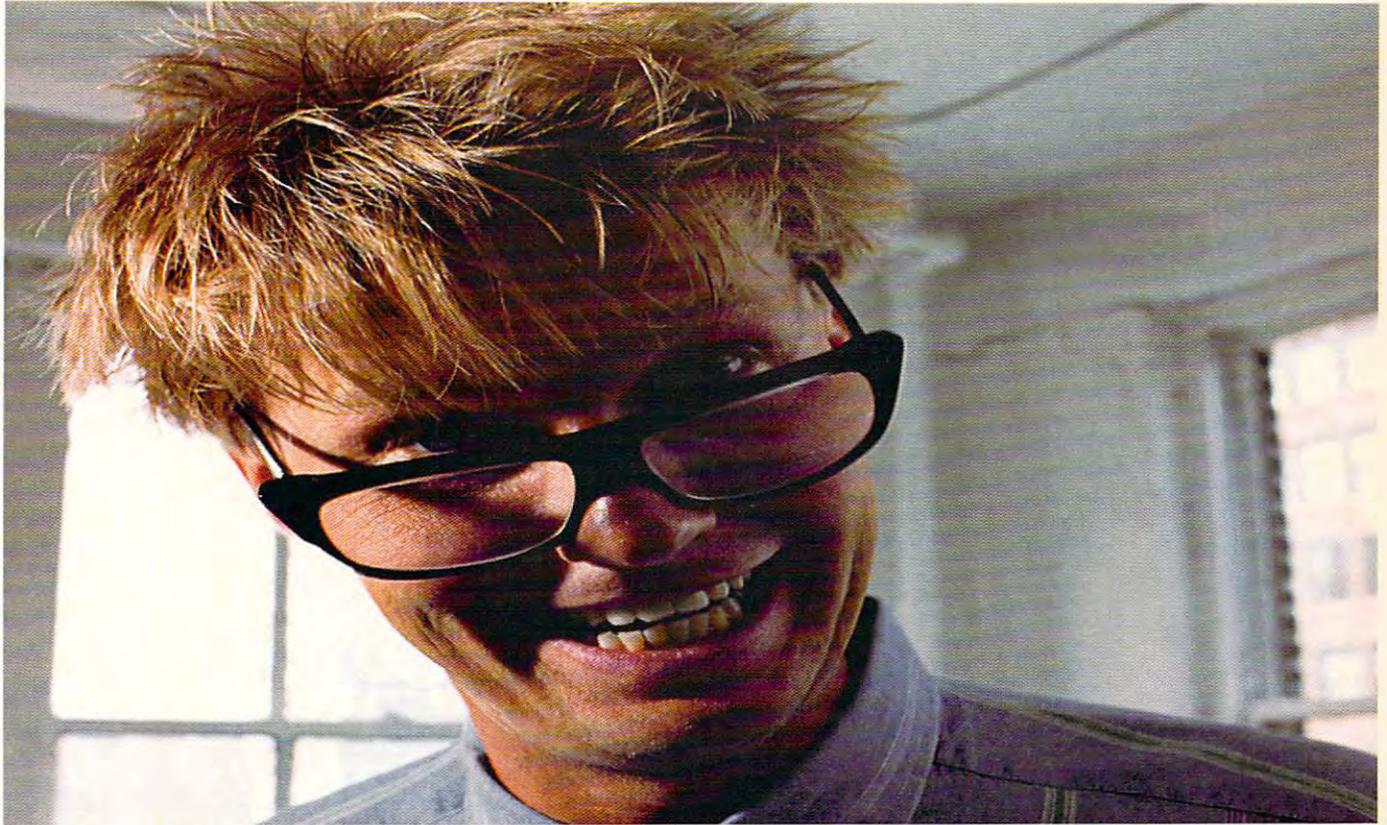
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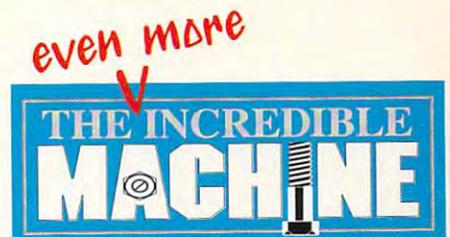


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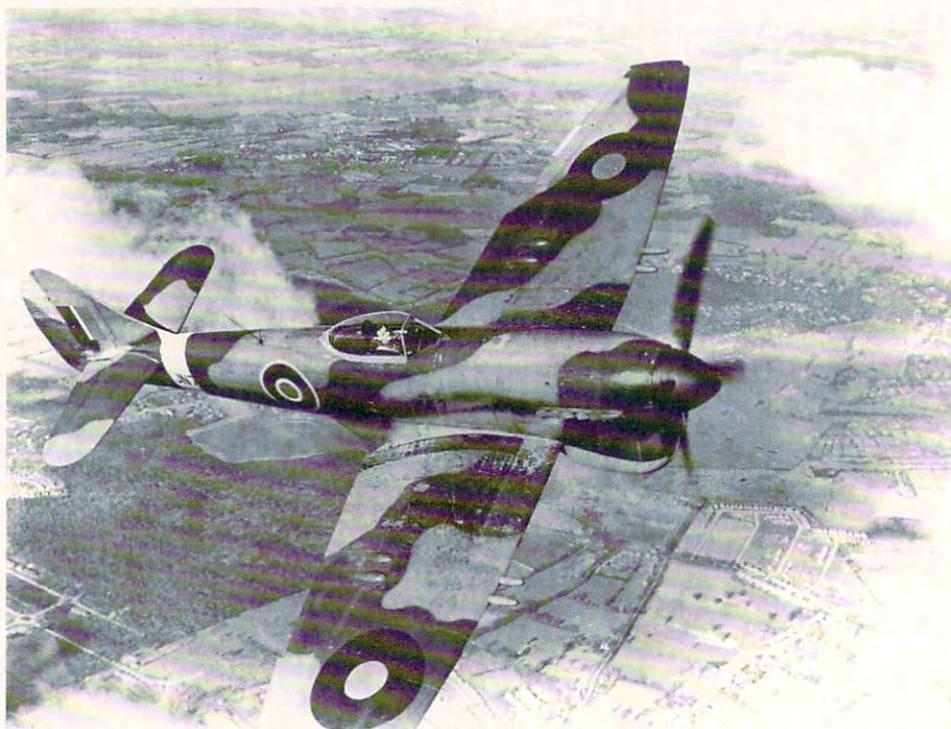
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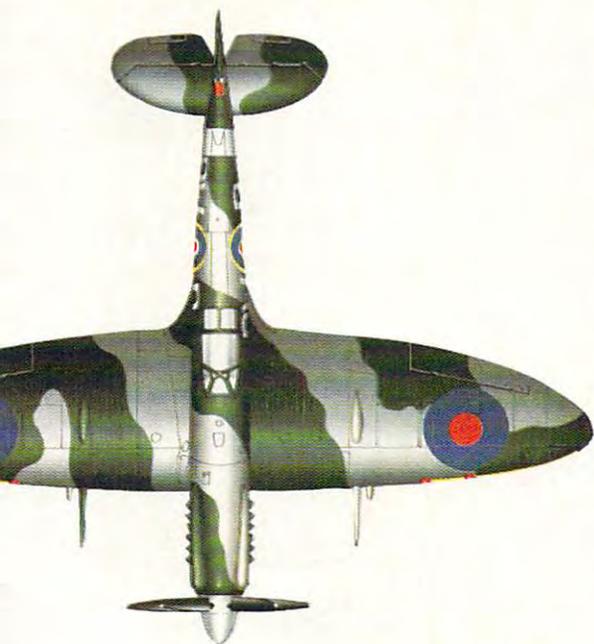
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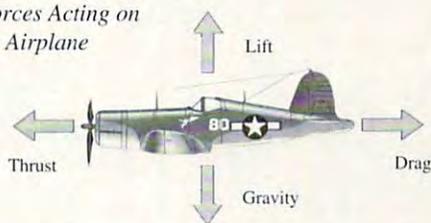




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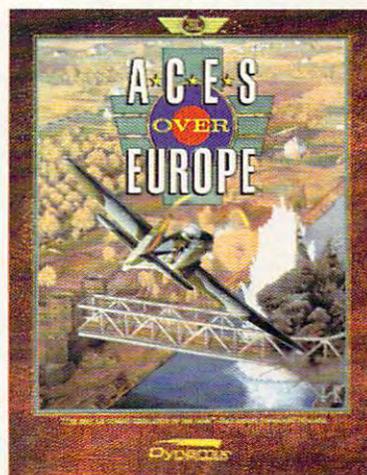


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WALK SOFT RUNS HARD NEWS ONLINE

Hold the presses—in fact, forget the presses. Walk Soft has taken the paper out of newspaper and replaced it with your computer monitor, complete with sound and animation. News in Motion is the first online multimedia newspaper in the U.S. It's currently available as a weekly, but it will soon be issued as a daily (Monday through Friday).

You can download the "paper" every Saturday or have it sent to you on disk. You'll need Windows 3.1 and DOS 5.0 or higher. Its news and editorials come from agencies around the world: Reuters, *The Economist*, *Le Monde*, *Asahi Shimbun*, *Der Spiegel*, and others. Color photos, graphics, and political cartoons accompany the text, and sound and animation bring the news to life.

News in Motion also includes the soft news and fluff that so many readers find endearing in their favorite news magazines and papers. It has animated horoscopes and comics, the *Frugal Gourmet*, and defense coverage from *Jane's Defense Weekly*.

Subscriptions are available for 1, 3, 6, and 12 months. Rates are higher

than for weekly news magazines or daily papers—\$4.80 per issue for a 12-month subscription—but downloading is toll-free if you use a 9600-bps or faster modem.

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IT'S NOT THE CARD YOU HEAR

As any audiophile will tell you, the best stereo in the world sounds only as good as its speakers. Since the same principle applies to computer sound systems, your choice of speakers is as important as your choice of a sound card.

The ACS50 amplified speaker system from Altec Lansing offers you many of the features of high-fidelity home-audio speakers and amplifiers. The two-way speakers have 2 1/2- x 1 1/4-inch midbass drivers and 3/4-inch ferrofluid-cooled dome tweeters. They're magnetically shielded so you can place them beside your monitor without interference, and they're matched with the amplifier for optimum frequency response.

The amplifier mounts onto your monitor, so the



Altec Lansing's ACS50 speaker system



Vdeck 500 from Sony Computer Peripheral Products

headphone jack and volume control are on the front of your computer rather than on the sound card. Circuitry for bass and treble boost are built into the amplifier.

Altec Lansing
(800) 258-3288
\$100
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VDECK, VISCA, AND OTHER VIDEO VERNACULAR

Sony has added a second 8-mm VCR to its Vdeck series. Like the first Vdeck (the CVD-1000 Hi8), the new Vdeck 500 was designed to be a computer peripheral rather than simply a VCR you can connect to your computer. Sony's Video System Control Architecture (VISCA) is built into the deck, so you can connect it directly to your computer and control it with your video-editing software using VISCA drivers.

The Vdeck has a number of professional features for precise editing, including time coding for highly accurate searching and dubbing, input and output jacks for

communicating with other devices in a VISCA daisy-chain, and voice boost for voice enhancement and background noise reduction.

You can also expect to see more video software for Windows. Microsoft has incorporated VISCA protocol into its new Media Control Interface (MCI) drivers. Software developers can use these drivers to create video-editing software that can control your camcorder, VCR, and other video devices. The platform-independent VISCA protocol has already been used in drivers for Macintosh and other systems, but the system-level support offered by Microsoft's new MCI drivers should prompt many new PC applications. Desktop video may soon be as common as desktop publishing.

Developers can download the new drivers from Sony's Bulletin Board Service at (408) 955-5107.

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SPOTLIGHT

PC KARAOKE AND SOFT KARAOKE

These days, nightclubs are famous for their karaoke machines, which encourage fun-loving (and often alcohol-sodden) folks to get up in front of a crowd and bark out a hit song, all to the recorded accompaniment of a full ensemble and background singers. Now, two new software products, PC Karaoke (Sirius Publishing, 602-951-3288, \$99.95) and Soft Karaoke (Tune 1000, 800-363-8863, \$49.95), let you do your crooning at home. And while both products do a great job of replacing the standard karaoke machine, they're as different as Frank Sinatra and Nirvana.

PC Karaoke is, from an options point of view, the simpler of the two products. A CD-ROM-based Windows program that features 256-color graphics, studio-recorded music, and action video sequences, PC Karaoke synchronizes onscreen lyrics with the beautifully arranged and professionally recorded songs.

When you run the program, you see a full-screen graphical menu depicting the songs on the current disc. To choose a song, simply click on its picture. The song's graphic then fills the screen, after which the song loads and begins to play, highlighting the lyrics on the screen as it goes.

If you want to sing along with all 12 of the musical selections on the disc, you can click on KJ's Top 12 Countdown. This brings up a karaoke jockey (the karaoke version of a disk jockey), who gets you started on your musical tour and pops in now and then with some humorous silliness.

Extra song discs are available from Sirius for \$15.95 each. The current catalog features 40 discs that cover all kinds of music, from Broadway show tunes and movie soundtracks to hard rock and rap. The disc that comes with PC Karaoke features a wide range of selections, including "You've Lost That Lovin' Feelin'," "Twist and Shout," "Everything I Do," and "Friends in Low Places"—12 songs in all. The pack-

range). In addition, the volume control panel lets you set each individual instrument's volume, and the instrument control panel lets you assign any one of dozens of different instruments to any instrument track in the song. Of course, with the main control panel's controls, you can play, pause, fast-forward, and reverse the current song, much as you can with a tape deck.

To get this manipulative power, however, you have to

such favorites as "Dust in the Wind," "Stand By Your Man," and "The Way We Were." Additional disks containing ten songs each sell for \$19.95 per disk. In its current catalog, Tune 1000 offers 28 disks; these include the usual assortments as well as collections by specific artists such as Fleetwood Mac, Michael Jackson, Frank Sinatra, and Elton John.

Which product is better? That depends on what's most important to you. PC Karaoke is a sound and graphical delight (with a price tag that reflects this), but it allows no manipulation of instruments. If you like to fiddle with your music, and are willing to forfeit some sound quality and the fancy graphics, Soft Karaoke's powerful control panel will keep you busy for hours.

The bottom line is that both are excellent products, differentiated enough from each other that they will appeal to different segments of this niche market. Both products install easily and work right out of the box—as long as you have your Windows multimedia drivers and mixers set up properly. Both include a starter set of songs (although Soft Karaoke includes only 5, compared with PC Karaoke's 12), and both include microphones (although PC Karaoke's microphone is of a higher quality).

Whichever program you pick, you'll be able to enjoy the karaoke experience in your own home—which will go a long way toward making your next party the hit of the block. But do your friends a big favor: Practice in private first. □



One of the 12 songs that are included in PC Karaoke

age includes a certificate for two additional discs.

While PC Karaoke's CD-ROM format offers greater sound quality, Soft Karaoke's MIDI format (no CD-ROM drive required) offers greater flexibility. When you run Soft Karaoke, a tape player-like control panel appears. Using the control panel, you can not only load and run song files, but also manipulate the files in various ways.

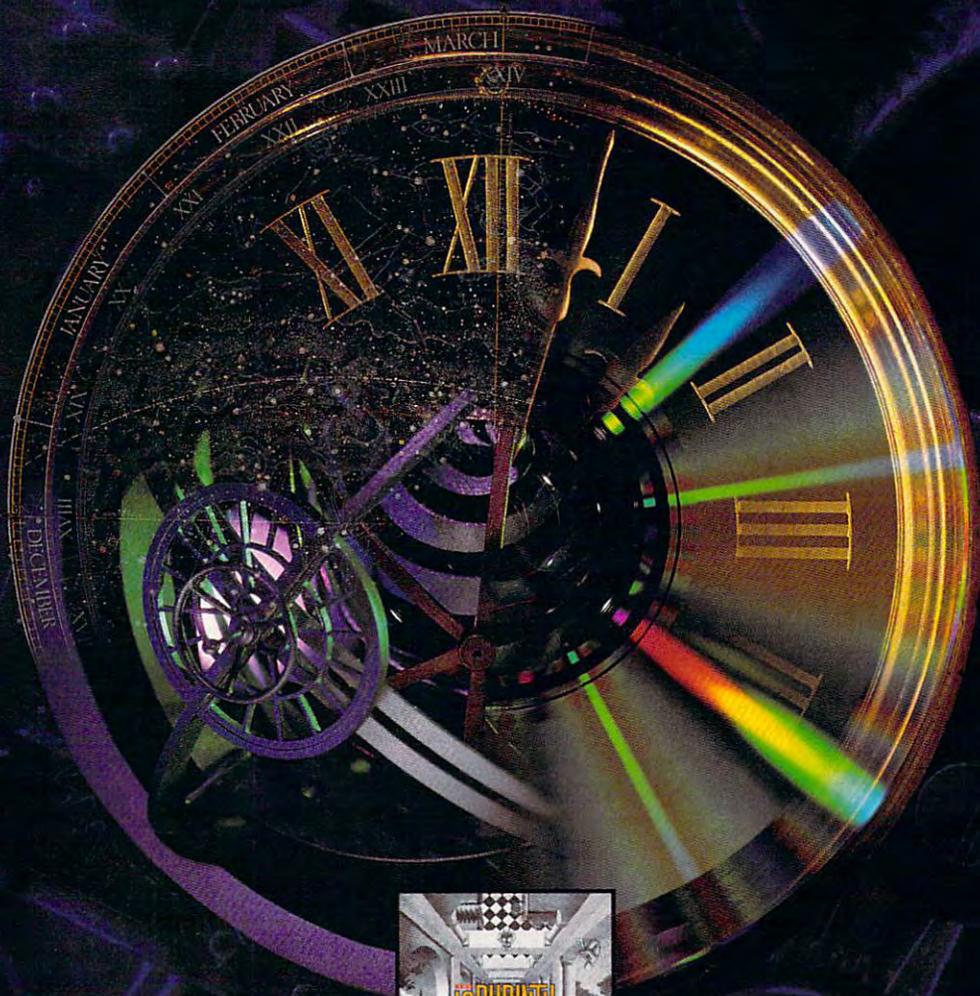
For example, you can change both the tempo and key (changing the key is especially valuable for people with a limited vocal

give up a certain amount of sound quality. This is because MIDI files aren't actual sound recordings but files that control MIDI instruments. To put it simply, all the sounds you hear with Soft Karaoke are generated on a synthesizer, either your sound board or some other external MIDI instrument. The actual quality of the sound depends on the quality of your synthesizer. (It's worth pointing out that much of today's natural-sounding music is actually created with MIDI synthesizers.)

Soft Karaoke comes with five song files, including

The Labyrinth of Time

(o n c . d .)



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PRODUCTIVITY CHOICE

This innovative box of tools manages to be both accessible to the beginner and deep enough for the power user.

Tom Campbell

PC TOOLS FOR WINDOWS

Central Point's PC Tools for Windows is bigger and sleeker (and more expensive) than its DOS version. If you're ready for its fresh new feature mix, you'll find it's the Lexus of utility packages: big yet swift, elegant yet fully functional, more expensive than last year's model yet still a great value.

This Windows version of PC Tools is a distant relation of its smash-hit DOS counterpart. It contains a replacement for the Windows desktop, a File Manager replacement, a backup program, data recovery for thrashed disks or files, an antivirus utility, a system analyzer, a disk optimizer, and a BASIC-like scripting language.

There are a few extras thrown in too, such as a scheduling program originally designed to run the backup program but now of general-purpose use, customization that lets you make extensive changes to the user interface in all of the applications, and some wildly creative but undocumented screen savers.

Users of the DOS version will note that the telecommunications, database, notepad, and outliner modules are missing and presumed dead: Central Point found that either Windows had these features already or too few users took advantage of them. I miss the multiwindow notepad and the database manager.

It's within Multidesk, the program's replacement for the Windows desktop, that some of the best features are found. Multidesk knits everything together and makes



good on its promise of offering an improvement over Windows' own desktop. Not only is it arguably easier to learn and use, but it's also demonstrably superior. The best features are QuickLauncher and multiple desktops. QuickLauncher lets you add program or folder names to the System menu and launch them from there, sort of like desk accessories on the Macintosh. As with the Mac, Windows is a multitasking operating system that presumably makes this approach redundant. Yet, as anyone who's ever used desk accessories on the Mac will tell you, doing things this way is so much easier than switching to the desktop to run a program that it makes perfect sense once you've given it a test drive.

Perhaps Multidesk's most innovative feature is its multiple desktops, which I find much harder to explain than to use. Instead of being limited to one desktop, you can have as many as you want. You select among these desktops by way of a floating palette (or a menu, if you don't want

the palette around). The palette shows miniature yet fully functional versions of each of your custom desktops. It's sort of like groups in Program Manager, but it's abstracted to the desktop itself.

At first I thought this would be a "Who needs it?" feature, but I found myself relying on it more and more. I had already patched together a clunky approach using groups with Program Manager. When I realized this, I converted to Multidesk and didn't look back. Plus, I was able to employ some other working habits I'd planned to acquire with Windows 3.0. Multidesk's folders, which act like supergroups, can be nested, allowing me to make use of the hierarchical organization I had expected Windows to give me.

All of this presupposes a pretty complex hard disk layout, perhaps one on a network; for someone who runs only one or two applications, Multidesk is probably overkill. As someone who lives in Windows all day, I found the transition to PC Tools smooth and

natural, but I wondered if it was for everyone.

Eventually I realized that almost everyone using Windows 3.1 applications probably has a pretty big hard disk because the new apps all seem to take 10, 20, or 50 megabytes, strewing complex directory structures and hundreds of files in their wake. So SmartFind was a welcome relief. It lets you search for a file on the hard disk or for text within a file. SmartFind does the expected but extends it dramatically, allowing you to use dates, file attributes, and wildcards in one unbelievably swift package.

SmartFind, and indeed all of PC Tools, worked just great on a network. And while our network is notably lax (everyone uses the same password), there are dozens of customizing and security options for those in more demanding situations. I've never encountered an easier product from the network administrator's point of view that was equally simple on a one-user system.

ScriptTools, the package's macro language, is the best such Windows script language I've seen. If using batch files is your idea of automating tasks, you'll be in for the thrill of your life when you play with ScriptTools. It's a BASIC-like language with jillions of Windows-y features. With it, you can create dialog boxes, access the Clipboard, time events, maintain control over the keyboard, gain access to DLLs, execute network-related commands, and more. If you're not a programmer, you'll use ScriptTools to record scripts, as you do with Windows' own Recorder. But ScriptTools comments on

your scripts, offering a matchless opportunity to teach the patient nonprogrammer how to program. I've seen a lot of Windows batch languages, and this one is tops.

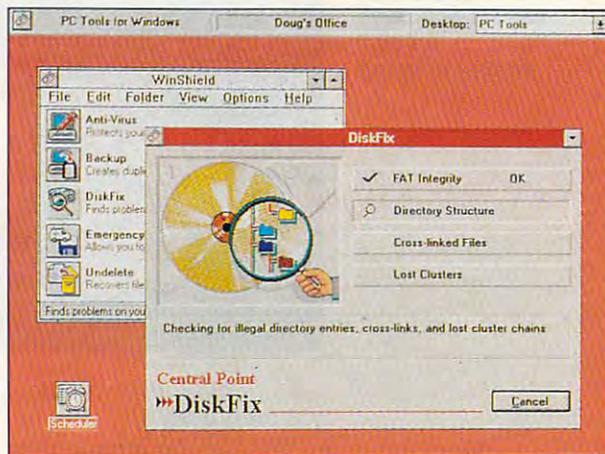
PC Tools has a whole range of file-recovery programs. The installation process gives file recovery top priority. If you've bought the product because of a hard disk crash, because your hard disk's FAT has been fried, or because you want to recover a damaged dBASE file, the installation program won't copy the PC Tools files onto your hard disk until you've taken care of the problem. It promotes preventive medicine, leading you through the creation of a disaster-recovery disk and even offering a self-stick label for the disk.

In a package this big, you're sometimes lucky enough to get a fortune cookie—one of those seemingly quirky little surprises that threatens to turn into a full-time hobby. In the case of Windows 3.0, it was Solitaire. In 3.1, it was Minesweeper. In PC Tools, the screen savers seem to fall into this category. Not even mentioned on the box, in the manuals, or in the README file, they're apparent only to the sharp-eyed during installation. Nothing is said other than that you can leave them out of the installation. To see them, you need to open the Windows Control Panel, choose Desktop, and go to Screen Saver. I'll leave the rest a surprise, except to tell you that Food Fight is my favorite, even though it needs an 80486 to really do its thing.

I had a few problems with the package, all small. The manual is hideously underin-

dexed (the box trumpets PKZip file compression and decompression, for example, but neither ZIP or PKZip are in the index). The tape backup software actually replaced the original tape backup software that came with my CMS backup without telling me, rendering the tape drive useless when I was told to reconfigure it for PC Tools. While PC Tools' tape backup software decided to remove all traces of my original tape backup

IBM PC or compatible (80386 compatible), 4MB RAM, Windows 3.1 or Windows for Workgroups, hard drive with 5-14MB free (depending on the number of



software, it couldn't figure out the proper IRQ and DMA settings for my CMS tape drive, and I'd left the original manual in storage during a move. Of course, I couldn't find CMS or Colorado Mount Systems in the index when I went to look up the problem.

Still, PC Tools for Windows gives you a really big bang for the buck. Like very few other Windows products, it manages to be both accessible to the beginner and deep enough for the power user. Like even fewer multipurpose products, it does a great job with everything it sets out to do—without getting in your way. □

modules installed), Microsoft-compatible mouse—\$179.95

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PERSONAL PRODUCTIVITY

William Harrel

RESOLUTION

Just when you think an industry standard has been set, somebody moves the mark. All of the major manufacturers are championing low-cost 600-dpi printers.

There's nothing new about 600-dpi printers. High-end desktop publishers and graphics designers have used 600-, 800-, and 1200-dpi devices for a few years now. Until recently, high-resolution printers have been too expensive for personal use. Today you can buy one, such as the HP Laser-

ters with diagonal legs, such as *M*, *V*, and *W*, print with jaggies (stairstepping). Small type can print with strokes (fine lines) broken up, or with circles (*b*, *d*, *p*) filled in. Higher resolution helps maintain fine lines and stroke weights in small text, and large text printed at higher resolution has smooth, sharp edges.

But where you'll really notice a difference is in graphical and gray-scale (photograph) images. Some graphics contain tight arcs and angular lines that 300-dpi printers can't print without jaggies.

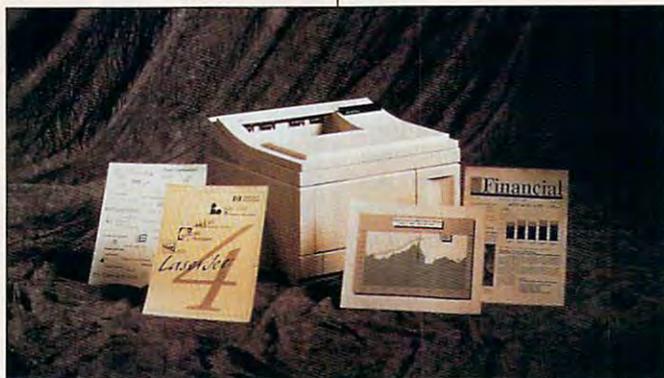
dependent graphics, such as those created by CorelDRAW!, Micrografx Works, and other draw programs. Screens create shading and other gray fills, such as Corel's graduating linear and radial fountain fills.

For many applications, 600-dpi resolution proves good enough for camera-ready art that is to be reproduced. Printers with 600-dpi resolution also make better proof printers. However, when you need perfect text and graphics, you'll still need to run your documents on an imagesetter at the neighborhood service bureau. Toner—what the printer uses to print—is still toner; it cannot produce fine lines and grays as well as imagesetters, even though today's toner is much finer than that of just a few years ago.

Not only do you get improved text and graphics from these new high-resolution printers, but they also print faster. New RISC processors and other innovations, such as improved parallel ports, halve the processing time. The Lexmark 4029's parallel port, for example, can accept two or three times more data per second than the ports of 300-dpi printers developed a few years ago. Several printers, such as HP's LaserJet 4, are built around Intel's 20-MHz 80960 RISC processor, which processes data at break-neck speeds and requires less printer RAM, making the printers less expensive to produce and upgrade.

Other innovations, such as windows accelerators, also turn in record printing times. These combination software-hardware solutions use your computer's memory, TrueType fonts, and souped-up printer drivers for speeds as much as ten times faster than those of printers that do not support such solutions. □

**Do you need
600-dpi resolution?
It's all a
question of image.**



Jet 4, for less than \$1,500 (if you shop around).

Why 600 dpi? Twice the resolution means twice the quality, right? Actually, 600-dpi resolution is four times higher than 300-dpi resolution.

In applications where the information is more important than the packaging, such as word processing and spreadsheets, 300 dpi is plenty of resolution. But newsletters, presentations, and sales proposals should look as slick as possible. This is especially true when you plan to reproduce them on a copy machine or at the print shop, where some quality invariably gets lost in the process.

Some 300-dpi printers don't handle large type well. Curved edges can print broken and uneven, and charac-

Jaggies result from dots too large to fill in—or smooth out—tight areas. The tighter dots of 600-dpi printers smooth out graphics much more effectively than the larger dots produced by 300-dpi printers.

Since laser printers simulate shades of gray by alternating black dots with white areas, 600-dpi printers have a significant advantage over 300-dpi printers. Photographs print more sharply at 600 dpi. You wind up with about four times the number of simulated shades of gray as on a 300-dpi machine. Printers with 300-dpi resolution are capable of only 25 shades of gray; 600-dpi printers can simulate more than 100 shades of gray.

The 600-dpi printers also print tighter screens, or percentages of black, in device-

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Rmorf 0.4

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Flux 1.1

Challenge your computer opponent in one of the most addictive games you'll ever play in this new strategy board game for one player. Every time you land beside an enemy piece, it changes to your color and becomes yours. Flux features many unique setups and has three difficulty levels. Flux requires VGA graphics and a mouse. Registration is \$15.

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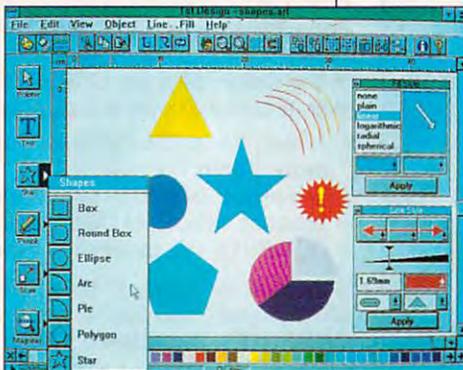
ART WORKS

Robert Bixby

DEAD REPTILES: SOFTWARE EVOLUTION

Are you as tired of dinosaurs as I am? If not, check out Jurassic ART from Computer Support (15926 Midway Road, Dallas, Texas 75244-9982; 214-661-8960; \$59.95). It's a special packaging of Scenerio (reviewed in an earlier column). Computer Support has always been known for its clip art, and it's brought something new and interesting to the genre—

Low-cost products aren't necessarily low-end. Like PagePlus and GeoWorks, 1st Design provides inexpensive power.



a little flexibility. Jaws and limbs of certain pieces of dinosaur clip art can be ungrouped from the rest of the drawing and rotated to change the pose. Kids will love the drawings you create with Jurassic ART, if dinosaurs haven't gone the way of the pet rock and the Davy Crockett hat by the time you read this.

Lizards have popped up in the chat areas online as well. Among the Rush Limbaugh ditthead clubs and invitations to twisted trysts, Barney (the kid-show dino) is appearing in the names of chat rooms such as Death to Barney.

If you're looking for a GUI with a collection of useful apps like spreadsheet, database, and word processor, GeoWorks Ensemble 2.0 is out—and has been out for

some time now. Unfortunately, the folks at GeoWorks (2150 Shattuck Avenue, Berkeley, California 94704; 510-644-0883; \$79.95) wouldn't let me write about the product until it was on the market.

GeoWrite, the program most directly applicable to this column, has a lot of new desktop publishing capabilities including master pages and frames. You can use all of the fonts you've been using with 1.2. The new GeoWrite automatically converts 1.2 documents to 2.0 format, but although you can export to several other formats (not just ASCII), you can't export to a GeoWrite 1.2 format.

GeoDraw is now packed with drawing utilities including curve editing and more import filters. At their most advanced level (all apps in 2.0 feature four levels of operation), each of the major applications incorporates GeoDraw, so you can use all of the drawing tools within GeoDraw and GeoWrite as well as within the spreadsheet and database.

GeoWorks Ensemble 2.0 is a faster, friendlier, larger collection of even more useful utilities and applications than version 1.2. Desktop publishers should consider it among other low-cost desktop publishing options. GeoWorks seems to be more interested in third-party support this time around, having already run a "boot camp" for outside developers.

I might as well admit that I love a bargain. GST, the developer of Timeworks' line of desktop publishing programs, is going to introduce a Windows illustration and design

program called 1st Design at the incredible price of \$49.95.

With 53 TrueType fonts, 1st Design features a simple autotrace, polygons and stars, gradient fills, Bézier curves, blends, and typographical manipulation (like kerning, fitting to path, and spacing) worthy of a product several times its price.

The 1st Design product does lack masking and hole-cutting features, however.

The GST product was released in the U.S. in September, though it's been available in Britain for some time. GST can be reached at Meadow Lane, St. Ives, Huntingdon, Cambridgeshire, England PE17 4LG; 011-44-480-496-789. As of this writing, GST doesn't have a U.S. address.

A second GST program, 1st Press, may also be introduced. It's a frame-based Windows desktop publishing package reminiscent of Ventura Publisher.

There's stiff competition at the low end of the price spectrum from products like PagePlus (Serif, P.O. Box 803, Nashua, New Hampshire; 800-697-3743), which is being compared with high-end desktop publishing programs like QuarkXPress but sells for only \$59.95. A fonts package (with 120 TrueType fonts) and a type manipulation package are available for \$19.95 each.

Have a DTP tip you'd like to share? Let me know about it by calling (900) 884-8681, extension 7010203 (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call will cost 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone. Or write to "Art Works" in care of this magazine. And if you don't have a tip, please let me know what you're publishing, what software you're using, and how "Art Works" can help. □

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WHERE IN SPACE IS CARMEN SANDIEGO?

The world's favorite villain, Carmen Sandiego, sure does get around. She began her illustrious career by hopping across the globe, committing new crimes wherever she set down her jet. Since then, not only has she victimized every corner of the earth, but she has also managed to find her way through time and America's past. Now, in *Where in Space Is Carmen Sandiego?*, her crime spree leads into the great expanse of the universe, where a gang of dastardly aliens joins her to terrorize the solar system from the sun to lonely, frozen Pluto.

If you're familiar with the other Carmen Sandiego games, you'll be able to slip into this new installment like a pair of favorite slippers. Although your crime stopper vehicle has metamorphosed into the Cosmohopper and the game controls have been rearranged, the basic gameplay is identical to that in the other games in the series.

You begin by getting your assignment from the chief, a bizarre alien who looks like a cross between Jabba the Hut and a parakeet. Because the squeaking and squawking he passes off as language is incomprehensible to human ears, your Cosmohopper's main screen displays the conversation in English. When you get your first assignment, you learn that, as always, Carmen and her gang are snatching valuable artifacts. For example, the chief may tell you that the culprit has stolen the Skynd crater from Ura-



nus's moon Umbriel, the Sacajawea from Venus, or Hermes's winged hat from Mercury.

With your mission recorded, you blast off to the place the Sandiego gang was last seen. To complete your mission, you must search several of 32 locations for 1 of 15 suspects. Locations you'll visit include not only the nine planets but also the sun, asteroids, Halley's comet, and many moons. The 15 aliens that make up your suspect list are as different from each other as a tomato is from an anteater. Sporting such punny names as Astro Fizzix, Avery Littlebit Phelps, and Hannover Fist, these creatures represent some of the strangest life forms ever seen in our solar system.

Besides the villains, you have your on-board computer, VAL 9000, to keep you company. Using VAL, you can access an online database, dossiers on the various criminals, a travel log, and the game options. In addition, VAL sometimes uses her digitized voice to relay such sarcastic comments as "What do

you think the little *E* stands for on your fuel gauge?" and "A rocket scientist you're not. You've eliminated all suspects."

Upon arrival at your new location, you gather clues by questioning witnesses, tapping into V.I.L.E. radio frequencies, or performing a star search for incoming messages from your colleagues. Witnesses and V.I.L.E. radio transmissions immediately give you clues to your next destination. When performing a star search, however, you must first use the star map to lock onto the constellation from which the transmission was sent. To find the constellation, you use the controls on your Cosmohopper to scroll the star map to the correct longitude and latitude, at which time the selected constellation spins to the right of the screen and displays its associated animated image (for example, a bull for Taurus).

Finding where the culprit has fled is only half of your battle, though. You also need to learn the criminal's identity so you can get a warrant for his or her arrest. To do this, you

contact an informant, who tells you about one of the creature's seven characteristics: gender, number of eyes, feature, locomotion, favorite writer, favorite astronomer, and favorite food. You might, for example, discover that the creature has no eyes, loves the writings of H. G. Wells, or snacks on space cadets.

After deciphering the clues, you choose your next destination. To help narrow things down, the Cosmohopper's display offers a menu of four locations, one of which is correct. Clicking on a location sends your Cosmohopper blasting into space. When you arrive, you're shown a digitized NASA photo of the location. If the location you picked is correct, you enjoy a short, animated sequence of a V.I.L.E. henchman's outerspace antics. One animation features a one-celled creature that divides into two and, upon seeing its twin, flees in terror. Another depicts a creature covered with suction cups that gets stuck to your screen. All told, there are about a dozen of these humorous sequences.

After the V.I.L.E. henchman skedaddles, you begin the clue-gathering process again. Eventually, after several jumps to various locations in the solar system, you catch up with the criminal and make your arrest—assuming, of course, that you arrive in time, don't run out of fuel, and have the proper warrant.

One thing that sets *Where in Space* apart from the other Carmen Sandiego games is its huge online database. Although the game comes with *Peterson First Guide to Astronomy*, you don't need it to play. All answers to the clues

can be found in the online database, which is accessed through your Cosmohopper's VAL 9000 computer.

The database menu allows you to select any of 18 general topics, including each of the planets; such topics as astronauts, astronomers, and explorations; and a glossary of astronomical terms. When you select a general topic, a list of subheads appears, enabling you to jump to a specific topic of interest with a click of the mouse. To find topics even more quickly, you can enter a word into the text entry area, and the computer will search the database for every occurrence of the word, after which you can browse all the identified entries for the information you need.

Most entries in the database include digitized graphics. As you browse through the database, you'll come across portraits of astronauts and astronomers, photos of planets and moons, cross sections of celestial bodies, and images of satellites, just to name a few. Animation, too, is used to good effect in the database, from orbiting planets to the birth of the sun to an awe-inspiring flight over the surface of Mars that was constructed from actual photos taken by the Viking.

In short, the astronomy database included with *Where in Space* is worth, by itself, the price of the entire package. And it's very easy to use; you can access it without having to play the game simply by typing *carmen val* at the DOS prompt. Even after you've grown tired of the game (if that's possible), the database is sure to continue to fascinate.

If *Where in Space* has a

weak point, it's the same one found in previous games in the series: There just aren't enough animated sequences. Although the animation adds much to the game at the start, it doesn't take long before the sequences start repeating. You can stop an animation at any time by clicking a mouse button, so you aren't forced to watch them again and again. But the game

IBM PC or compatible (80386 compatible), 640K RAM, VGA, hard drive with 8MB free; mouse recommended, most sound cards supported—\$79.95



would be much improved with enough animated sequences to carry the player through a full game with minimal repetition.

Still, *Where in Space Is Carmen Sandiego?* is yet another wonderful entry into an already long and successful line of educational computer games. Plus it's a fascinating romp through the solar system featuring awesome digitized photos from NASA's own files and a clever gang of otherworldly characters. You have to wonder, though: Now that Carmen has made it through America, Europe, the world, time, America's past, and space, where can she possibly go next? □

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SPECTRUMPROSE HOLOMICROBYTE?

When Sierra asked Jim Walls to do another Police Quest, he turned in his badge and did Blue Force for Tsunami instead. The game turned out even better than some of his Police Quest work, and a sequel is underway. Sierra turned to another law enforcement veteran, former Los Angeles police chief Daryl Gates, to codeign Police Quest IV. And it made the latest cop-on-the-beat adventure a cross-media event by bringing in "America's Most Wanted" producer Tammy Dargan to produce the game, which Sierra says creates a "whole new category of gaming: reality role-playing."

In a story set in contemporary Los Angeles, you play detective John Carey, out to find a killer who has "worked the media and public into a frenzy." Nowadays, Sierra is making an effort to differentiate its adventures, and the twist is technological in this latest Police Quest—it marks the first use of Kodak's DCS 200Ci digital camera in creating a computer game. Gates took the design team on location with the camera in downtown L.A. to shoot many of the color background scenes. Due out this month for MS-DOS, the game is also scheduled for CD-ROM and the Mac. (Rumors that the Gates-designed game includes a video camera are unfounded. Or at least there wasn't one in my package.)

In the fantasy realm, Sierra has transformed its TSN (The Sierra Network) multiplayer game Shadow of Yserbius into a single-player quest for PCs. The boxed edition includes a new chapter in the Yserbius saga and other new features. In November, look for Inca 2 and Goblins 3 (both

created by Coktel Vision) and Quest for Glory IV: Shadows of Darkness from Sierra.

New engine, new world. Instead of just bringing out yet another Magic Candle game with a new software engine under the hood, designer Ali Atabek let the Candle series go out with the third installment. Atabek did develop an all-new engine, but he harnessed it to drive a fresh fantasy world and story line for Mindcraft's latest role-playing series, The Griffon Masters. The first installment is already out. And if you miss playing the original Magic Candle games, try The Bloodstone, which employs the same engine.

A first in the realm of "utilitarian" software, Walt Disney licensed some of its characters to Berkeley Systems, which does the After Dark screen saver. The new screen saver features animations from *101 Dalmatians*, *Beauty and the Beast*, Mickey Mouse shorts, and other cartoon classics. Disney reportedly worked closely with Berkeley on the product and plans more such licenses and more coproducing in the future. Already out for the Macintosh, the screen saver should be shipping for Windows by now.

Sequel time. Origin's Wing Commander Academy lets you design new missions and trade them with friends or play new randomly generated missions. It's a stand-alone game, so you don't need the original program. But don't look for another Wing Commander for a while. Wing Commander III isn't slated for release until late 1994. But at least the construction set doesn't signal the end of the series, like it did with SSI's Unlimited Adventures construction set for Gold Box games. Origin is using the Strike Commander technology in upcoming titles such as Privateer, a

trading and combat game which takes place in the depths of outer space, and Pacific Strike, which re-creates World War II dogfight action.

LucasArts' new variety pack, Classic Air Combat Sims, contains Battlehawks 1942, Their Finest Hour, and Secret Weapons of the Luftwaffe, along with all the Tour of Duty disks. Adjustments were made so the joystick routines and other aspects of the older programs function well on a 486. B-Wing is LucasArts' second mission disk for X-Wing. It introduces a new craft to fly, as well as the fifth Tour of Duty. Spectrum HoloByte's MiG-29 is the slickest and most substantial mission disk of the year, letting you take the other side in the Falcon 3.0 war.

Will CD-ROM games really sell? LucasArts simultaneously released Day of the Tentacle on floppy and CD-ROM. A major distributor reported the versions selling about equally—a good sign for the newer format. Other new CD-ROMs to look for this fall are Electronic Arts' Labyrinth (originally designed for CDTV) and Brøderbund's The Myst, both CD-ROM-only adventure-style games. Other recent CD-ROM releases worth looking for include I-Motion's Shadow of the Comet (mixing action and adventure) and Alone in the Dark II (adventure in a Gothic horror setting), as well as LucasArts' action-arcade game Rebel Empire (the company's first CD-ROM-only title).

The hot news as this was being written was Spectrum HoloByte's acquisition of MicroProse, a deal that pumped \$10 million into the latter company. MicroProse's balance sheet, it's rumored, was inspiration for the title of Legacy: Realm of Terror, which was released prior to the deal. The plan is for both companies to operate independently. □

LucasArts' Day of the Tentacle is selling equally well on CD-ROM and floppy.

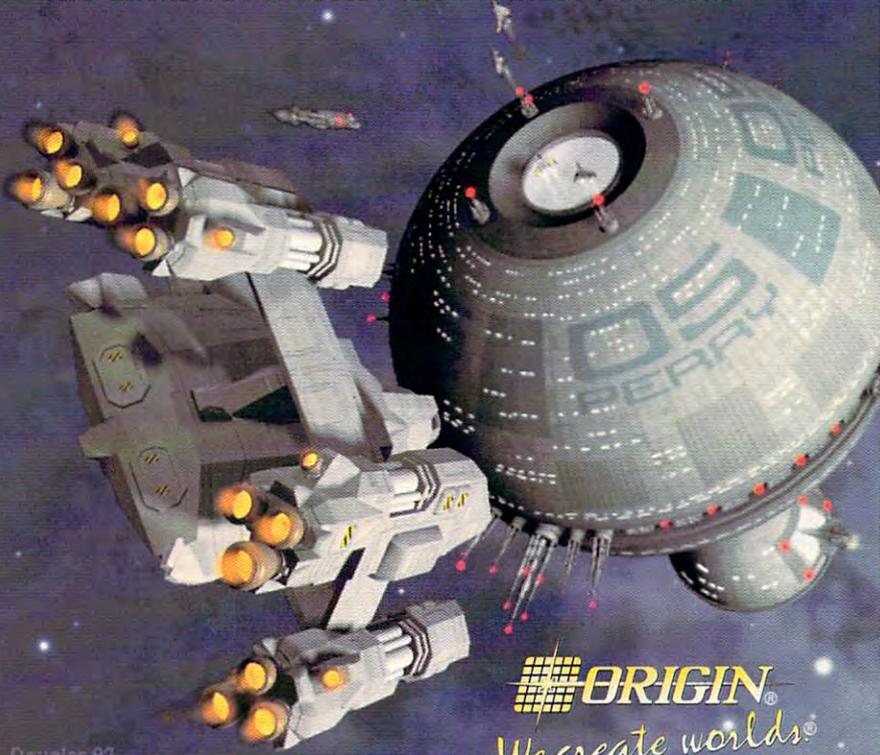
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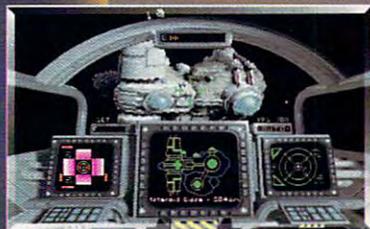
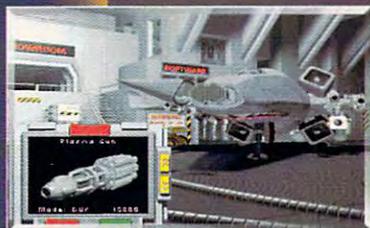
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ENTERTAINMENT CHOICE

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Scott A. May

INCA

Adrift in time and space, you awaken to fulfill a destiny written more than 500 years ago: savior to the lost Incan civilization. So begins one of the year's most audacious and original games—an action-adventure born of a rich past, set in the unknown future.

Imported from French software developer Coktel Vision, Inca showcases the rising talent of designer Pierre Gilhodes, who gave Sierra's Gobiliiins its distinctive punch. Gilhodes's latest combines many disparate styles and gaming genres, strung together with a thoroughly out-of-kilter story line. What in theory should never work unfolds with singular grace and clicks in our imaginations.

To fully appreciate Inca, you must immerse yourself in its unusual background, based equally in fact and fable. The story begins in 1525, as an aging Incan ruler named Huayna Capac foretells the fall of the great Tawantinsuya empire. He predicts floods, earthquakes, and the arrival of "bearded savages"—Spanish marauders lured by tales of "the gilded one," El Dorado. According to legend, El Dorado was an Incan chief who would cover himself in gold dust for ritual celebrations. As a sacrifice to the god of nobility, he'd wash off the gold in the waters of Lake Titicaca. Followers would also toss gold into the lake to appease the sun god.

In 1532, Spanish conquistadors, led by Francisco Pizarro, waged battle on the mighty Incan warriors. Though the Spaniards were outrageously outnumbered, the Incan army, weakened by



years of civil war, was soon defeated. Pizarro's men, however, found little gold. As Capac says, "The real treasure—Inca knowledge—will never be found."

From this beginning, Inca blasts 500 years into the future, aboard the lost city Paititi, which is adrift in space. You're approached by the spirit of Huayna Capac, who welcomes your return as El Dorado. Your mission is to restore brilliance to the Incan sun by recovering the three missing jewels of Time, Matter, and Energy. To succeed, you must win the help of various spiritual protectors and defeat the powers of Aguirre, an evil force symbolic of the greedy, savage conquistadors.

Your journey unfolds along a linear path that's divided into three phases, one per jewel, of increasingly diverse and difficult quests. The game offers a satisfying mix of arcade and mental challenges, ranging from 3-D space combat and first-person shootouts to mind-bending graphic and logic puzzles. You must confront and overcome obstacles in a prescribed order. While unsolved puzzles merely stall

your quest, failed arcade segments result in loss of life. Instead of traditional game saves, randomly generated pass codes allow you to restart the game at various milestones in your journey.

The cursor-driven graphic interface functions in two modes: cockpit and ground views. Behind the controls of your Tumi fighter, the cursor serves as both weapons crosshairs and navigational device. Some of the action you'll encounter includes asteroid belts, Star Wars-style trench combat, and deep-space dogfights. Your toughest (and most unusual) galactic battle kicks off the game's final phase, as you square off against authentic Spanish galleons. These huge, three-masted ships firing comet-sized cannonballs are as unsettling as they are deadly.

Ground exploration features a similar windowed display, with a visual inventory and limited online advice from Huayna Capac. Besides fighting, you also pick up and manipulate objects, which are key to solving the game's series of visual puzzles. Correct moves trigger dazzling audio

and visual rewards, enticing you to press on. Other elements of play include multiple 3-D mazes and realtime duels to the death with Aguirre's space-age warriors, fought with plasma bolts instead of swords. These otherwise simple slugfests are heightened considerably with outstanding full-motion digitized video and sizzling sound effects.

The game's graphics are extraordinary—an opinion echoed at the 1992 Paris Super-games Show, where the title won honors for best graphics. Much of the game's visual appeal stems from its superb use of color as well as its sheer variety of graphic styles, from Gouraud-textured 3-D polygons to finely detailed scanned bitmap artwork. Complementing the animated actors is a full range of crisp, digitized speech, much of it delivered in the authentic Quechuan tongue. For those unfamiliar with this arcane culture, the main menu offers an online glossary of terms used throughout the game. Other sampled sound effects include goose bump-inducing footsteps and slamming doors as well as the atmospheric groans and creaks of the wooden galleons rocking in space.

Dynamic on disk, the game is absolutely stunning



CD-ROM version of *Inca*

on CD-ROM, offering enhanced cinematic segues, full character voices, and stereo soundtrack. Inca's CD-ROM audio is unlike that in any other CD-ROM game on the market. It uses true CD audio, not just the computer's sound card, and the result is absolutely incredible.

Gilles Douieb supplies 14 pieces—over 40 minutes—of original New Age-style music, performed with authentic Incan woodwinds and percussion. Also included is the song, "Inca People," written and performed by J. M. Marrier. A minor hit on European radio, the song adds flair to the CD-ROM version's extended graphic intro. An audio interface, built into the main menu, allows instant access to any of the CD-ROM's music tracks. There's even an on-screen *antara* (bamboo pan-pipe) for those inclined to play along, available in both versions. Overall, Sierra's multimedia treatment transforms an uncommonly good game into a true work of art.

Despite the game's unusually rich graphics and sound, the game makes surprisingly minor hardware demands, running equally well on both low-end (80386/20 minimum) and high-end (80486/66) systems. The biggest price paid is hard drive space, which ranges from 16MB for the disk version to 33MB for the CD-ROM version. One nice touch: Sierra's CD-ROM installation offers four configuration choices, allowing you to transfer 100, 70, 25 or 0 percent of the game to hard disk. Because of the game's segmented story structure and effective memory usage, most users with reasonably fast CD-ROM drives (250- to

350-ms access time) can get by with minimal hard drive installation.

As with most bright gems, this one has a few minor flaws. One of the most annoying is simply the speed at which onscreen text—usually important clues or dialogue—appears and quickly vanishes. Given the game's eccentric nature and enigmatic prose, this loss of information can easily lead to confusion. The designers should've given players control of text flow

IBM PC or compatible (20-MHz 80386 or faster), 640K RAM, 256-color VGA, hard drive with 18MB free, mouse; joystick optional, supports Sound Blaster, Ad Lib, Thunder Board, Pro



or at least provided a way to pause the display. Also disappointing is the poorly implemented joystick routine, an arcade setback softened only by the game's well-designed mouse controls. Finally, once solved, the game provides little replay value. A possible solution would be to scramble some puzzles or to increase the difficulty level of the arcade sequences.

Inca's surrealistic blend of ancient folklore and science fiction will throw many players off guard. But those looking for a wholly original, multifarious challenge will delight in this fantastic journey of sight, sound, and imagination. □

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GAMEPLAY

Paul C. Schuytema

ROMP ON THE WILD SIDE

First, grind up a portion of Bimthylquinoline crystals; then add just a touch of Metyraphosphate. Dispense as a powder, and presto! Birth control for the radical woman of the 1880s. This and other exciting recipes can be yours to concoct in Freddy Pharkas, Frontier Pharmacist, the latest adventure from the twisted minds of Al Lowe and Josh Mandel.

Freddy Pharkas is the first truly fresh idea for an adventure game that I've seen for quite some time. The game takes place in Coarsegold, California, in 1888—just a few years after the gold rush. Our hero, Freddy, is not a gunslinger (although he once was); he's a pharmacist who also runs a soda fountain on the side.

I spoke with designer Al Lowe about the game, and I was particularly interested in how he came up with the idea of Wild West pharmacology. It seems that the team at Sierra On-Line had already committed to doing a comedy Western game, since it was a hitherto untapped niche in the adventure market. Lowe, along with Mandel (the adventure's producer and writer) and Roberta Williams (of Laura Bow fame) were sitting around, brainstorming, looking for a central character. Lowe somehow got his tongue twisted as he attempted to say "farmer" and "rancher" at the same time, and "pharmacist" came out. Within minutes, the three of them were laughing so hard that they were rolling on the floor. The idea of a frontier pharmacist was one of those ingenious mistakes, and it was perfect.

Freddy is a Dudley Do-Right sort of guy. He has a di-

ploma and is struggling to keep his village from becoming just another ghost town.

A few things really stand out in this adventure. First is the feeling of a true environment: Coarsegold seems to be living and breathing even when Freddy isn't there. The town is a side-scrolling work of art. It was first created as a six-foot-long painting, and then it was digitized into the computer. (The original is now hanging at the Sierra offices in modern-day Coarsegold.)

Beyond just looking gorgeous, the town is a closed system that allows Freddy to wander, explore, and interact with the characters in a very convincing way.

The game's puzzles are also outstanding. Face it: Any good adventure game is simply a good story braided with a series of player-solvable puzzles. But all too often, the puzzles fit a routine formula or are so obtuse that people in their right minds can't begin to solve them.

In Freddy Pharkas, the puzzles are difficult yet solvable, and there's more player involvement. But what makes them so interesting is that each one is unique and crazy; they really stretched my creative-problem-solving acumen. Freddy must analyze, mix, build, and perform all sorts of gyrations as he moves from puzzle to puzzle, making players work very hard for rewards.

I've deliberately avoided talking about the game as a comedy because, for me, gameplay is the foundation upon which everything else is built. Freddy Pharkas, though, is a comedy, first and foremost. Lowe saw it as an opportunity to pay homage to the rather seedy genre of the Western film, and he took nearly every cliché he could find and warped it to fit this zany world.

Some characters, like Fred-

dy's faithful Indian sidekick, Sрни Bagdnish (the animist from India), play with the stereotypes. Other gags pay homage to certain movies; take, for instance, the scene between Sрни and Freddy, which is reminiscent of the scene in *Cat Ballou* in which Jane Fonda helps Lee Marvin dress for a gunfight.

Lowe worked long and hard on the story line for Freddy Pharkas, attempting to create the richest and most believable tale possible for his sense of humor. He even took a workshop in plot and story development from Roger McKee to help with his story. Then he turned to Mandel for his magic pen. Mandel wrote the text of the gags and dialogue, and he created a wonderfully absurd handbook, *The Modern-Day Book of Health and Hygiene: 1881 Edition*, which comes with the game.

When I asked Lowe what difficulties he encountered when working on Freddy Pharkas, he was silent for a moment. Then he shrugged (over the phone) and said, "Actually, I'm getting pretty good at this." You'll agree with him when you play the game.

He's very appreciative to all those who've helped him create the game, especially Clint Eastwood, whose movie *Unforgiven* is one of Lowe's favorites. And Lowe says that he certainly appreciates Clint's winning an Oscar just to promote Freddy Pharkas.

Freddy Pharkas breaks new ground and refines Lowe's comic storytelling ability. But most important, it's extremely challenging and entertaining. Like any good B Western that comes with a tub of popcorn, Freddy Pharkas, Frontier Pharmacist is well worth the price of admission. Indeed, taking a romp on the range with this Wild West pharmacist is time well spent. □

Become a Wild West pharmacist in Al Lowe and Josh Mandel's latest zany world.



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Building a virtual golf course that feels like the real thing is all work— and all play.

In a darkened office, surrounded by The Eagles' *Greatest Hits* from the CD player, Bruce Carver, president of Access Software, does trees. He spends as much time on trees as he can, without totally ignoring other minor duties such as determining the direction of the company, deciding whether to license its products to Microsoft, and tending to other pesky details. No one digitizes images as well as Bruce Carver. And few probably enjoy it as much, either.

We're thankful for his talent and dedication. The results, seen in Access Software's series of add-on golf courses for the company's line of golf games, are best-selling, ultrarealistic renditions of famous courses around the world. Banff

Springs, a recent release, is on the software bestseller lists at press time. By the time you read this, Tarpon Springs, a Florida course, will probably be the latest success.

Anyone with a PC and an interest in golf—and certainly any faithful COMPUTE reader—knows about Links 386 Pro and its junior partners, Links and Microsoft Golf (Links for Windows). These games perennially win the Software Publishers' Association's Best of the Year Awards, COMPUTE Choice Awards, and countless other prizes. The games' success lies in the seamless marriage of an unmatched golf game engine with actual golf courses lovingly and meticulously digitized to provide an almost real sense of the

course as you play.

All three games use the same course disks, but the courses are most spectacular in Links 386 Pro's 256-color Super VGA mode. That game's basic interface provides all the information you could possibly want, from scrollable, zoomable aerial views and reverse views from the green to an incredible array of statistics on your play. Balls behave precisely as they would on a real course, rolling down hills, bouncing off paved golf cart paths, and careening wildly if you should be unfortunate enough to hit a ball washer. We don't know what happens when you hit an alligator with a hard two-iron shot, but we'll find out as soon as the Tarpon Springs course ships. (The alligator will be on the

course in the exact spot it was the day the design team shot the video used to create the course disks.)

It's Magic

As important as the game's basic play engine is, the golf courses themselves provide ever-fresh excitement to the game. The stunning beauty and realism of these courses never cease to amaze us, even now that we know how they're created. Access routinely receives calls and letters from golfers who have played the actual courses and are astonished at how much the computer version simulates reality.

These courses duplicate the real thing, down to the placement of each tree and bush, ball washer, bench, boulder, and yes, even alligator. These are magical

By Richard O. Mann
and
Ramona R. Mann

Illustration by
Richard Hawks

THE GREENING



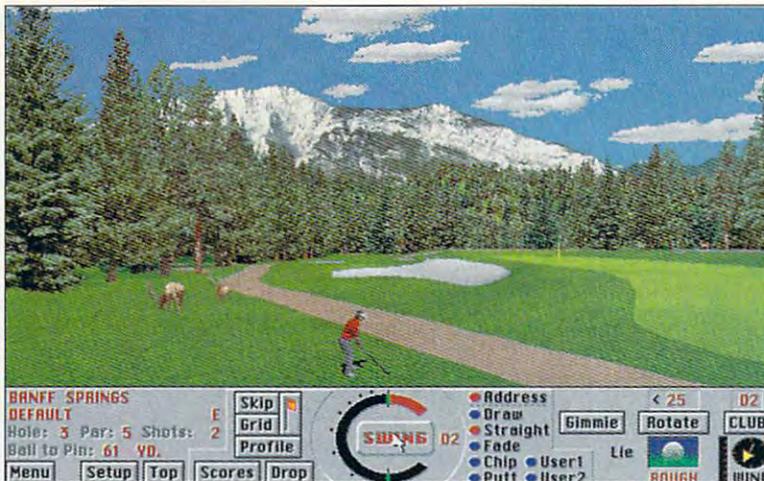
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worlds that are so like reality that it's easy for you to totally lose yourself.

What's even more amazing is that Access pumps out these enchanting courses every few months. How can Access produce such realistic courses so quickly? How can it convert miles of verdant terrain into such an accurate computer simulation? We spent a day with the members of the Links design team at Access in Salt Lake City to find out what sort of magic they use to accomplish these seemingly impossible tasks.

The Magicians Take the Stage

It all starts with course selection. The folks on the Links course design team are avid golfers who study golfing books and magazines when they're not actually out on the links. They watch for famous courses with outstanding features, such as picturesque settings or particularly inter-



In Banff Springs, where the deer and the antelope play, realism is the effect Access programmers strive for.

esting or challenging hole layouts.

Once the team obtains the rights to use a course, it swings into action. John Berven, who shoulders the overall responsibility for the project, and Zeke McCabe, a professional photographer, travel to the site and play a round to familiarize themselves with the course. If it doesn't rain, the next few days are spent taking videos and still photos of the course. "Golf course managers call us whenever things get too dry—it always rains for four days

shrubby, buildings near the course, animals, boulders, and so forth—all of these need to be specially shot.

Meanwhile, McCabe takes still photos of trees and other objects. Trees, we learned, make or break the visual portrayal of a golf course. McCabe works diligently to identify 50-60 trees that exemplify all the generic trees on the course. He also shoots all the small identifying features of the course, such as the flags on the flagsticks, so that every detail

when we show up," says Berven.

The Show Begins

Berven straps on a battery pack and a special video camera and then walks the entire course with the tape running. He walks down the middle of each fairway, pausing frequently to make a 360-degree turn for the tape. He also makes sure he gets a thorough set of shots of any special objects noted during the previous round of golf. Unusual trees or

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will show up in the game.

Finding and shooting all the objects can be a challenge. It was at Tarpon Springs that McCabe decided to photograph a six-foot alligator that was sunning itself just off the fairway. As Berven tells it, McCabe nervously crept closer and closer to the gator, snapping shot after shot. Finally, about ten feet from the gator, he was satisfied that he had enough good shots. He relaxed and turned to walk back to the golf cart. As he did, the gator slipped back into the swamp with a loud smack of its tail on the water. "Zeke jumped ten feet when he heard that. He thought the gator was after him," says Berven, chortling.

The next day, McCabe strapped himself into a rented helicopter so that he could hang out the door and take 35-mm photos with his fast-winding Nikon F-4. The chopper flew down each fairway sideways, with the door McCabe was hanging from tilted to let him shoot the photos directly down, without any obstructions. When developed, these stills were taped together to give a four-foot strip photo of the hole from above.

The pair also obtains a topographical map of the course. If none is readily available, they have professionals create one.

Creating Illusions

Back in Salt Lake City, digitizing begins in earnest. Technicians scan the topographical map into a special course architecture program developed for this purpose. It reads the information into a course database, capturing essential information about every square foot of the course's terrain: elevation, nature (fairway, green, rough, sand), slope, and so forth.

From there the course goes to the smoothers, a half-dozen experts who compare the computer's rendition of the course from the topographical map with the videotape and aerial photos. Using the architecture program, they can do virtually anything to the terrain, from smoothing the curves of the edge of the fairway to creating hills or holes anywhere. Primarily, they convert the somewhat roughly mapped information into smoothly flowing terrain that matches the image on the videotape. Splitting up the course among the staff of smoothers makes it possible for them to finish this painstaking, inch-by-inch work in five or six weeks. At the conclusion of smoothing, Berven polishes the transition between holes, making sure everything matches up seamlessly.

The Magic Is in the Art

While the smoothing is in process, some other things are happening. McCabe's shots of trees and objects go to the best Kodak Photo CD lab he can find; there they're converted to CD-based images. With those CDs in hand, Bruce Carver starts his month's work of perfecting each image.

Photos, of course, have an unlimited range of colors. To convert them from SVGA, Carver has to refine each image to a palette of only 256 colors. Building the palette that gives the best results is the key to Carver's arcane art. He is meticulous, working pixel by pixel till the images approach perfection.

Outside the president's office, the word is that courses are often held up for weeks while Carver refines that last pixel. In his office, Carver says with a gentle grin, "I have to hustle to keep from holding things up."

Planting the Illusions

Once Carver is satisfied, the object files go to Berven, who "plants" the trees and other objects. With the object files at the ready, Berven works with his overhead photo strip to precisely place each tree and other object in its proper place on the terrain. He can place a tree within one square foot

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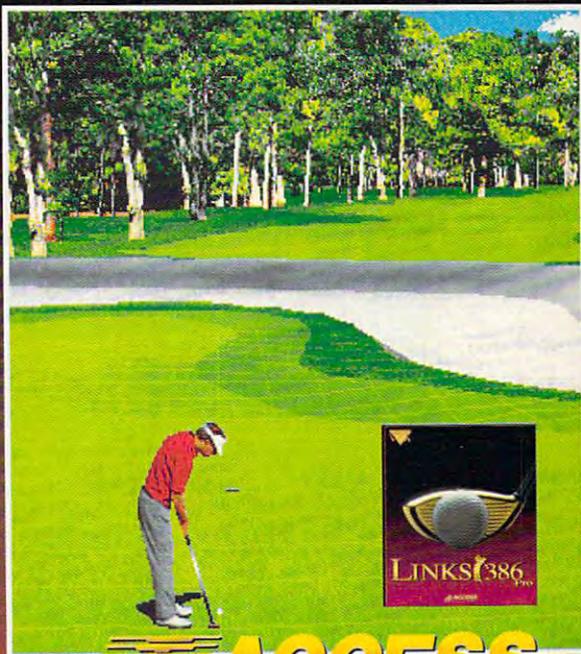
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of its actual location and plot terrain within two inches of its actual elevation. He places each unusual tree and object in its appropriate square foot, then works with the representative generic trees and shrubs, sizing them according to the videotape's image and planting them where the overhead photos show them.

After completing this process, Berven plays the computer course, comparing each hole to the videotape as he goes. "Even though we've placed each tree, sand trap, and other feature in exactly the right place, sometimes they simply don't feel right. In real life, things occasionally look different than they really are, so we have to tweak things to achieve the real look and feel, even though it results in a tree being slightly out of place or a hill being higher than it really is," he says.

Then the course goes into intensive play testing. Many minor problems show up at this stage, mostly in the smaller details. The team continues to refine the course until Berven is satisfied that the course seems exactly the same as the course he's played and videotaped. Around 2-1/2 months have passed from playing the opening round to sending the

product to manufacturing.

The course design and production teams have this process down to a science. They've created a dozen courses so far and routinely produce new ones approximately every two months. As they work, however, they come up with new refinements in the technology. In fact, almost every course has shipped with a new version of the core game program with minor changes, adding features needed for the new course.

A Real Fantasy Course

Perhaps you've seen calendars or posters featuring the most difficult golf holes in the world. One pictures the green on a tiny ledge halfway down the cliff at Niagara Falls; others are similarly outrageous. The Access golf geniuses couldn't resist the challenge to create their own fantasy course.

But Links courses are real, based on actual terrain. They must allow you to actually play the course. For a setting for his make-believe course, Berven went to the U.S. Geological Survey map repository to search for the ideal topography. He selected an area near Kings Peak in the rugged High Uinta mountain range in Utah.

The course is well under way; we saw fairways in the bottoms of canyons, tees on cliffs, and greens a hundred feet above the fairway. This is going to be a wild golf course—but rest assured, it's almost real. If you could get the land rights, you could build this course up there in those rugged mountains.

The fantasy course will be released as part of a promotional tie-in with Access's upcoming state-of-the-art interactive movie game, *Under a Killing Moon*, a two-CD thriller due in the first quarter of 1994.

Devotion and Passion Make the Magic

You don't often encounter executives spending their time digitizing trees in darkened rooms. Bruce Carver's passion for his work is evident, as he eagerly explains the intricacies of trees, 256-color palettes, and searching for the best Photo CD lab. Here is a man who pushes the limits of technology and human effort in order to achieve the highest quality possible. The result is a seamless, magical illusion which so closely simulates reality that you have to remind yourself you're sitting in a chair at your house and not in some faraway place chipping away out on the links. □



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64/128 VIEW

Here are a couple of new products from two companies that still have faith in the Commodore market.

Tom Netsel

Peter Fiset, the man behind Performance Peripherals, makes a number of great products for the 64 and 128. Check out any CMD advertisement and you're sure to notice RAMLink and RAMDrive, just two of his creations.

GEOS and REU users are probably familiar with two of Fiset's other Commodore peripherals: BBGRAM and BBU. BBGRAM is a battery-backed RAM for GEOS 2.0 that is a fast alternative to mechanical drives. BBU is a battery backup cartridge for the 64 or 128 that provides permanent memory (nonvolatile) for Commodore RAM expansion units.

Many companies have dropped Commodore products from their inventory, but Fiset keeps making new ones. Continuing with his alphabetical names, Fiset now offers BBRTC, a new and novel realtime clock.

While he doesn't say so, I assume BBRTC means battery-backed realtime clock. In any event, this module plugs into the unused joystick port for non-GEOS applications. Software that comes with the module executes automatically whenever GEOS is booted. This sets the GEOS time and date. Users can program BBRTC to any date and time, and leap years are calculated automatically.

BBRTC works with or without an REU, and it can be used with GEOS 1.3 and up, including GEOS 128 2.0. It comes with a number of utilities that are written in BASIC. BBRTC sells for \$19.95 plus \$3.00 shipping and handling to U.S. destinations, \$4.00 for those in Cana-

da, and \$6.00 elsewhere. For more information or to order, contact Performance Peripherals, 5 Upper Loudon Road, Loudonville, New York 12211; (518) 436-0485. To place an order from the U.S., call (800) 925-9774.

In other news, Mad Man Software has started to ship its Compression Kit. This is a disk and file backup system that features fast data compression for the 64.

According to Gene Barker, the Mad Man himself, Compression Kit works with all Commodore computers and drives. Designed for the 64, the kit works with both North American NTSC and European PAL versions. It's also configured to work with JiffyDOS, all of the CMD hard drives and floppy drives, RAMLink, and RAMDrive. This menu-driven utility lets you copy, move, and delete standard files, as well as copy and compress partitions and entire disks.

For a number of years, Mad Man has been working on its multidisk adventure game, Messiah III. Compression Kit grew out of the company's need to provide a reliable backup and verify utility that worked with all of the staff computers and drives. As it turned out, this utility worked so well that Barker decided to market it. Compression Kit sounds like a great utility for power users or sysops who run a multi-drive BBS.

Compression Kit retails for \$39.95. It can be ordered from Mad Man Software, 1400 East College Drive, Cheyenne, Wyoming 82007 or by calling (800) 34-MADMAN. For more information call (307) 632-1178. □

GAZETTE

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Keith & Co. Inc. 87

The Sound Interface device has three voices that enable your 64 or 128 to play music, imitate musical instruments, talk, and make sounds. Here's how to tap into that power.

THE SOUNDS OF SID

If you've used your 64 for any length of time, you probably know what great sound capabilities it has. Each 64 has three voices, or tone oscillators, and each of these voices has four waveforms: triangle, sawtooth, pulse, and noise. All three voices must share the same volume control, but each voice can produce sound independently of the others. The Sound Interface Device, an integrated circuit chip known as SID, resides inside both the 64 and 128 computers. It has the ability to let your computer play music, imitate musical instruments, talk, and make any number of sounds to accompany games. To produce a single sound on the SID chip, it's necessary to issue a few commands in a precise order. SID occupies memory registers 54272 through 54300 in the 64. To produce sounds, we poke different values to

several of these registers. Here's a review of the order in which you must issue commands to cause SID to produce a sound.

1. Clear the chip
2. Turn up the volume
3. Wait
4. Set a frequency
5. Set an envelope
6. Turn on a waveform

Of course, this procedure plays only a single note on one SID voice. By changing frequencies, you can play a simple melody. Many songs for the 64, however, include a melody, a harmonic line, and some percussion. This requires that all three SID voices be programmed more or less independently. Beautifully elaborate songs are usually programmed in machine

By Larry Cotton

language, but simpler tunes can easily be programmed in BASIC. Before we go any further, however, we must understand the concept of bit manipulation.

Bit Manipulation

The 64 and 128 are both 8-bit computers. That means that each of their myriad of memory registers holds one byte, or eight individually controllable bits. When you turn on or turn off a voice, you're actually gating and degating a memory register. To gate a voice-control memory register, you simply change one bit—the first one—in that register. See figure 1 for a representation of one particular register, 54276, which is the control register for voice 1.

In figure 1, the rightmost bit—bit 0—must be set, or changed, from a 0 to a 1 to make the voice speak. Do this by poking a 1 to the memory register 54276.

However, in addition to setting the 0 bit, you must

also select one of the four waveforms. This requires setting another bit to 1. As you can see in figure 1, each of the four leftmost bits (4 through 7) represents a waveform.

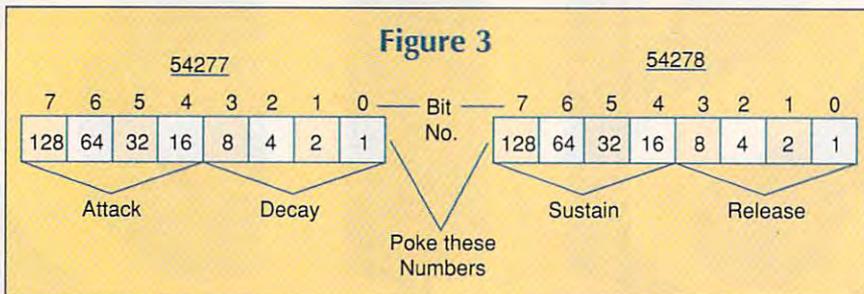
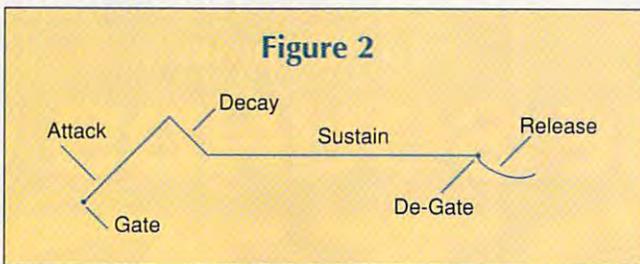
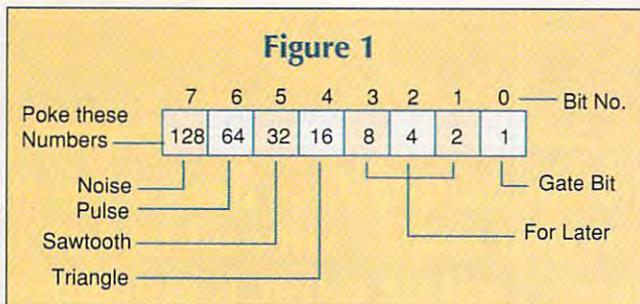
To select a waveform, pulse, for example, you set bit 6 to a 1. Bit 6 is controlled by poking a 64. Add 1 to gate the register and then poke the result to that register. Thus, a poke of 65 to 54276 turns on voice 1's pulse waveform. Poke 33 to turn on or gate the sawtooth waveform, 17 to turn on the triangle waveform, and 129 to turn on noise.

The pulse wave is unique. To hear it, you must poke some value to at least one of its two pulse-width registers. For each voice, there are coarse and fine pulse-width registers.

For now, we'll just poke 8 to the coarse pulse-width registers 54279 and 54286 for voices 1 and 2, respectively. The other waveforms don't need this poke.

OK, the voice is on. There are several ways to make the voice shut up. The easiest way is to make bit 0 a 0 again. We've seen that if waveform 65 gates the register to make it play, poking a 64 degates or turns it off. Likewise, poking a 129 turns on the noise waveform, while 128 turns it off.

There are at least three other ways to



silence a voice. You can change the voice's envelope to a shorter sustain and/or decay value; you can poke a 0 to the voice's frequency registers; or you can poke a 0 to 54296, the master volume control.

Here's a snippet of a program featuring two sustained voices,

accompanied by percussion, that demonstrates some of the techniques just described. Take a look at the Three Voices listing and follow the line-by-line explanation that follows.

Line 10 defines S as the first of SID's 29 memory registers. It then clears the chip by poking all the registers with 0. Lines 20 and 30 turn up the volume and initiate a short pause.

In lines 40 and 50, attack and decay for voice 3 (the drum) are set differently from attack and decay for voices 1 and 2 (melody and harmony). Likewise, sustain and release are set differently in lines 60 and 70. Line 80 sets up the pulse wave width

for the first two voices.

We read data for the melodic frequencies in line 100, while the drum's frequency remains constant at 50 (line 90). In lines 110 and 120, we poke both fine and coarse frequencies to the register.

Now let's use bit manipulation to turn on voices 1 and 2 with a pulse wave. We set bits 6 and 1 by poking a 65 (64 + 1) to 54276 (S+4) and 54283 (S+11) in line 130. While the notes play, a FOR-NEXT loop in lines 140-180 plays four drumbeats. Line

Three Voices

```

ED 10 S=54272:FORJ=STOS+24:POK SE 120 POKES+1,A1:POKES+8,B1:R
EJ,0:NEXT:REM CLEAR SID EM COARSE FREQUENCIES V
[SPACE]CHIP OICES 1 AND 2
DP 20 POKES+24,15:REM VOLUME A XD 130 POKES,A2:POKES+7,B2:REM
LL 3 VOICES FINE FREQUENCIES VOICE
AJ 30 FORT=1TO500:NEXT:REM WAI S 1 AND 2
T PH 140 POKES+4,65:POKES+11,65:
JF 40 POKES+5,12:POKES+12,12:R REM TURN ON VOICES 1 AN
EM ATTACK AND DECAY VOIC D 2 (PULSE WAVE)
ES 1 AND 2 BG 150 FORZ=1TO4:REM NO. OF DR
FA 50 POKES+19,2:REM AD DRUM UM BEATS
BM 60 POKES+6,4:POKES+13,4:REM EQ 160 POKES+18,129:REM TURN O
SUSTAIN AND RELEASE VOI N VOICE 3 (DRUM)
CES 1 AND 2 CG 170 FORT=1TO200:NEXT:REM LE
XK 70 POKES+20,15:REM SR DRUM NGTH OF DRUM BEAT
QS 80 POKES+3,8:POKES+10,8:REM HS 180 POKES+18,128:REM TURN O
SET UP PULSE WAVE AS SQ FF VOICE 3
UARE WAVE VOICES 1 AND 2 GR 190 NEXT
HA 90 POKES+15,50:REM COARSE F ED 200 POKES+4,64:POKES+11,64:
REQ VOICE 3 (DRUM)--FINE REM TURN OFF VOICES 1 A
FREQ. NOT NECESSARY ND 2
FP 100 READA1,A2,B1,B2:REM REA MD 210 GOTO90
D FREQUENCIES FOR VOICE XD 220 DATA16,195,21,31,15,210
S 1 (A1, A2) AND 2 (B1, ,25,30,14,24,16,195,0,0
B2) ,0,0
GK 110 IF A1=0 THEN END

```



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Figure 4

Attack

- 0 (no bits) shortest
- 16 (bit 4)
- 32 (bit 5)
- 48 (bits 4 and 5)
- 64 (bit 6)
- 80 (bits 4 and 6)
- 96 (bits 5 and 6)
- 112 (bits 4, 5, and 6)
- 128 (bit 7)
- 144 (bits 4 and 7)
- 160 (bits 5 and 7)
- 176 (bits 4, 5, and 7)
- 192 (bits 6 and 7)
- 208 (bits 4, 6, and 7)
- 224 (bits 5, 6, and 7)
- 240 (bits 4, 5, 6, and 7) longest

Decay

- 0 (no bits) shortest
- 1 (bit 0)
- 2 (bit 1)
- 3 (bits 0 and 1)
- 4 (bit 2)
- 5 (bits 0 and 2)
- 6 (bits 1 and 2)
- 7 (bits 0, 1, and 2)
- 8 (bit 3)
- 9 (bits 0 and 3)
- 10 (bits 1 and 3)
- 11 (bits 0, 1, and 3)
- 12 (bits 2 and 3)
- 13 (bits 0, 2, and 3)
- 14 (bits 1, 2, and 3)
- 15 (bits 0, 1, 2, and 3) longest

150 turns on the noise waveform—the drumbeat—by poking a 129 (128 + 1) to voice 3's control register; line 170 degates it. Line 180 ends the drumbeat's FOR-NEXT loop.

Line 190 degates voices 1 and 2 by resetting bit 0 to 0, and then line 200 sends control back to read more note frequencies.

release (54278) for voice 1.

Figure 4 is a chart which can help you decide what to poke to the attack/decay register. The upper four bits, 4–7, control attack, while the lower four, 0–3, control decay. Attack can be gradually lengthened by pok-

ing the values shown in increments of 16. Poking 240 sets all four bits, 4–7, for the longest attack time.

Changing decay gradually, however, is a bit easier. Just poke 1–15 for increasingly longer decay times. Sustain and release are controlled in register 54278 for voice 1. Bits 4–7 control sustain, while 0–3 control release.

Of the four parts of an envelope, sustain is the only one that is a volume level, as opposed to a rate of volume change. Therefore, you must set a sustain level before the release can be heard.

Enough theory. Check out the short program called Envelopes that should end your quest for the perfect envelope. As you hear the sounds, watch the values change to show what to poke where to achieve that sound. This is for voice 1 only. For voice 2, add 7 to the memory registers; for voice 3, add 14. As mentioned, voice 1 occupies registers 54272–54278, voice 2 occupies 54279–54285, and voice 3 resides in 54286–54292. □

More on Envelopes

A note's envelope can be described as the way its volume changes while it plays. Figure 2 shows how a typical envelope could look.

The rate of rise in volume at the left of the curve is called the attack, which starts as soon as the voice is gated. This volume usually rises to a relatively high level and then drops back. This part of the sound's lifetime, called decay, is the rate that the volume of the sound diminishes from this highest level to the sustained level. Sustain is the flat portion of the sound curve.

Finally comes the release portion. Release starts when the voice control register is degated and is the right-most portion of the curve.

Timing also influences the representative shape of an envelope. Remember, we used FOR-NEXT loops to create pauses while the notes and drumbeats sounded.

Each voice uses two memory registers to control its envelope, which is often referred to as the ADSR envelope. The first register controls attack and decay, and the second controls sustain and release.

How do you know what to poke into the envelope registers? I've found that the most effective way to set up an envelope is by trial and error, listening to the sound. However, it helps to know how the envelope is affected by the setting of each bit. Figure 3 represents the memory registers for attack and decay (54277) and sustain and

Envelopes

```

AM 10 PRINTCHR$(147)
CC 20 POKE650,128:REM REPEAT A
NY KEY
RR 30 F1$=CHR$(133):F2$=CHR$(1
37):F3$=CHR$(134):F4$=CH
R$(138)
CG 40 F5$=CHR$(135):F6$=CHR$(1
39):F7$=CHR$(136):F8$=CH
R$(140)
EF 50 SID=54272:FORJ=SIDTOSID+
23:POKEJ,0:NEXT:REM CLEA
R SID
KA 60 POKESID+24,15:REM FULL V
OLUME
SG 70 V1=6:V=2↑V1+1:REM INITIA
L VOICE
SG 80 D=5:REM INTIAL DECAY
JB 90 P=30:REM INITIAL PITCH
EK 100 POKESID+3,8:REM PULSE W
IDTH
HQ 110 PRINT"{HOME}{DOWN} P =
{SPACE}RANDOM PITCH
JJ 120 PRINT" V = CHANGE VOICE
AG 130 PRINT" ANY KEY = REPEAT
PD 140 PRINT" SPACE BAR = BEGI
N RELEASE
KB 150 PRINT"{DOWN} ATTACK TIM
E = {3 SPACES}F1/F2":PRI
NT" DECAY TIME
{2 SPACES}={3 SPACES}F3
/F4"
PE 160 PRINT" SUSTAIN LEVEL =
{SPACE}F5/F6":PRINT" RE
LEASE TIME = {2 SPACES}F
7/F8
BB 170 GETA$:IFA$=""THEN170
FX 180 IFA$=CHR$(32)THENPOKESI
D+4,V-1:GOTO110:REM SIL
ENCE SOUND
BE 190 IFA$="V"THENV1=V1+1:IFV
1=8THENV1=4
GK 200 IFA$=F1$THENA=A+1:IFA>1
5THENA=15
EM 210 IFA$=F2$THENA=A-1:IFA<0
THENA=0
PR 220 IFA$=F3$THEND=D+1:IFD>1
5THEND=15
CR 230 IFA$=F4$THEND=D-1:IFD<0
THEND=0
JB 240 IFA$=F5$THENS=S+1:IFS>1
5THENS=15
AF 250 IFA$=F6$THENS=S-1:IFS<0
THENS=0
MC 260 IFA$=F7$THENR=R+1:IFR>1
5THENR=15
HA 270 IFA$=F8$THENR=R-1:IFR<0
THENR=0
MK 280 PRINT"{DOWN} ATTACK
{4 SPACES}DECAY
{5 SPACES}SUSTAIN
{3 SPACES}RELEASE
RS 290 PRINT"{DOWN}"A*16"
{LEFT} {UP}"
BK 300 PRINT"{DOWN}"D"{LEFT}
{UP}"
PJ 310 PRINT"{DOWN}"S*16"
{LEFT} {UP}"
CB 320 PRINT"{DOWN}"R"{LEFT} "
EG 330 PRINT"{DOWN} POKE 54277
,"A*16+D"{LEFT} "
AA 340 PRINT"{DOWN} POKE 54278
,"S*16+R"{LEFT} "
BC 350 POKESID+5,A*16+D:REM AT
TACK/DECAY
XD 360 POKESID+6,S*16+R:REM SU
STAIN/RELEASE
AA 370 POKESID+4,V-1:REM SILEN
CE SOUND
GF 380 IFA$="P"THENP=INT(40*RN
D(1))+5:REM RANDOM COAR
SE PITCH
QB 390 PRINT"{DOWN} POKE 54273
,"P"{LEFT} "
PD 400 POKESID+1,P:REM COARSE
{SPACE}PITCH
XD 410 V=2↑V1+1:POKESID+4,V:RE
M BEGIN SOUND
XH 420 PRINT"{DOWN} POKE 54276
,"V"{LEFT} "
XQ 430 GOTO110
    
```

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The most obvious feature of the FD is its storage capacity. There are two models from which to choose. The FD-2000 offers 1.6MB of storage on a high-density disk and 800K on a standard 3½-inch floppy. The FD-4000 offers the same as the FD-2000, but it'll let you store 3.2MB on an extended-density disk. Both drives include a utilities disk and come with JiffyDOS.

That's a lot of room, even for GEOS power users like me, who accumulate fonts and clip art like dust balls under the bed. No matter what you spend your computer time doing, from games to telecommunicating to desktop publishing, you'll find plenty of space to do it on the FD.

Without a way to organize and operate that space, however, it'd be close to useless. That's where JiffyDOS comes in. CMD's experience with its hard drives and RAMLink comes shining through with the FD. It knows, for example, that many Commodore programs require a drive which is 100-percent compatible with the 1541.

CMD also knows that Commodore's built-in DOS, designed to fit the cozy world of 5¼-inch disks, would be helpless in the wide-open

spaces of a high-density 3½-incher. JiffyDOS, on the other hand, has grown with the technology, from starting out as a system for making your Commodore drives a little smarter and a whole lot easier to use to managing hard drives and multiple megs of RAM with the finesse of a seasoned pro.

The key to handling space for JiffyDOS is partitioning, breaking up the megabytes into smaller sections. The FD drive, like other CMD power peripherals, comes with a disk of utilities to make this a snap.

You don't have to split things up if you don't want to. If you want the thrill of seeing 12,736 blocks free when you list your directory, you can create one big native mode partition.

But, as I said, a lot of programs get ornery if they don't find everything laid out exactly like a 1541. Drop one of these programs into a native mode partition, and it would lock up faster than the local bank at five o'clock. On top of that, it's just plain easier to find your way around in smaller spaces, where you don't wait for a directory listing to scroll by like a freight train at rush hour. This is where smaller partitions, either native mode or those emulating standard drives, are perfect.

You can, for example, create a 1581-size partition of 3200 blocks for downloading files from QuantumLink. You might create another 1581-size partition to run GEOS under the deskTop, since the deskTop can only recognize a partition that acts like a regular drive. You can also create a partition that emulates a 1541 or 1571, right down to the track and sector layout—but you'll notice that it's certain-

ly faster than a 1541 drive.

The FD also beats the 1581 hands down, as I learned from a friend who borrowed the FD to run his BBS for a few days. He usually uses four 1581 drives. Even running simply as a 1581, reading a standard 1581-format disk, the FD easily outpaces the other drives on his system running identical tasks. Then, after configuring the drive as a large native partition, he let the FD take over his upload/download chores. When he realized just how much space that gave him, he suggested that I leave the unit with him for a few more months.

Speed isn't the only plus you get from the FD. The SWAP command, which RAMLink and RAMDrive also have, makes the FD even more compatible. You can, for example, use the FD as a data drive for some programs and even for downloading from QuantumLink by swapping the unit to drive 8. You can also let the FD play RAMLink, giving you a variety of areas for various tasks. The FD will let you switch configurations by popping in a different disk, something you can't do on a RAM device without reformatting the whole thing. This makes the FD drive wonderfully flexible. When you add an actual RAM device into the mix, the possibilities are almost endless!

If you use GEOS, the FD drive will be especially exciting. To be able to fully access its various partition possibilities, you'll want to buy a copy of Gateway. Even with the deskTop, you'll have a fast 1581 at your disposal, which means 3200 blocks to pack full of GEOS files. But once you let Gateway take over, you'll be sailing along at warp speed. You

can work with large native mode partitions that you can further divide into subdirectories. You can even switch between partition types, although you can't copy between them directly.

Both geoShell and DualTop will also let you access native mode partitions, but only geoShell in its current version will also let you access subdirectories. In my opinion, a large partition organized into subdirectories is the best possible storage arrangement for GEOS, whether on a disk, in RAM, or both.

The utilities disk that comes with the FD drive includes copy programs to transfer files or whole disks to FD disks and partitions. It also includes FD Tools, which takes care of most disk chores, including formatting and creating various configurations of partitions. You don't actually need to use these programs, of course. If you're the kind of user who likes to tinker, you'll find that CMD has once again provided all the documentation you could ask for. JiffyDOS commands, along with BASIC 2.0 and 7.0 commands, are presented with plenty of examples. There's also lots of technical information to let you really put the FD to work. The drive itself hooks up to your system just like any other disk drive, directly to your computer or daisy-chained to any other drives.

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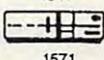
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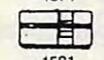
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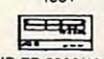
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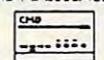
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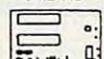
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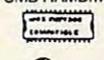
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Where's the Software?

Is the 64 starting to die? I sure hope it isn't. Unfortunately, it seems to me that there are fewer and fewer places selling 64 software these days. There are only two stores in the city of San Antonio that still sell 64 products. Are major companies still producing products for us? If so, who are they? And where can I get GEOS for the 64?

DOUG DENNY
SAN ANTONIO, TX

In business terms, the 64 is considered to be a mature market. That's a polite term for one that isn't growing. The computer has been around for more than a decade, and almost everybody who wants a 64 already has one. Also, those users have already purchased most of the software that they want, too. Before they dropped the Commodore line, software developers saw sales of their products plummet. New titles just didn't sell, and merchants can't devote shelf space to items that the public doesn't buy. Unfortunately, a large number of people who once used Commodores have moved on to other platforms, and that's where the action is now.

There is still a good solid core of dedicated Commodore users, but it doesn't have the numbers it once did. All of this means that whenever a new product for the 64 comes out, instead of 100,000 copies being sold, the number has dropped to 1000—or less. Major companies with large overheads can't make a profit on sales of that size.

If you look through the advertisements in Gazette, you'll see new products for sale, but in most cases, the firms offering them are small. In many ways, the market is

back to where it was in the early days. A lone programmer gets an idea, writes the code, and then sells the program by mail from his or her house or post office box. Only now, the number of buyers is no longer growing.

There are still a few major distributors for Commodore products. Two of the largest are Software Support International (800) 356-1179 and Tenex (800) 776-6781. Call for a catalog. Moving up in the number of 64/128 products handled is Creative Micro Designs. This firm distributes a good number of Commodore items, both hardware and software. CMD is also the place to buy any GEOS products. Call (800) 638-3263 to order or to request a catalog.

Last December, Gazette published a list of large and small companies that still handle Commodore products. An updated version of that list is in the works. The best way to keep the 64 alive is to support those companies that support the 64.

Keyboard Cleaning

I have to press some of the keys on my 64 quite firmly before they register. I think the contacts must be dirty. I've read the procedure for dismantling a keyboard and cleaning it, but now that I need the instructions, I can't find them. Can you help?

JIM GORDON
BLOOMINGTON, IN

Keyboard problems can often be traced to dirty contacts. Some keys may stick slightly, resulting in their printing twice. Cleaning usually takes care of these problems. It's not too difficult, but it does require some care. Before you tackle the job, have on hand some isopropyl alcohol, a soldering iron, and a couple of Phillips screwdrivers.

Turn over your 64 and remove the three screws. This will let you remove the top of the case. Be careful with the plastic tabs that act as hinges. Unplug the wires that are connected to the red pilot light. A plug pulls out from the socket; you don't have to unsolder them.

Turn the top of the case down, exposing the bottom of the keyboard. You'll see a number of small Phillips-head screws holding on the keyboard bottom. Remove these screws and put them in a safe place. Then, unsolder the two bare wires that connect beneath the Shift Lock key. Do not unsolder any of the colored wires.

Remove the bottom cover of the keyboard, and you'll see a large circuit board on the other side. This is where the contacts are for the keys. If you see any obvious dirt or foreign material, be sure to remove it. Then dampen a clean cloth with the alcohol and rub it gently over the entire circuit board. Pay close attention to clean the square circuit areas.

Reach under the keyboard and press each key. A bar under each key that makes the actual contact will come up out of a hole. Clean each of these bars as well.

Allow the board to dry thoroughly and then resolder the two wires and reassemble the keyboard. It should work good as new.

Okimate Paper

I run three businesses from my home: a mobile DJ service, a radio/TV production facility, and a message-on-hold service. I do it all on a 128 with GEOS. I have two 1571 drives and a 2MB BBG from PPII that I manage with CMD's Gateway.

I alternate among three different printers, depending on

Where to find
Commodore
software, how to
clean your
keyboard, and a
source for
Okimate printer paper

the job I am doing. I use a Star NX-1000C for everyday printing; a Brother HR-25 daisywheel for letter quality business correspondence; and an Okimate-10 for banners, posters, and other graphics.

The Okimate (thermal transfer and no ribbon, remember?) works great with the high-quality fax paper that's available in most office supply stores. A guy in a print shop recently asked if the flier I'd printed on the Oki was printed on a laser printer.

Thanks for all your support over the years, and I guess I'll keep banging away on this old thing until the keys fall off.

PRESTON THOMPSON
FREDERICKSBURG, VA

Thanks for the tip, Preston. I'm sure many readers will appreciate this new source of paper for their Okimate printers.

Renumber

I am writing my first decent-sized BASIC program for the 64. Through an interface on my user port, it will operate the solenoids of a game. To proceed, I need two things.

First, I need a program that will renumber the lines of my program. It must allow me to select the starting line number and the interval.

Second, I am trying to locate a book called *Commodore Interfacing Blue Book*. The publisher is Microsignal Press, but it is out of business. Can anyone help me locate this book?

F. KOSTER
171A LONG HILL DR.
YORKTOWN HEIGHTS, NY 10598

Perhaps one of our readers can help you locate the book you want, but we have a renumbering utility that works with the press of a function key. Gazette published Renumber 64 by Hubert Cross in the November 1987 issue.

This short machine language utility does what you want, and it also rennumbers references made in GOTOs, GOSUBs, ON-GOTOs, and ON-GOSUBs.

A few copies of this issue are still available. The U.S. price for the magazine is \$6 and \$3 for the companion disk. These prices are valid for any issue prior to October 1990. You can order by writing to COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

Good luck with your game. Let us know how the project turns out.

Disk Finder

I am writing a program that I want to be as user friendly as possible. I think I have covered all the possible problems that I can think of but one. Is there a routine that I can use to tell whether or not there's a disk in the user's 1541 drive?

RICHARD BLAKE
ALTON, IN

Trying to anticipate every error that a user might make can mean a lot of code for your program, but it's a good idea. Here's a short routine that might do the trick.

It's a good idea to check first to make sure that the drive is turned on. That's handled in lines 1000-1040. Then try to initialize the disk and read the Error channel. We do that in lines 1050-1100.

This routine could be inserted at the start of your program if you omitted the RETURN command in line 1110 and appended the rest of your code from there.

```
1000 OPEN 15,8,15: CLOSE 15
1010 IF ST = 0 THEN 50
1020 PRINT "TURN ON YOUR
DRIVE AND PRESS A KEY"
```

```
1030 GET AS: IFA$ = "" THEN 1030
1040 GOTO 1000
1050 OPEN 15,8,15,"1"
1060 INPUT#15,E: CLOSE 15
1070 IF E = 0 THEN 1110
1080 PRINT "INSERT A DISK IN
YOUR DRIVE AND PRESS
ANY KEY"
1090 GET AS: IFA$ = "" THEN 1090
1100 GOTO 1050
1110 RETURN
```

Software Wanted

I've looked all over for software for the 64 and I've found a lot of good word processors, but there's one program that I can't find. I'd like to have a program that checks my grammar after I've written something. Has anyone written such a program or seen such a program for the 64?

MIGAILL RICE
CINCINNATI, OH

Has Gazette ever published a hurricane tracking map? If not, I'm sure those of us who live along the Atlantic coast would like to have one. I'd like to see a program that would present a map of the Atlantic coastline, Gulf of Mexico, and Caribbean. Each day you could enter a hurricane's latitude and longitude, and the program would plot the points on the map. As the plots were updated, you could see the path of the storm and have some idea of where it might strike next.

LOU ROSEN
CORAL GABLES, FL

If any programmers have written programs similar to these, we'd be interested in publishing them.

Do you have a question or comment? Write to Gazette Feedback, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. □

A renumbering utility for programmers, a way to determine whether or not a disk is in a drive, and reader requests for programs

PD PICKS

Steve Vander Ark

ZIX AND STONES

OK, enough serious stuff for a while. It's time for another shot of adrenaline-pumping, toe-curling action games. I've played through a bunch of great public domain and shareware games to bring you a couple of the best programs for the 64 and 128. It's a tough job, but someone has to do it.

Before we charge headlong into the latest batch of the deadliest games around, let me run something else by you. A popular telecommunications service of interest to Commodore users is GENie. The Commodore libraries on GENie are quite extensive. If you happen to know the file number of the program you want, all you need to do is request a download and feed in that number. That's the fastest way to download a specific program, and since you're paying by the minute, *fast* means you save money.

Just because I'm such a nice guy, I'll include the GENie file number of each PD program that I mention in this column. If I find that the file isn't available on GENie, I'll upload it there. How's that for service?

This month's first game, Super Rockfall, is another masterpiece from Mark Dickenson. The other is Zix, an outstanding version of the old Breakout game. Both of these great programs will get your blood pumping and your joystick jumping.

Super Rockfall by Mark Dickenson. Q-Link filenames: SUPROCKFALL1.SDA (190 blocks) and SUPROCKFALL2.SDA (28 blocks). Both files are required and were uploaded by Mark AD E. GENie file number is 8916.

This outstanding 64 program is reputed to be the best game on Q-Link. That's a matter of taste, but from a reviewer's point of view, considering

programming pizzazz, user friendliness, game mechanics, and playability, Super Rockfall wins hands down.

Yes, it's a fabulous game, a remake of the venerable Dig Dug arcade game. There's more strategy per screen in Rockfall than you can imagine. And there's plenty of chance to abuse your joystick as you try to tumble little boulders into the right places and try not to start an avalanche. All this action should certainly put Super Rockfall into anybody's Top Ten, but there's a lot more. For example, there's a screen editor to let you create your own fiendish challenges to foist on your friends.

A lot of delighted Rockfall fans have done just that, and you'll find a host of player-created levels on Q-Link. Mark Dickenson also added a very nice music player to the game, which, coming from the author of StereoSIDPlayer, is not surprising. When you download the game, it comes with a nice selection of SID music files to brighten your day. You can even set the game to recognize an extra SID sound chip if you have one.

The documentation is another strong point. The simple fact that it has documentation sets it above a great many games you'll find on Q-Link or GENie. Mark gives you not only documentation but also a slick little viewer that lets you read it onscreen.

Zix by Pierre Messier. Q-Link filename: ZIX2 (21 blocks). Uploaded by Harold W1. GENie file number: 6647.

One nice feature on Q-Link is that users can post notes about files in the libraries. When you want to find a good program to download, you can browse through these comments and find out if there is a problem with a program or if other users have liked it. I use these notes a lot as I dig

for treasures in the Q-Link libraries, and when I started reading the comments on Zix, I realized that I had hit pay dirt. Someone even said that Zix was probably the best game on Q-Link after Super Rockfall. That got my attention.

The first thing I noticed about Zix was how short it is. A short program is often short on graphics or sound effects. In this case, though, short simply means tight, efficient programming in machine code, which results in an addicting and exciting game.

The inspiration for this game, as I mentioned, is Breakout. I always loved that game, especially the fancier versions that included falling power pills and weird but wonderful brick layouts. Zix incorporates all these goodies, including the best one of all, the one that lets your paddle fire little bombs at the bricks. I don't know about you, but I love a game that lets you blast things into pixel dust with an endless supply of missiles.

There are actually two versions of this game on Q-Link. This one is the updated version which has a few minor bugs fixed and also includes paddle-speed control. The graphics and brick designs are the same in each, as are the various power pills. There is no documentation available, so you'll have to use trial and error to figure out what each pill does. There is also no way for you to know that pressing a number from 1 to 9 before you start playing adjusts the paddle speed or that you can cheat and get 99 lives by pressing Control-P, but, hey, now I've told you!

Each of these great games is a shining example of Commodore programming at its best. You will seldom find programs this exciting—at least not until you see what I've found for next month! □

Here are a couple of outstanding games that will make your list of Top Ten favorites.

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BEGINNER BASIC

Larry Cotton

WHERE'S THE DATA? PART 3

Last month, we wrote a short program to save a to-do list to a floppy disk. If you dutifully followed along, your list is now embedded as magnetic particles on a piece of Mylar, awaiting retrieval. Here's a short program to retrieve your list from the disk to your television or monitor screen. The items pop onto your screen as they're pulled from disk.

```
148 PRINTCHR$(147)
149 DIMIS(100)
150 INPUT"[DOWN] NAME OF
LIST TO LOAD";LS:IFL$=""
THEN END
160 OPEN1,8,0,LS
170 INPUT#1,X
180 PRINT
190 FORT=1TOX:INPUT#1,IS(T):
PRINTIS(T):NEXT
200 CLOSE1:END
```

Line 149 dimensions your item array (allots memory space for the list) to the same maximum size as when it was saved. Line 150 uses the INPUT statement to get the name of your list. Be sure to load the list using exactly the same name you used when you saved it.

Line 160 is this month's critical syntax line. The 1 after OPEN is the file number—the same number you gave the file last month. The 8 means you're communicating with the disk drive. The 0 between the second and third commas tells the disk drive to load (as opposed to save) a file. L\$ is the name of the file that was input in line 150.

INPUT# in line 170 is the command to pull the data from the disk. It's the opposite of PRINT#, which you used last month to save the data on the disk.

The first thing we must get from the disk is the number of

items that are on your to-do list. That quantity was sent to the disk last month as the variable X. You don't have to use X again per se, but you must use a similar variable type. X\$ won't work.

Once we have the quantity X, we can begin pulling each item from the disk, one by one, using a FOR-NEXT loop, the upper limit of which is X. Line 190 does the job. It uses INPUT# to load the array IS(T), then prints each item as it's retrieved. After the items have been loaded from the disk and printed onscreen, the file is closed in line 200.

Let's merge this and last month's programs. We can then make a couple of modifications to add a simple menu. Follow these steps.

1. Type in this month's program and save it to disk in case you make an error.
2. Clear the screen.
3. List the program at the top of the screen, but don't run it.
4. While this month's program is showing, type under it `LOAD"FILENAME",8`, where `FILENAME` is the name of the save-to-disk program we wrote last month.
5. Last month's program is now in the computer's memory, and this month's program is showing on your screen. Don't clear the screen.
6. Move your cursor to the top of the screen and begin pressing the Return key on each of this month's program lines. When finished, the programs will be merged.
7. Clear the screen and list the program to confirm that you have lines 10 through 200.
8. Add these lines.

```
35 PRINT"[CLR][DOWN] DO YOU
WANT TO SAVE OR"
36 PRINT"[DOWN] LOAD A LIST
(S/L)?"
37 GETAS:IFAS<>"S" THEN
```

```
IFAS<>"L" THEN37
38 IFAS="L" THEN150
```

9. Add `END` at the end of line 140. It should read as follows.

```
140 CLOSE1:END
```

10. Remove lines 148 and 149.

11. Save the merged program with a new filename, such as `TODOLIST`.

Lines 35–38 add a simple two-choice menu. Save includes typing, saving, and printing the list on your TV or monitor screen. Load loads the list and prints it onscreen. Feel free to elaborate on and refine this menu to your liking. With a little creativity and some skillful programming, you can add features such as deleting or changing an item, prioritizing the list, or printing out a hard copy.

Here's the entire listing with checksums for The Automatic Proofreader to help you avoid typing errors.

```
AM 10 PRINTCHR$(147)
GQ 20 DIMIS(100):PRINT"NO MORE
THAN 100 ITEMS!":PRINT
"{DOWN} PRESS ANY KEY TO
BEGIN."
GR 30 GETAS:IFAS=""THEN30
HP 35 PRINT"{CLR}{DOWN} DO YOU
WANT TO SAVE OR"
CE 36 PRINT"{DOWN} LOAD A LIST
(S/L)?"
GD 37 GETAS:IFAS<>"S"THENIFAS<
>"L"THEN37
HK 38 IFAS="L"THEN150
BQ 40 PRINTCHR$(147)
CQ 50 X=X+1:INPUT" TO DO";IS(X
)
PF 60 IFIS(X)=""THENX=X-1:GOTO
80
BF 70 GOTO40
EM 80 PRINT
KK 90 FORT=1TOX:PRINTIS(T):NEX
T
GC 100 INPUT"[DOWN]NAME OF LIS
T TO SAVE";LS:IFL$=""TH
ENEND
PA 110 OPEN1,8,1,LS
QA 120 PRINT#1,X
FR 130 FORT=1TOX:PRINT#1,IS(T)
:NEXT
QJ 140 CLOSE1:END
QM 150 INPUT"[DOWN]NAME OF LIS
T TO LOAD";LS:IFL$=""TH
ENEND
PF 160 OPEN1,8,0,LS
PG 170 INPUT#1,X
QD 180 PRINT
MQ 190 FORT=1TOX:INPUT#1,IS(T)
:PRINTIS(T):NEXT
SH 200 CLOSE1
```

After you've saved items to a file on disk, you need another program to read them again.

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MACHINE LANGUAGE

Jim Butterfield

SQUIGGLE ARRAY

The earliest Commodore computer, PET 2001, was shipped with a tiny program called Squiggle. Squiggle, written in BASIC, draws a wandering line around the screen. We can rewrite this program in machine language and learn a little about arrays as we do so.

Depending on whether it is going up, down, left, or right, the line is drawn with character 221 or 192, a vertical or horizontal bar. You'll find these on the keyboard as the shifted - and * keys. When the line randomly changes direction, one of the corner graphics, such as Commodore-A, is used to make a continuous line.

We use a table to decide which graphics character to print. The following 4 x 4 tables (one in decimal and the other in hex) map the previous or old direction against the new direction of the squiggle.

New (decimal)				Old
Up	Down	Left	Right	
222	0	176	174	Up
0	221	173	189	Down
189	174	192	0	Left
173	176	0	192	Right

New (hex)				Old
Up	Down	Left	Right	
DD	00	B0	AE	Up
00	D0	AD	BD	Down
BD	AE	C0	00	Left
AD	B0	00	C0	Right

Here's how to read the above table or two-dimensional array. If we're going up and want to continue to go up, we should print character 222. We can't go directly from up to down. The 0 signals an illegal direction change. If we're going up and want to go left, we must print character 176, that code for the Commodore-A key combination.

Our table has four rows and four columns, each numbered 0-3. The previous direction

sets the row number. Multiply it by 4 and add the new direction (column), and you've reached the right spot in the table. We can multiply by 4 with two left-shift commands; it's handy to have a power-of-2 column count.

Two more things help make the job easy. First, each table entry fits within a single byte. And since the whole table fits within 256 bytes, we can reach any entry with simple indexing, rather than having to use indirect addressing.

After we print the selected character, we must move the cursor in the appropriate direction. Which way? The program reads a one-dimensional array (a list or vector) that looks up the cursor movements associated with certain character codes: cursor up, down, left, and right for characters 145, 17, 157, and 29, respectively.

We'll get pseudorandom numbers by reading consecutive bytes of ROM. Let's track the program flow. Detailed code is not given here; for a closer look, run the program and disassemble the machine language code.

The program is poked into memory starting at hexadecimal \$2000, decimal 8192. The table is located at \$2073. You can see it in BASIC lines 190 to 220. Behind it is the list of cursor movements, which will be placed at \$2083.

Clear the screen and move the cursor into the screen area. Set random number tracking to ROM address \$C000. Set the initial direction to up, code 0. Store this at address \$2200.

At \$2021, the program is ready to start work on our fake random value. A value from 0-3 sets our new random direction. Each ROM location can give us four such values, two bits at a time. We extract the byte from ROM, store it away at address \$2201, and hack

off two bits. This gives us the random value for the new direction, which we store at address \$2202.

The old direction is stored at \$2200; the new at \$2202. Time to look up our 4 x 4 table to get the printable character. A 0 would signal an illegal direction.

Multiply previous direction by 4 (two ASL commands). Add the new direction; in this case, a logical OR will do the job just as well. The result, transferred to the X register, gives the offset from the start of the table at \$2073. Simple indexing will grab the character we need.

2033 LDA \$2200
2036 ASL A
2037 ASL A
2038 ORA \$2202
203B TAX
203C LDA \$2073,X
203F BNE \$2049

If the character from the table is a value other than 0, we leap ahead and print it. Remember, 0 signals an illegal direction, meaning the line wants to double back upon itself. In this case, we'll just tell it to continue in the direction that it was traveling, or in computer language, set the new direction to equal the previous direction.

2041 LDA \$2200
2044 STA \$2202
2047 BPL \$2033

Note that the above BPL always branches. Can you see why?

At \$2049, the character is printed, followed by a cursor left. We go to our second array to send the cursor in the right direction. Incidentally, we also set the previous-direction value to the new-direction value.

The Run/Stop key is checked at 205D. A little work to set

Let Squiggle wander about your screen drawing lines while you learn about arrays.

up the next fake random value, and we loop back.

The program ends when we scan past the end of ROM or when the Run/Stop key is pressed.

Squiggle runs on virtually all Commodore 8-bit machines but doesn't behave quite the same on each. The 128, for example, cheerfully opens up space on the screen when the line runs off the right-hand side. Of course, the ROMs are different in each computer, too.

You'll quickly discover that ROM reading isn't the finest way to generate random values. Many 0 values produce lots of Up commands, and the line will often bump uselessly against the top of the

screen. You'll see distinctive movement patterns as the program scans through repetitive parts of ROM.

Machine language Squiggle runs several hundred times faster than its BASIC forebear. Sixteen thousand moves will take place in less than a minute. That's too fast for easy viewing, so you might like to try your hand at slowing it down so that you can see the line moving. Another possible project would be to add code to keep the wiggling line from trying to run offscreen.

Here's the BASIC listing for Squiggle to get you started. Once the program pokes the machine language code into place, Squiggle takes off.

```
PD 100 DATA 169,147,32,210,255
      ,162,10,169,17,32,210,2
      55,169,29
XA 110 DATA 32,210,255,202,16,
      243,169,0,133,253,169,1
      92,133,254
KF 120 DATA 162,0,142,0,34,160
      ,0,177,253,141,1,34
MM 130 DATA 78,1,34,78,1,34,41
      ,3,141,2,34,173,0,34
BB 140 DATA 10,10,13,2,34,170,
      189,115,32,208,8,173,0,
      34
GS 150 DATA 141,2,34,16,234,32
      ,210,255,169,157,32,210
      ,255
XP 160 DATA 174,2,34,142,0,34,
      189,131,32,32,210,255
RR 170 DATA 32,225,255,240,16,
      173,1,34,200,192,4
CE 180 DATA 144,190,230,253,20
      8,2,230,254,208,175,96
AE 190 DATA 221,0,176,174
GK 200 DATA 0,221,173,189
HM 210 DATA 189,174,192,0
EM 220 DATA 173,176,0,192
GC 230 DATA 145,17,29,157
BE 280 PRINT "SQUIGGLE!"
QJ 300 FOR J=8192 TO 8326
DS 310 READ X:T=X
DD 320 POKE J,X
PP 330 NEXT J
FM 340 IF T<>15825 THEN STOP
MP 400 SYS 8192
```

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PROGRAMMER'S PAGE

Randy Thompson

INTERFACE AGONY AND ECSTASY

This month I'm reprinting a letter sent in by Jack Blewitt of Rockford, Illinois, that should interest anyone who has ever struggled with Commodore printers and interfaces. I've edited it slightly for size.

"The May 1993 issue of Gazette's 'Feedback' column helped a reader with a printer underlining problem. As comprehensive as the answer was, it did not mention one of the prime reasons many printer problems occur: peculiarities of specific printer interfaces. Even if you don't have one of these interfaces, you should be aware of the problems they may cause just in case you ever decide to write a program for others to use.

"The Cardco-B, Cardco+G, Super-G, and Gee-Whiz interfaces were designed to emulate both Commodore- and Epson-compatible printing modes. In these emulation modes, the interface translates many special printer commands before passing them along to the printer. Some printer commands are ignored when the interface doesn't understand them. Because you may want to use a printer feature that the interface doesn't directly support, you can use the OPEN command's secondary address (SA) to tell the printer interface to pass printer commands through unaltered. Even when the interface's DIP switches are set to transparent mode, certain SA values allow you to override that setting.

"For example, to ensure that your printer commands reach the printer, you should use an SA of 0, 1, 7, or 8 when you want to send Commodore-specific printing commands such as Reverse, Expanded, 7-pin graphics, and so on. If

you want to use Epson-specific printer commands for such things as underlining or 9-pin graphics, send them through a printer channel that was opened with an SA of either 4 or 5 (depending on your desired line spacing). Remember, there is no reason you can't have more than one printer channel open at the same time—each with its own unique SA value—so printer commands can be mixed if necessary.

"If your word processor doesn't allow you to change the SA to access your printer, as with The Write Stuff, you might consider locking your interface into transparent mode before loading the program. With the Cardco and PPI interfaces, you do this by adding a 20 to the SA value. For example, by executing the following command prior to running your word processor, you lock the interface in Epson mode.

**OPEN 4,4,25:PRINT#4,"EPSON
MODE LOCKED":CLOSE 4**

"Please note that many printers, such as Legend and Sieksha printers, use the SA for their own special purposes. Since it is impossible for programmers to test their code on every type of printer/interface, you must patiently experiment with SA values.

"Another handy tip to remember is to use the CHR\$() function instead of the actual letter designates when sending printer commands. If your interface's ASCII translation is turned on, an uppercase E might be converted to lowercase, thus changing your printer command to something that might not work. By sending commands such as the following, you should have much greater success with printer codes.

PRINT#4,CHR\$(27);CHR\$(69):

REM CHR\$(69) equals E

"Each interface has its own special set of printer codes and so do most printers. Check your manual anytime a program doesn't produce the results you anticipate. Be particularly careful when preparing to print graphics. A Star NX-1000 printer is not the same as an NX-1000C (C for Commodore version), and so on. Even with the same print-heads, it is not possible to activate the 9-pin graphics on a Commodore version of the same printer.

"If you want your graphics to print on a computer with the Hot-Shot+ interface, never use the <ESC><****> Select Graphics Mode commands. Hot-Shot+ works all right at 80DPI, but it balks if you attempt to print at 120DPI in this mode. This is probably why so many Hot-Shot+ owners went bananas trying to make Paperclip Publisher print. Hot-Shot+ uses <****> as a proprietary command and will not pass it to the printer. Using the interface's K, L, Y, and Z equivalents works with all interfaces to change graphics density and prevents the above catastrophe.

"It is the responsibility of Commodore users to read and understand the features of their equipment. There are just too many hardware configurations out there for programmers to meet the needs of everyone. If you find that you need specific help, check with your local Commodore user's group to see if an expert there is using the same printer and/or printer interface you are. And while you're getting help, be sure to share your own discoveries. Good Commodore support is getting hard to find."

If you have a good printer tip, send it to Gazette. We'll share it with our readers. □

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A GEOS USER'S GUIDE TO GENIE

If you've read my columns, you know that I'm excited about QuantumLink. I spend quite a lot of time there, poking around the libraries for files to download or chatting with other users over a game of bingo. As I've said before, if you're a Commodore user, you should be on Q-Link. There will never be another service like Q-Link with so much to offer 64 users.

But Q-Link isn't the only game in town. One of the more popular online services these days is GENie. GENie supports any type of computer, from the Apple II to mainframes, by sending and receiving ASCII text rather than graphics.

GENie has a special area devoted to our machines that's called the 64/128 Flagship. It's run by John Brown, the fellow behind Parsec and *Twin Cities 128 Magazine*. In the Flagship, John maintains message, libraries, and so on.

The resident GEOS expert is a programmer and writer named Robert Knop; his name online is R.KNOP1. He visits the Flagship regularly, making sure GEOS users get the help and information that they need.

One way GEOS users can get all this help and information is by visiting the bulletin board area. There is a whole category devoted to GEOS messages. Subject areas include converter programs, mega fonts, font editors, geoPublish, gateWay, and geoProgramming in geoBASIC or geoProgrammer. You can read the messages, add your own responses, or ask questions of your own.

You can meet other people in the evenings in the Real-Time Conference area. Here

you chat live with other Commodore users from around the country. You can often find John Brown himself, under the name C128-JBEE. Look for Doug Cotton from Creative Micro Designs, too.

There are no officially scheduled GEOS chat times, nor is there a separate GEOS chat area as there is on Q-Link. Rob Knop, however, hosts the conference area on Thursday nights. That's a great time to get GEOS information.

Of course, one of the more popular areas in the Flagship is the file library, which is full of great Commodore programs just waiting to be downloaded. There are 47 different libraries, each containing programs devoted to a particular aspect of Commodore computing. You can find terminal programs in library 6, for example, or 128 graphics in library 28. There are games galore, lots of SID music files, graphics, and utilities for anything you can imagine. Every week or so, John posts a list of the best from the latest crop of files. This makes your hunt for the latest and best programs a little quicker and easier.

As you might guess, there are several libraries for GEOS files. Library 35 is GEOS applications and utilities, number 36 is for GEOS graphics, and number 37 is for GEOS fonts. Kent Smotherman, Irv Cobb, and other crack GEOS programmers regularly upload their programs here.

Some of the more recent uploads in the applications library include an 80-column version of the popular geoWrite utility Toolkit and a disk directory printer which makes listings just the right size for 1581 disks. There's also a blank keyboard overlay done in geoPaint that you can customize for your own needs. Another user who is handy with his Handyscanner has been upload-

ing scanned photographs to the graphics library.

Over in the font library you'll find some very useful fonts, good for sensible word processing. There are also a few crazier ones such as Mega Valdez, which looks like it's dripping oil.

If you're interested in coming aboard the Flagship on GENie, be prepared to spend a little money, especially at first. It can be more than a little confusing as you try to figure your way through the extensive menu system. You'll be paying by the hour while you wander around, so plan on a few large bills while you learn the ropes. The best way to learn anything is by doing it, and GENie is no exception. Before long you'll be sailing through the menus like an expert. Believe me, gaining access to this source of help, information, and programs is well worth the cost.

Here's how you can sign on to GENie:

- Set your terminal software for half duplex (local echo) at 300, 1200, or 2400 bps.
- In the U.S. dial (800) 638-8369; in Canada dial (800) 387-8330.
- Upon connection, type HHH.
- At the U#= prompt, type *XTX99018,COMMRT* and then press Return.
- Have a major credit card or your checking account information handy.

When you sign on with the COMMRT password, that puts you on the Commodore users' mailing list, and it gives the Flagship credit for signing up a new user.

Once you're aboard, be sure to drop me a note. My screen name is S.VANDER-ARK. I'm always happy to answer questions and listen to comments! □

GENie is an online service that has a lot to offer Commodore and GEOS users.

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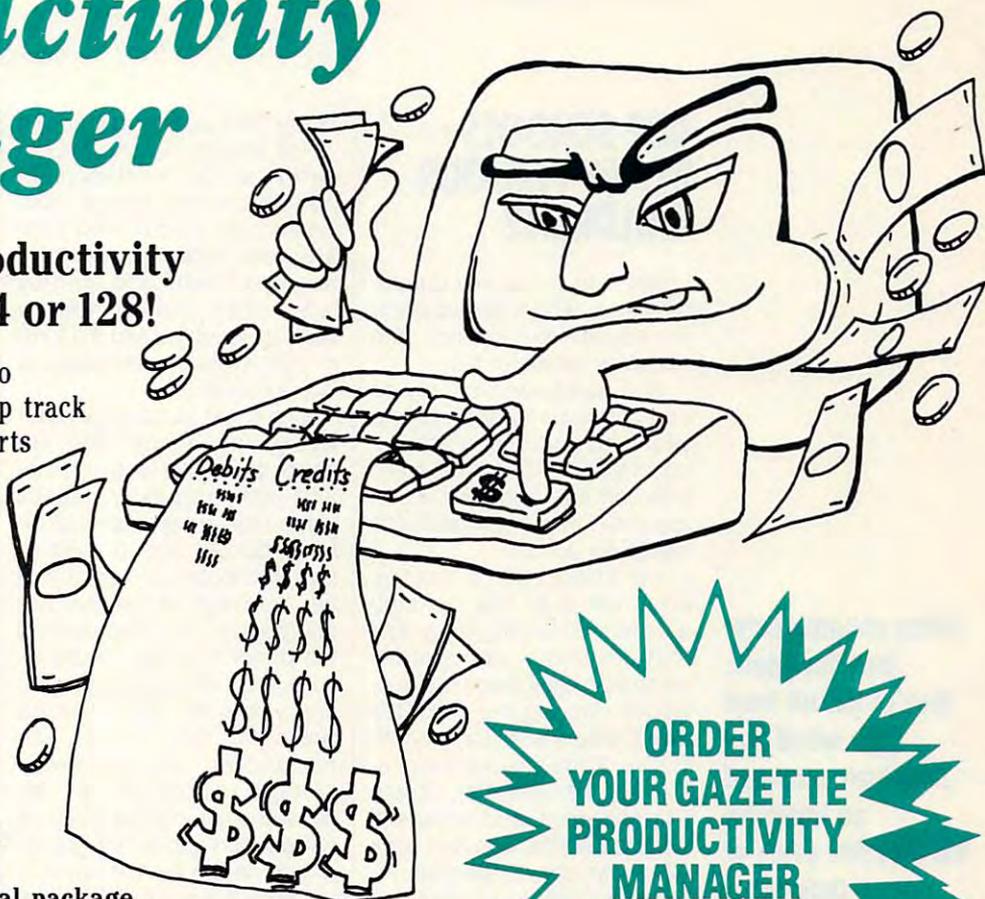
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D'IVERSIONS

Fred D'Ignazio

ARE SCHOOLS READY FOR OUR CHILDREN?

I have a four-year-old daughter, Laura, who is almost ready for school—but I'm not sure school is ready for her.

She has been working on computers since she was one year old, and she is now an accomplished "mouseketeer." She can find and click a single pixel on a high-resolution computer screen.

Her introduction to reading and math skills has included a variety of learning programs that resemble videogames more than they resemble textbooks. Among her favorites are Edmark's Millie's Math House, Sierra On-Line's Alphabet Blocks, EA*Kids' Eagle Eye Mysteries, and Voyager's AmandaStories. She also uses CD-ROM encyclopedias, including Compton's Multimedia Encyclopedia; National Geographic's Mammals; and Discis' and Brøderbund's CD-ROM storybooks such as Scary Poems for Rotten Kids, Just Grandma and Me, and Arthur's Teacher Trouble.

Laura is comfortable with computers, but she's not a toddler nerd. In fact, she spends only a few minutes a day at the computer. Like any four year old, most of her "work" takes her outdoors and into the company of other people.

She spends a couple of mornings a week at day care. She attends toddler play gym at the YMCA, and she goes to dance class and art class. In the summer, she attends various camps, including swim camp and dinosaur camp.

Like other kids of her generation, Laura is a born button pusher. She has her own little Strawberry Shortcake boom box and her own Fisher-Price cassette player to play a li-

brary of audio cassettes which feature Raffi "save the earth" songs, lullabies, and soundtracks from favorite movies such as *Aladdin* and *Little Mermaid*. She has her own Sesame Street and Barney videotapes and confidently pops a videotape into the family VCR whenever she wants to see a movie.

She is just as adept at other family appliances. She answers the cordless telephone, and she regularly leaves voice mail on her parents' office phones. She publishes her own books by enlarging her drawings on her daddy's photocopier and then stapling the pages together. She's also a good little photographer and works the video camera like a pro. On occasion she has also sent her own faxes. Using a picture phone, she has transmitted a still image of her devilish grin to her grandmother in the Florida keys.

Laura is a normal kid in the gadget-rich 1990s. That is why I worry about her going to school next year. Laura's world is saturated with little electronic gadgets, but school is gadget-deprived.

As a kindergartener Laura will be lucky if she has occasional access to a computer. She will have little chance to see movies, listen to tapes, or receive or make phone calls. If she does see a computer or other device, it will probably be in a tightly supervised situation in which she is told to perform narrowly defined tasks.

This would contrast sharply to her prior experiences in which she has had the time and trust to explore the computer or any other machine. At school things are certain to be quite different.

Some schools are now experimenting with what they call IEPs, Individualized Education Plans. But this is precisely what preschool kids experi-

ence before they ever reach school. Kids who are lucky enough to have the advantages that Laura has spend their days trooping all over the community with parents, babysitters, and nannies, attending courses at a variety of community organizations. They experience a well-rounded, highly satisfying version of school that takes place entirely outside of school walls.

Then these same kids turn five, and they enter school. They cross the threshold into the classroom, and they spend several hours each day cut off from the world they have explored so freely the first five years of their lives.

At home, if Laura wanted to contact her parents or grandparents, she would call them. If there were an emergency, she would dial 911. She has been taught that four years old is not too young to take charge of her life and to "reach out and touch someone."

At school, if Laura wanted to contact her parents or grandparents, she would be told this was improper. She would learn the value of patience. And isolation. And powerlessness. She would learn that five years old is not nearly as old as she had believed.

And what about children less advantaged than Laura? They never have the opportunity to experience the richness of the world—either personally or electronically—and never have the opportunity to make decisions on their own. Then they turn five and go directly from their disadvantaged world into a disadvantaged school.

(Next month, we'll look into new educational strategies which turn Laura's classroom into an open system—a classroom without walls—where children are able to practice skills and use tools they will need in tomorrow's world.) □

When children enter the classroom, they're cut off from the world that they have explored so freely for the first five years of their lives.

SUPER SCREEN FONTS

By Rick Kane

Have you ever noticed how nice text looks on a PC clone with an EGA display? The characters are clear and crisp, and they're also smoother and fuller than the Commodore character set. This is because the PC clone characters have twice the vertical resolution! It takes 16 bytes to define one of these characters instead of the 8 bytes per character we're used to looking at. Seems kind of unfair, doesn't it?

Well, we don't have to put up with it anymore. While it isn't generally known, the Commodore 128 is capable of using the same 8- x 16-pixel character sets as those high-priced PCs. Actually, a 128 can use up to 32 scan lines per character, but I'm getting ahead of myself! It's really no secret, but part of the trick involves using the 80-column (8563) chip's interlace mode, which results in twice the usual number of vertical pixels in the same space.

Not So Fast

The backbone of this entire capability is a feature known as interlace sync and video mode. Never mind the jargon. Video is displayed as two fields, one for even-numbered scan lines and one for odd-numbered. This is what we mean by the term *interlaced*. First one field is displayed, and as it fades, the other is displayed in the course of 1/30 second. If not for this setup, your eyes would see the top of the screen fade before the next frame could be drawn, resulting in less pleasing, and probably more tiring, television.

In normal display mode, most computers display only one field; the other is left blank. This is fine for most purposes because the characters displayed are very sharp and there is no clarity problem in skipping the alternate field. By selecting interlaced mode, however, the computer can display twice as many dots vertically.

One additional note here: The much-talked-about flicker associated with interlace mode on most computers happens because computers still display only one field every 1/30 second on alternate scan lines. True video and broadcast television display every 1/60 second. This means one field has a

much longer time to fade before the other field is displayed. A long-persistence monitor has phosphor on its CRT, which takes longer to fade out and helps to minimize the flicker.

Uses for Interlace Mode

Interlace can be used in a number of ways. One use is making super-high-resolution graphics, such as those possible with I Paint. One drawback is that the resulting 640- x 400-pixel screen requires 32000 bytes for just a monochrome graphic, far more than the 16K supplied with the original 128. (The 128D comes with 64K of video RAM.) Interlace can be invoked in text mode, however, and no extra memory is required.

If you have PaperClip, the Pocket series, Dialogue, Desterm, or SpeedScript 128 with SpeedSpell, you may have used a 50-row display mode. In this mode, these programs display 50 rows of 80 8 x 8 characters—nearly a full page of text. Now 4000 bytes are needed for screen memory, plus 4000 for color (attributes). Along with the 8K devoted to character definitions, this fits nicely into the 16K provided. An 80- x 50-row mode would also be handy in program editing, but it would require extensive rewriting of the screen editor, which would make this mode incompatible with most existing software.

As I said, there is another way. Thanks to the flexibility of the 8563, we can switch to 8 x 16 characters. This is just like the EGA characters of PC clones. This way, the screen editor still works with 25 rows of characters. It doesn't care how you've defined the characters. All it's concerned with is putting the right character code at the right position on screen. The 8563 takes care of the actual video rendition of the characters, much as the VIC chip does for 40 columns. As long as the program in question doesn't redefine the characters or reset the 8563, it will work just fine. And as you'll see, just a few modifications to SpeedScript 128 let you use your favorite word processor with more clarity than ever before!

A Little Demo

To get our initial 8 x 16 set, we'll use

the 8 x 8 character set as a starting point, doubling each byte (scan line). So, if the original data was ABCDEFGH, the new character would be AABBCDDDEEFFGGHH. At this point, the skeptics are asking, "Why do this? Won't the result look essentially like the noninterlaced 8 x 8 characters?" Well, yes and no. Type in Demo 8 x 16 and run it for a demonstration of 8 x 16 characters and a hint of the possibilities for a new character set.

Typing It In

Demo 8 x 16 is written entirely in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you attempt to run it.

The redefined characters in this demo give you some idea of the clarity involved with this mode. Not only do the characters look smoother, they allow more headroom between lines of text, giving a much cleaner overall look. After you run the demo, you can leave things as they are or reset the 128 by typing `SYS 57721: SYS 65378`.

Building Characters

SuperFont Editor lets you take full advantage of this mode's capability. It allows you to create your own 8 x 16 superfont, although it can be used to edit 8 x 8 fonts as well. An accompanying program provides the ability to quickly load your creations directly to the 80-column character definitions.

SuperFont Editor is a full-featured editor, with commands for copy, paste, reverse, range copy, and more. All this is possible on any 128, not just those with 64K of VDC RAM.

In accomplishing its assigned tasks, SuperFont Editor uses the power of BASIC 7.0 in some instructional ways. It uses both the underused WINDOW command (to give a more pleasing environment) and the little-known and nearly undocumented RREG command (one of the most powerful commands in Basic 7.0). SuperFont Editor also shows some other interesting features of the 8563, such as independent cursor control.

Typing More In

Program 2 is SuperFont Editor, the

main program. All Commodore control and color codes have been defined as variables to make it easier to type. Pay attention to spaces in quotes, because they affect the appearance of the screen.

Program 3, Autoheader.maker, is a program which creates the header for setting the screen to 8 x 16 and redefining the characters. After entering and saving the program, run it, and it will create a file that is called SFONT.AUTOHEADER. The superfont you create will be appended to this file later. Once again, use The Automatic Proofreader to enter these programs without typos.

Using SuperFont Editor

When you first run SuperFont Editor, you will be presented with the editing grid showing the first character of the first character set at the upper left. Below it, an information window shows the current character, its screen code, and the character set. At the upper right is a display of most of the commands available. In the lower right, the current character set is displayed.

First, let's talk about the function keys. Keys f1 and f2 are used to select the next higher or lower character in the set.

Press f3 to select a character by typing it in. You may press Ctrl-9 (reverse on) to edit the reverse image codes.

Press f4 to alternate between the uppercase/graphics character set (set 0) and the uppercase/lowercase set (set 1).

Press f5 to toggle 8 x 8 or 8 x 16 character mode. It doesn't do anything to the character set itself. With certain monitors, such as the 1902A and some 1084 series, the 8 x 16 mode will look fuzzy. If it does, press Alt-f5 to try 8 x 15 characters. Because of internal differences in some monitors, the characters should now look sharper.

Press f6 either to double the data in an 8 x 8 character set, giving a low-res 8 x 16 set to start from, or to restore the system character set. If you change back to 8 x 8 mode after doubling the character set, you will see just the top half of the 8 x 16 font. Everything still works; you just can't really read the screen.

Press f7 to load a previously saved

8 x 16 character set for further editing. You can get a directory by typing \$ for the filename. The No Scroll key holds the directory listing. If the name you want scrolls off the screen, press Stop to return to the filename query before the directory is finished.

Press f8 to save your work. This command saves the entire character set. It requires 33 free blocks on a disk.

Editing

Use the cursor keys to move around the editing grid. The Return key moves the cursor down one and all the way left. Full wrap is supported in all directions. The Home key takes you to the upper left, while Clr creates a blank character. The space bar toggles the pixel under the cursor on or off. The cursor doesn't advance on its own; you must move it yourself.

Use C to copy the current definition into a buffer, and use P to paste it in the place of a different character. This is very useful in quickly getting a start on similar characters. Press the Control key and 9 simultaneously to reverse the bit pattern of a character. This is useful after pasting a character to its reverse equivalent.

The # key can be used to enter a character by its screen code; this is particularly helpful for the comma, colon, and other characters which can't be entered from the 128's keyboard input routine.

Press O to access two additional options. Here, you can copy your normal characters to the reverse video characters within a set. This will save a lot of work! The second option lets you copy a range of characters from one set to the other. This is very flexible and fast.

To exit SuperFont Editor, press Run/Stop. A small red window just above the lower left info window will ask if you really want to exit. Press Y to confirm.

That's It

When you've finished creating and saving an 8- x 16-character font, you'll want to be able to load it in and select 8 x 16 mode painlessly. This is accomplished with the Sfont.autoheader program, the third program in this series.

You must append your font file to the end of the Sfont.autoheader, creating a file that can be run from BASIC.

To do this, use the following command.

```
OPEN 15,DRIVE,15, "CO:FILENAME=
SFONT.AUTOHEADER,Fontfile":CLOSE15
```

FILENAME is the resulting filename, and FONTFILE is whatever you named the font file you wish to install. Now run the new program. Your display will be set to interlaced, and the 8- x 16-character set will be loaded into the 8563S character memory.

If you get the fuzzy display mentioned earlier, list the program. Change SYS 7220,15 to SYS 7220,14 and resave the program. Don't change the length of the BASIC line, or the program will not work.

You may want to adjust your screen colors to minimize the flicker. Lowering the contrast and brightness settings can help, too, or invest in one of the dark Plexiglass panels to fit over your screen.

That's all there is to it! Once you've become used to a superfont, you won't want to go back. You'll have to, though, in some cases. This mode is not compatible with programs that use 50-row display or preview. You must disable the 8 x 16 characters first, by typing SYS 57721: SYS 65378.

DEMO 8 x 16

```
XA 50 REM COPYRIGHT 1993 -COMP
    UTER PUBLICATIONS INTL L
    TD - ALL RIGHTS RESERVED
XA 100 REM 8X16 INTERLACED CHA
    RACTER DEMO BY RICK KAN
    E
ME 110 FAST:WR=DEC("CDCC")
HK 120 PRINTCHR$(147)CHR$(14) "
    8 X 16 INTERLACED CHA
    CTER DEMO"
JP 130 PRINT:PRINT"IF SCREEN R
    OLLS OR IS FÜZZY, PRESS
    SPACE"
RF 140 A=15:GOSUB500:PRINT"PRE
    SS ANY OTHER KEY TO CON
    TINUE"
AD 150 DO:GETKEYK$:IFK$<>" "TH
    EN EXIT
HJ 160 A=15+(A=15):GOSUB500:LO
    OP
CF 170 PRINTCHR$(145)CHR$(145)
    CHR$(27)"@":GOSUB1290:S
    YS4864
QB 180 PRINT:PRINTCHR$(2)"THIS
    IS THE STANDARD CHÄRAC
    TER SET:";TAB(50);"ABCD
    EABCDE
JJ 190 PRINTTAB(50);"ABCDEABCD
```

```

E
RS 200 PRINT:PRINT"PRESS A KEY
...":GETKEYK$
DJ 220 PRINTCHR$(145)CHR$(2)"U
SE SUPER FONT EDITOR TO
MAKE FINER CHARACTERS:
";TAB(50);CHR$(142)"ABC
DEABCDE"
BJ 230 PRINTTAB(50);"ABCDEABCD
E";CHR$(14)
QG 240 GOSUB1480
FF 490 END
QM 500 SYSWR,1,36:SYSWR,3,8:SY
SWR,A,9:SYSWR,A,11:SYSW
R,A,23:SYSWR,A,29:RETUR
N
HB 1280 :
QD 1290 A$="":RESTORE:I=DEC("1
300"):READ A$:DO UNTIL
A$="END":POKE I,DEC(A
$):I=I+1:READ A$:LOOP:
RETURN
EX 1300 DATA 20,0F,13,A9,20,85
,FA,A9,00,85,FB,85,FC,
F0,19,A9
MF 1310 DATA 30,85,FA,A9,00,85
,FB,85,FC,F0,0D,A2,12,
20,DA,CD
PA 1320 DATA 85,FA,E8,20,DA,CD
,85,FB,A5,FA,A2,12,20,
CC,CD,E8
QP 1330 DATA A5,FB,20,CC,CD,A0
,00,20,DB,CD,99,00,14,
C8,C0,08
PS 1340 DATA D0,E5,A5,FA,A2,12
,20,CC,CD,A5,FB,E8,20,
CC,CD,A0
QK 1350 DATA 00,B9,00,14,20,CA
,CD,20,CA,CD,C8,C0,08,
D0,F2,E6
ED 1360 DATA FC,A6,FC,D0,B6,60
,END
FK 1480 RESTORE 1500:SYSWR,36,
18:SYSWR,16,19:FORI=0T
O79:READA$:SYSWR-2,DEC
(A$):NEXT
PH 1490 SYSWR,32,18:SYSWR,16,1
9:FORI=0TO79:READA$:SY
SWR-2,DEC(A$):NEXT:RET
URN
PG 1500 DATA 00,00,10,38,6C,C6
,C6,FE,C6,C6,C6,C6,00,
00,00,00
HA 1510 DATA 00,00,FC,66,66,66
,7C,66,66,66,66,FC,00,
00,00,00
QE 1520 DATA 00,00,3C,66,C2,C0
,C0,C0,C0,C2,66,3C,00,
00,00,00
XA 1530 DATA 00,00,F8,6C,66,66
,66,66,66,66,6C,F8,00,
00,00,00
EG 1540 DATA 00,00,FE,66,62,68
,78,68,60,62,66,FE,00,
00,00,00
JX 1550 DATA 00,00,00,00,00,78
,0C,7C,CC,CC,CC,76,00,

```

```

00,00,00
HQ 1560 DATA 00,00,E0,60,60,78
,6C,66,66,66,66,7C,00,
00,00,00
HP 1570 DATA 00,00,00,00,00,7C
,C6,C0,C0,C0,C6,7C,00,
00,00,00
BP 1580 DATA 00,00,1C,0C,0C,3C
,6C,CC,CC,CC,CC,76,00,
00,00,00
KP 1590 DATA 00,00,00,00,00,7C
,C6,FE,C0,C0,C6,7C,00,
00,00,00

```

SUPERFONT EDITOR

```

PH 100 REM COPYRIGHT 1993 - CO
MPUTE PUBLICATIONS INTL
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VED
DK 110 REM WRITTEN BY RICK KAN
E
HJ 120 :
XH 130 TRAP 210
QH 140 FAST:GOSUB3000:GOSUB270
:GOSUB390:GOSUB2010
CD 150 GOSUB1220:DO:DO:GETKEYK
$:K=INSTR(MN$,K$):LOOP
{SPACE}UNTIL K
DE 160 ON K GOSUB 1260,1290,13
20,1350,1440,1220,1530,
1040,1060,1120,1090,206
0,2120,1850,1750,1590,1
620,2330,1170,1680,1380
GK 170 LOOP
BB 180 END
PR 190 :
GJ 200 REM ERROR TRAP
DD 210 IF EL=1970 THEN RESUME
{SPACE}NEXT:REM DIRECTO
RY
FM 220 IF EL>1759AND EL<1950TH
EN RESUME 1920:REM LOAD
/SAVE
ES 230 GOSUB550:PRINTC$LR$:IN
PUT"EXIT Y/N";EX$:IFEX$
<>"Y"THEN PRINTLB$C$S$:G
OSUB 1220:RESUME
AQ 240 PRINTLG$H$M$H$C$S$E$L"E
$N";:END
RA 250 :
GX 270 DIMD(15),C(15),D$(15),C
$(15),PX$(2),PC$(1):WR=
DEC("CDCC"):RR=DEC("CDD
A"):WM=WR-2:RM=RR-2:VD=
15:CO=0:CS=0
AG 280 E$=CHR$(27):DL$=CHR$(20
):IN$=CHR$(148):RT$=CHR
$(29):LT$=CHR$(157):DNS
=CHR$(17):UP$=CHR$(145)
:CR$=CHR$(13):SP$=CHR$(
32):HM$=CHR$(19):CS$=CH
R$(147)
JF 290 LC$=CHR$(14):UC$=CHR$(1
42):UL$=CHR$(2):UO$=CHR
$(130):FL$=CHR$(15):FO$
=CHR$(143):RV$=CHR$(18)
:RO$=CHR$(146):FORI=0TO

```

```

13:RR$=RR$+RT$:NEXT
AE 300 DB$=CHR$(31):LR$=CHR$(1
50):DG$=CHR$(152):GR$=C
HR$(153):LB$=CHR$(154):
LG$=CHR$(155):YL$=CHR$(
158):CY$=CHR$(159)
GK 310 PX$(0)=LG$+SP$+CHR$(167
):PX$(1)=DG$+SP$+CHR$(1
67):FORI=0TO7:PX$(2)=PX
$(2)+PX$(0):NEXT:PC$(0)
=CHR$(155):PC$(1)=CHR$(
152):EW=1:CA=82
SD 320 FORI=0TO15:C$(I)=PX$(2)
:NEXT
CP 330 FK$="{8 SPACES}":FORI=0
TO1:FORK=0TO3:F$=CHR$(1
33+4*I+K):KEY(I+1+2*K),
F$:MID$(FK$,I+1+2*K,1)=
F$:NEXT:NEXT
RX 340 MN$=DN$+RT$+UP$+LT$+SP$
+HM$+CS$+F$(0)+FK$+"CPO
#" +RV$+CR$
QF 350 POKE2603,64:REM TURN ON
CURSOR
XR 360 RETURN
JJ 370 :
JB 380 REM SCREEN SETUP
FS 390 COLOR6,7:PRINTLCS$E"M"E
$R"LB$H$M$H$C$S$;
RJ 400 WINDOW 40,1,64,5,1:PRIN
TDN$LT$"{I}"RV$DN$LT$SP
$DN$LT$SP$DN$LT$SP$S"
$25 I}"RO$;
XH 410 PRINTCY$;:WINDOW 39,1,6
3,4,1
AC 420 PRINTDN$TAB(4)"SUPER FO
NT EDITOR":PRINTTAB(3)D
N$"<C> 1993 COMPUTE"E$"
L";
RP 430 GOSUB830:GOSUB470
BB 440 RETURN
PR 450 :
FA 460 REM EDIT WINDOW
ER 470 GOSUB760:GOSUB570
KB 480 PRINTE$M"DB$;:IFEW THE
N WINDOW 4,2,19,17,1
KB 490 PRINTLG$;:WINDOW 2,1,17
,16,EW
AQ 500 GOSUB960:PRINTH$LC$SUO$
;
BC 510 EW=0:PRINTLG$;:RETURN
RB 520 :
GG 530 PRINTLBS;:WINDOW 25,19,
78,24:PRINTDN$LT$"{I}"R
V$DN$LT$SP$DN$LT$SP$DN$
LT$SP$DN$LT$SP$S"{54 I}"
RO$;
GK 540 PRINTLBS;:WINDOW 24,19,
77,23:RETURN
DQ 550 PRINTLBS;:WINDOW 2,19,2
0,19:RETURN
RE 560 :
AF 570 WINDOW 21,4,36,18
KM 580 PRINTE$M"LG$SP$S"C"SP$L
B$"{I}-COPY
AM 590 PRINTSP$RV$S"{3 I}
BS 600 PRINTLG$SP$S"P"SP$LBS"

```

PROGRAMS

```

    {I}-PASTE
FM 610 PRINTSP$RV$"{3 I}
AJ 620 PRINTLG$RT$SP$"CLR"SP$LB
    B$"{I}
RG 630 PRINTLG$RT$SP$"HOME"LB$
    RV$SP$
EJ 640 PRINTSP$SP$RV$"{5 I}
EB 650 PRINTLG$SP$"SPACE"SP$LB
    S$"{I}-ON/OFF
AH 660 PRINTSP$RV$"{7 I}
QA 670 PRINTLG$"CTRL"LB$"{I}"L
    G$SP$"9"SP$LB$"{I}-REVR
    SE
ED 680 PRINTSP$RV$"{4 I}"RT$"
    {3 I}
BQ 690 PRINTLG$SP$"# "SP$LB$
    {I}-CHARCODE #
CG 700 PRINTSP$RV$SE$"Q{3 I}
HS 710 PRINTLG$SP$"O"SP$LB$
    {I}-OPTIONS
DB 720 PRINTSP$RV$SE$"Q{3 I}"RO
    S;
BF 730 RETURN
XX 740 :
PK 750 REM INFO
BE 760 PRINTDB$;:WINDOW 4,21,1
    9,23,1
CM 770 PRINTYLS;:WINDOW 2,20,1
    7,22,1
CF 780 PRINTUO$LC$SP$"CHARACTE
    R:"SP$CHR$(142-128*CS)S
    P$LT$LT$SP$LC$;:SYSWM,C
    O:PRINT
ED 790 PRINTTAB(5)"CODE ";STR
    $(CO):PRINTTAB(6)"SET :
    ";CS;
CK 800 RETURN
KD 810 :
BD 820 REM MENU
AD 830 WINDOW38,6,79,24
CJ 840 PRINTLG$F1{2 SPACES}":
    PRINT"{2 SPACES}--"DG$
    -"LB$"- FORWARD 1 CHARA
    CTER"
SM 850 PRINTRT$DG$F2 -"LB$"--
    BACK 1 CHARACTER "
JE 860 PRINTLG$F3{2 SPACES}":
    PRINT"{2 SPACES}--"DG$
    -"LB$"- SELECT FROM KEY
    BOARD"
AQ 870 PRINTRT$DG$F4 -"LB$"--
    ALTERNATE CHARACTER SE
    T
RX 880 PRINTLG$F5 -"LB$"-- SE
    LECT 8/16 SCANLINES
DB 890 PRINTLG$F{2 SPACES}--"D
    G$"- "LB$"- "LG$"+ALT "L
    B$"- TOGGLE 16/15
JR 900 PRINTRT$DG$F6 -"LB$"--
    DOUBLE OR RESTORE 8-LI
    NE FONT "
CB 910 PRINTLG$F7{2 SPACES}":
    PRINT"{2 SPACES}--"DG$
    -"LB$"- LOAD FONT"
HG 920 PRINTRT$DG$F8 -"LB$"--
    SAVE FONT "
MB 930 RETURN
AQ 940 :
FP 950 REM GET CHARACTER DATA
HG 960 AD=DEC("2000")+16*(CS*2
    56+CO):AH=INT(AD/256):A
    L=AD-256*AH
SX 970 SYSWR,AH,18:SYSWR,AL,19
JX 980 FORI=0TO15:SYSRM:RREG D
    (I):NEXT
XR 990 FORI=0TO15:D$(I)="" :FOR
    B=7TO0STEP-1:D$(I)=D$(I
    )+PX$(-(D(I)AND2↑B)>0)
    ):NEXT
RH 1000 PRINTRT$LT$;:WINDOW 2,
    1+I,17,1+I:PRINTUL$D$(
    I);:NEXT:PRINTUO$;
DS 1010 RETURN
CA 1020 :
PD 1030 REM FORWARD
ME 1040 CO=(CO+1)AND255:GOSUB4
    70:GOTO1220
JK 1050 REM BACK
KF 1060 CO=CO-1:IFCO<0THENCO=2
    55
FA 1070 GOSUB470:GOTO1220
PH 1080 REM ALT CHARSET
HD 1090 CS=-(CS=0):GOSUB470:GO
    SUB2010:GOTO1220
GF 1100 :
XQ 1110 REM KEYBOARD ENTRY
XG 1120 PRINTYLS$E"M";:WINDOW
    {SPACE}2,20,17,20,1
GS 1130 PRINTUO$ " CHARACTER"CH
    R$(142-128*CS);:INPUTC
    H$
FS 1140 PRINTHM$TAB(11)":":SY
    SRM:RREGCO:GOSUB470:GO
    TOL220
FK 1150 :
GD 1160 REM GET CHAR CODE
BX 1170 PRINTYLS$E"M";:WINDOW
    {SPACE}2,21,17,21,1
CX 1180 C=-1:PRINTUO$
    {5 SPACES}CODE ";:INPU
    TC:IFC<256ANDC>0THENCO
    =C
FJ 1190 GOSUB470:GOTO1220
AP 1200 :
HB 1210 REM HOME CURSOR
AX 1220 PRINTES"M";:WINDOW 2,1
    ,17,16:R=0:C=7
GX 1230 SYSWR,64,10:RETURN
QS 1240 :
HQ 1250 REM DOWN
CJ 1260 R=R+1:IFR>15THENR=0
FB 1270 GOTO1400
EC 1280 REM RIGHT
ES 1290 C=C-1:IFC<0THENC=7:R=R
    +1:IFR>15THENR=0
MB 1300 GOTO1400
CQ 1310 REM UP
AD 1320 R=R-1:IFR<0THENR=15
DC 1330 GOTO1400
AP 1340 REM LEFT
SH 1350 C=C+1:IFC>7THENC=0:R=R
    -1:IFR<0THENR=15
QE 1360 GOTO1400
GD 1370 REM RETURN KEY
MK 1380 C=7:R=R+1:IFR>15THENR=
    0
MK 1390 :
KC 1400 PRINTRT$LT$;
GX 1410 WINDOW 2,1+R,17,1+R:PR
    INT RT$ LT$ LEFT$(RR$,
    14-2*C);:RETURN
FK 1420 :
RA 1430 REM TOGGLE PIXEL
QB 1440 PX=-((D(R)AND2↑C)=0):P
    RINTUL$PX$(PX)UO$;:GOS
    UB1410
KF 1450 MID$(D$(R),22-3*C,3)=P
    X$(PX):D(R)=XOR(D(R),2
    ↑C)
DK 1460 REM WRITE TO VDC
HM 1470 AD=DEC("2000")+R+16*(C
    S*256+CO):AH=INT(AD/25
    6):AL=AD-256*AH
JS 1480 SYSWR,AH,18:SYSWR,AL,1
    9
KA 1490 SYSWM,D(R)
EX 1500 RETURN
SX 1510 :
GF 1520 REM CLEAR
XD 1530 AD=DEC("2000")+16*(CS*
    256+CO):AH=INT(AD/256)
    :AL=AD-256*AH
JF 1540 GOSUB1220:FORI=0TO15:D
    $(I)=PX$(2):D(I)=0:PRI
    NTUL$D$(I);:NEXT:PRINT
    UO$;
PM 1550 SYSWR,AH,18:SYSWR,AL,1
    9
DF 1560 FORI=0TO15:SYSWM,D(I):
    NEXT:GOTO1220
RE 1570 :
RE 1580 REM COPY
DB 1590 GOSUB550:PRINTGR$CSSDN
    $"COPYING...":FORI=0TO
    15:C$(I)=D$(I):C(I)=D(
    I):NEXT:PRINTLB$CSS$:GO
    TOL220
GE 1600 :
AH 1610 REM PASTE
GE 1620 AD=DEC("2000")+16*(CS*
    256+CO):AH=INT(AD/256)
    :AL=AD-256*AH
PF 1630 GOSUB1220:FORI=0TO15:D
    $(I)=C$(I):D(I)=C(I):P
    RINTRT$LT$;:WINDOW2,1+
    I,17,1+I:PRINTUL$D$(I)
    );:NEXT
BE 1640 SYSWR,AH,18:SYSWR,AL,1
    9
MD 1650 FORI=0TO15:SYSWM,D(I):
    NEXT:GOTO1220
EK 1660 :
FC 1670 REM REVERSE
HJ 1680 AD=DEC("2000")+16*(CS*
    256+CO):AH=INT(AD/256)
    :AL=AD-256*AH
HM 1690 GOSUB1220:FORI=0TO15:D
    (I)=XOR(D(I),255):D$(I
    )="" :FORB=7TO0STEP-1:D
    $(I)=D$(I)+PX$(-(D(I)
    AND2↑B)>0):NEXT

```

```

SG 1700 PRINTRT$LT$;:WINDOW 2,
1+I,17,1+I:PRINTULSD$(
I);:NEXT
CA 1710 SYSWR,AH,18:SYSWR,AL,1
9
ES 1720 FORI=0TO15:SYSWM,D(I):
NEXT:GOTO1220
FR 1730 :
HF 1740 REM SAVE
DX 1750 F$="":GOSUB540:PRINTGR
$CSSDN$ SAVE:"INPUT"
FILENAME";F$:IF F$="
THEN1820
BH 1760 INPUT" DEVICE #";DR:IF
DR<8ORDR>15THEN1820
SR 1770 AD=DEC("2000"):AH=INT(
AD/256):AL=AD-256*AH
HM 1780 SYSWR,AH,18:SYSWR,AL,1
9
BB 1790 OPEN 2,DR,2,F$+" ,U,W":
A=DS:A$=DSS:IFATHEN181
0
PM 1800 SYSDEC("1386")
EJ 1810 CLOSE2:PRINTA$:SLEEP2
JD 1820 GOSUB2010:GOTO1220
JE 1830 :
EA 1840 REM LOAD
PE 1850 GOSUB540:F$="":DR=0:PR
INTGR$CSSDN$ LOAD: "
INPUT" DEVICE #";DR:IF
DR<8ORDR>15THEN1930
SF 1860 PRINTDN$ENTER '$' FOR
DIRECTORY"UP$UP$:INPU
T"FONT FILE TO LOAD";F
$
GF 1870 IF F$="$"THEN GOSUB196
0:GOTO1850:ELSE IF F$=
"THEN 1930
DG 1880 AD=DEC("2000"):AH=INT(
AD/256):AL=AD-256*AH
KE 1890 PRINTE$M";:GOSUB2010:
SYSWR,AH,18:SYSWR,AL,1
9
JA 1900 OPEN 2,DR,2,F$:A=DS:D$
=DSS:IFATHEN1920
QX 1910 SYSDEC("1366")
FA 1920 CLOSE2:PRINTHM$LRSD$;:
SLEEP2
SP 1930 EW=1:GOSUB390:GOSUB201
0:GOTO1220
XP 1940 :
JQ 1950 REM DIRECTORY
DX 1960 PRINTDB$;:WINDOW 51,1,
78,18,1:PRINTYLS$"L";
:WINDOW 49,0,76,17,1:P
RINTLR$" PRESS NO SCRO
LL TO PAUSE"E$"Q"YLS$CR
$E$"T"
MR 1970 CATALOG ON U(DR)
GX 1980 RETURN
QX 1990 :
KF 2000 REM DISPLAY CHARSET
GR 2010 GOSUB530:PRINTLG$CHR$(
142-128*CS);CS$;
MA 2020 FORI=0TO4:PRINTSP$;:FO
RJ=0TO51:SYSWM,(J+51*I
)AND255:NEXT:PRINTCR$;
: NEXT
FA 2030 PRINTLC$;:RETURN
DA 2040 :
ER 2050 REM TOGGLE 8/16 SCANLI
NE SCREEN
ME 2060 IF VR=LAND (PEEK(211)A
ND8)>0 THEN VD=14-(VD=
14):GOTO2080
FQ 2070 IF VR THEN 2090
DH 2080 VR=1:SYSWR,1,36:SYSWR,
3,8:SYSWR,VD,9:SYSWR,V
D,11:SYSWR,VD,23:SYSWR
,VD,29:RETURN
BP 2090 VR=0:SYSWR,0,8:SYSWR,7
,9:SYSWR,7,11:SYSWR,7,
23:SYSWR,7,29:RETURN
BD 2100 :
SF 2110 REM DOUBLE CHARACTER D
ATA SIZE
QH 2120 GOSUB540:PRINTYLS$CSSDN
$ SELECT : "RV$D"RO$
" - DOUBLE 1ST EIGHT L
INES":PRINTTAB(10)RV$
R"RO$" - RESTORE SYSTE
M FONT:PRINT"
{2 SPACES}ANY OTHER KE
Y ABORTS..."
DC 2130 GETKEYK$:IFK$="R"THENG
OSUB2010:SYSDEC("FF62"
):GOTO2200
BS 2140 IFK$<"D"THEN GOSUB201
0:GOTO2200
BM 2180 GOSUB2010
GB 2190 SYSDEC("1300")
DR 2200 GOSUB470:GOTO1220
XB 2310 :
AB 2320 REM OPTIONS
CE 2330 GOSUB540:PRINTLG$CSSYL
$ OPTIONS:"LGS
PRINTTAB(10)RV$R"RO$"
- COPY NORMAL TO "RV$
"REVERSE"RO$" CHARACTE
RS"
BX 2350 PRINTTAB(10)RV$T"RO$"
- TRANSFER BETWEEN CH
ARACTER SETS"
JC 2360 GETKEYK$:IFK$<"R"ANDK
$<"T"THEN GOSUB2010:G
OTO2380
KQ 2370 ONINSTR("RT",K$)GOSUB2
410,2510
PH 2380 GOTO1220
HH 2390 :
MJ 2400 REM COPY TO REVERSE VI
DEO CHARSET
RJ 2410 GOSUB2010
DQ 2420 FORCO=0TO127:AD=DEC("2
000")+16*(CS*256+CO):A
H=INT(AD/256):AL=AD-25
6*AH
QF 2430 SYSWR,AH,18:SYSWR,AL,1
9
KP 2440 FORI=0TO15:SYSRM:RREG
{SPACE}D(I):NEXT
JA 2450 AD=DEC("2000")+16*(CS*
256+CO+128):AH=INT(AD/
256):AL=AD-256*AH
HD 2460 SYSWR,AH,18:SYSWR,AL,1
9
AK 2470 FORI=0TO15:SYSWM,XOR(D
(I),255):NEXT
XE 2480 NEXT:RETURN
RS 2490 :
RM 2500 REM TRANSFER BETWEEN C
HARSETS
SB 2510 GOSUB540:PRINTLG$CSS$T
RANSFER BETWEEN CHARAC
TER SETS":INPUT"SOURCE
SET";S:IFS<0ORS>1THEN
2610
KM 2520 INPUT"FIRST SOURCE COD
E";FC:IFFC<0ORFC>255TH
EN2010
SX 2530 INPUT" LAST SOURCE COD
E";LC:IFLC<FCORLC>255T
HEN2010
XH 2540 INPUT"1ST DESTINATION
{SPACE}CODE";DC:IFDC<0
ORDC>255-LC-FCTHENPRIN
TUP$E$Q";:GOTO2540
XM 2550 CS=- (S=0):GOSUB2010
XS 2560 SA=DEC("2000")+16*(S*2
56+FC):SH=INT(SA/256):
SL=SA-256*SH
FE 2570 DA=DEC("2000")+16*(CS*
256+DC):DH=INT(DA/256)
:DL=DA-256*DH
JC 2580 SYSWR,DH,18:SYSWR,DL,1
9
KK 2590 SYSRR,,24:RREG:SYSWR,
A OR128,24:SYSWR,SH,32
:SYSWR,SL,33
BH 2600 FORI= FC TO LC:SYSWR,1
6,30:NEXT
HC 2610 RETURN
BF 3000 RESTORE:I=4864:DO:READ
A$:IFA$="END" THEN EXI
T
AE 3010 POKEI,DEC(A$):I=I+1:LO
OP:RETURN
HC 3020 DATA 20,0F,13,A9,20,85
,FA,A9,00,85,FB,85,FC,
F0,19,A9
CJ 3030 DATA 30,85,FA,A9,00,85
,FB,85,FC,F0,0D,A2,12,
20,DA,CD
JE 3040 DATA 85,FA,E8,20,DA,CD
,85,FB,A5,FA,A2,12,20,
CC,CD,E8
CQ 3050 DATA A5,FB,20,CC,CD,A0
,00,20,D8,CD,99,00,04,
C8,C0,08
JC 3060 DATA 00,F5,A5,FA,A2,12
,20,CC,CD,A5,FB,E8,20,
CC,CD,A0
RC 3070 DATA 00,B9,00,04,20,CA
,CD,20,CA,CD,C8,C0,08,
D0,F2,E6
JB 3080 DATA FC,A6,FC,D0,B6,60
,A2,00,86,FB,86,FA,A2,
02,20,C6
XQ 3090 DATA FF,20,CF,FF,20,CA
,CD,E6,FA,D0,F6,E6,FB,
A6,FB,E0

```

PROGRAMS

```
MF 3100 DATA 20,90,EE,4C,CC,FF
,A2,00,86,FB,86,FA,A2,
02,20,C9
JQ 3110 DATA FF,20,D8,CD,20,D2
,FF,E6,FA,D0,F6,E6,FB,
A6,FB,E0
DD 3120 DATA 20,90,EE,4C,CC,FF
,END
```

AUTOHEADER.MAKER

```
PK 5 REM COPYRIGHT 1993 - COMP
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FQ 10 REM SUPERFONT AUTOHEADER
MAKER
FP 20 INPUT "DESTINATION DEVIC
E";DD:IFDD<8ORDD>30THEN2
0
AC 30 OPEN2,DD,2,"SFONT.AUTOHE
ADER,P,W"
JF 40 RESTORE:DO:READ A$:IFA$=
"END"THEN EXIT
ES 50 PRINT#2,CHR$(DEC(A$));:L
OOP
KX 60 FORI=0TO112:PRINT#2,CHR$(
96);:NEXT:CLOSE2
GB 1000 DATA 01,1C,31,1C,0A,00
,9E,37,32,32,30,2C,31,
35,3A,8F
MQ 1010 DATA 20,53,55,50,45,52
,46,4F,4E,54,20,41,55,
54,4F,4C
GS 1020 DATA 4F,41,44,20,28,43
,29,20,52,49,43,4B,20,
4B,41,4E
AH 1030 DATA 45,00,00,00,00,AA
,AD,30,D0,48,09,01,8D,
30,D0,8A
GJ 1040 DATA 48,A2,24,A9,01,20
,CC,CD,A2,08,A9,03,20,
CC,CD,68
AG 1050 DATA A2,09,20,CC,CD,A2
,0B,20,CC,CD,A2,17,20,
CC,CD,A2
CS 1060 DATA 1D,20,CC,CD,A2,13
,A9,00,20,CC,CD,CA,A9,
20,20,CC
KR 1070 DATA CD,A9,1D,85,FB,A9
,00,85,FA,A0,00,B1,FA,
20,CA,CD
PP 1080 DATA C8,D0,F8,E6,FB,A5
,FB,C9,3D,D0,F0,68,8D,
30,D0,60,END
```

Rick Kane is the author of *I Paint*, a trademark of Living Proof, Ltd.

SCRIPT FIX

By Rick Kane

If you looked at the previous article on Super Screen Fonts, you know how this enhanced character mode can sharpen the onscreen text of a 128 from 8 x 8 pixels to 8 x 16 pixels. Wouldn't it be great to take advantage of this enhanced mode

when using SpeedScript 128, COMPUTE's word processing program? You can with Script Fix and Super Screen Fonts.

Script Fix is written in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save the program before you attempt to run it.

Modifying SpeedScript

When you run Script Fix, it will ask for a copy of SpeedScript 128 to load and modify. If you already use one of the SpeedScript enhancement programs such as SpeedSpell, start with an unmodified version of SpeedScript. If the patch program doesn't find the expected bytes where the patch goes, it will abort. If it is successful, Script Fix will ask for a filename for the modified version. The program will suggest adding SF to the source file's name, truncating it if it's longer than 16 characters.

When all done, run your installation program to set up the 8 x 16 characters. Then run the modified SpeedScript. It's beautiful!

SpeedScript with superfonds should be compatible with other add-ons to SpeedScript 128, especially if they are installed after the superfond fix. There is one certain caveat: Don't try to use the 50-row mode of SpeedSpell, or your screen will turn to garbage.

SCRIPT FIX

```
GJ 50 REM COPYRIGHT 1993 - COMP
UTE PUBLICATIONS INTL L
TD - ALL RIGHTS RESERVED
PX 100 DV=PEEK(186):IFDV<8THEN
DV=8
CQ 110 GRAPHIC CLR:G=RGR(0):GR
APHIC 1:GRAPHIC G
HH 120 TRAP 265:PRINTCHR$(147)
" SPEEDSCRIPT 128 : SUPE
RFONT FIX"
HX 130 F$="SPEEDSCRIPT 128"
JQ 140 PRINT "LOAD FILENAME
{2 SPACES}"+F$+CHR$(27)
+"J";TAB(13);:INPUT N$
XH 150 PRINT "FROM DEVICE ";DV
;CHR$(27)"J";TAB(11);:I
NPUT FD
PF 160 IF FD<8 OR FD>30 THEN 1
50
CB 170 SF$=LEFT$(N$,13)+"SF"
XQ 180 PRINT "LOADING...":BLOAD
(N$),B0,P(DEC("1C01"))
GB 190 IFPEEK(174)+PEEK(175)*2
56<>13578 THEN PRINT "I
```

```
{SPACE}DON'T KNOW THIS
{SPACE}VERSION!":GRAPHI
CCLR:END
RK 200 PRINT"PATCHING...":REST
ORE:DO:READ ADR:IF ADR<
0 THEN EXIT
XA 210 READ BYTES:FORI=0TO BY
TES:READ WAS,IS:IF PEEK
(ADR+I)<>WAS THEN 280
FK 220 POKE ADR+I,IS:NEXT:LOOP
HB 230 PRINT"SUCCESSFUL!":PRIN
T "SAVE FILENAME
{2 SPACES}"+SF$+CHR$(27)
+"J";TAB(13);:INPUT N$
KQ 240 PRINT "TO DEVICE ";FD;C
HR$(27)"J";TAB(9);:INPU
T TD
ED 250 IF TD<8 OR TD>30 THEN 2
40
HJ 260 PRINT"SAVING...":BSAVE(
N$),B0,P(7169)TO P(1357
8),U(TD)
XM 265 IF DS THEN PRINTDS$
EG 270 GRAPHICCLR:END
DR 280 PRINT"UNEXPECTED BYTES
{SPACE}FOUND!":GRAPHIC
CLR:END
BJ 290 DATA 7182,0,32,44
JK 300 DATA 7862,8,120,32,169,
86,1,224,141,32,4,0,10,
192,76,108,83,0,250,10
PK 310 DATA -1
```

Rick Kane is an independent video and film cameraman who lives in Minneapolis, Minnesota.

DOUBLE SIZE

By Rick Kane

Here's another program in which the 8 x 16 characters can be used on a 128. Be sure to start reading the Super Screen Fonts program in this issue for full details.

In noninterlaced mode, the 8 x 16 characters are twice as tall as regular characters. In combination with pixel double-width mode, they can be made twice as wide as well. The end result is a screen 40 characters wide and 12 characters tall.

This added size might be useful for in-store advertising displays, giving your eyes a rest while programming, or allowing everyone to sit back instead of huddling around the monitor at computer club meetings!

Double Size is written entirely in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you attempt to run it.

Bigger Text

If you run Double Size without first installing an 8 x 16 character set created from Super Font, you'll get the standard characters with double line spacing—a result which might have some uses of its own. Normally, you'll want to install your favorite set or create one especially for use in double-size mode.

This program is compatible with the screen editor as long as you don't define a new window or undefine the window by pressing Home twice. Your BASIC programs, program listings, and directories will work normally. Again, reset to normal by typing `SYS 57721:SYS 65378`.

Beyond Big

These techniques aren't limited to 8 x 16 characters. You could easily define characters that are 8 x 9, 8 x 12, or even 8 x 5 if you wanted. You'd have to adjust the total number of screen rows displayed (8563 registers 4, 6, 7, and 9 particularly) according to your needs.

With a little more difficulty, you can go beyond 16, up to 8 x 32-pixel characters! Above 16, though, character memory is handled differently. The system automatically allocates 16 bytes per character for any character set 8 x 16 or smaller. Above that, it switches to 32 bytes per character, so you need to reposition the start of each definition at 32-byte intervals, instead of 16-byte intervals. Also, note that one 256-byte character set now takes 8192 bytes. This means that for all practical purposes, you can use only one character set if you want to have any memory for display and attributes!

To try out even larger text, type in Beyond Big. It is also written in BASIC and should be entered with The Automatic Proofreader.

Save the program and then run it. Beyond Big asks for an 8 x 16 superfont file to read. Then it asks which character set to use. Character set 0 is uppercase/graphics, and set 1 is uppercase/lowercase. The file is read and then automatically doubled for 8 x 32-pixel characters.

Then the screen is set for a 40-column by 6-row screen! That's not a lot of space, but, as usual, the screen edi-

tor works normally. Colors, blink, underline, and so on are all available for scrolling, crawling text, or other clever (and big) displays.

DOUBLE SIZE

```
BM 0 REM COPYRIGHT 1993 - COMP
    UTE PUBLICATIONS INTL LTD
    - ALL RIGHTS RESERVED
QH 10 REM DOUBLE HIGH/WIDE USI
    NG 8X16 & PIXEL DOUBLE W
    IDTH
GG 20 REM BY RICK KANE
EH 100 WR=DEC("CDCC")
RJ 110 SYS WR,16,4:SYS WR,15,7
    :SYS WR,12,6:SYS WR,15,
    9:SYS WR,15,23:SYS WR,
    15,11:SYS WR,15,29:SYSW
    R,0,8:REM HEIGHT
AQ 120 SYSWR,64+16+7,25:SYSWR,
    63,0:SYSWR,40,1:SYSWR,5
    3,2:SYSWR,137,22:SYSWR,
    40,27:SYSWR,63,34:SYSWR
    ,52,35:REM WIDTH
QC 130 PRINT"{2 HOME}{CLR}":WI
    NDOW 0,0,39,11
```

BEYOND BIG

```
DJ 0 REM COPYRIGHT 1993 - COMP
    UTE PUBLICATIONS INTL LTD
    {SPACE}- ALL RIGHTS RESER
    VED
JK 10 REM 8X32 PIXEL CHARACTER
    S
GG 20 REM BY RICK KANE
CC 30 RR=DEC("CDDA"):WR=DEC("C
    DCC")
XG 40 GOSUB1000
SG 50 INPUT"DEVICE";DV:IFDV<80
    RDV>30THEN50
SR 60 INPUT"FONT FILE";F$
XQ 70 INPUT"WHICH CHARACTER SE
    T";CS:IFCS THEN CS=1
QK 100 OPEN2,8,2,F$:SYSDEC("CD
    CC"),32,18:SYSDEC("CDCC
    "),0,19:SYS4864,CS:CLOS
    E2
AX 110 SYSWR,31,9:SYSWR,31,23:
    SYSWR,31,11:SYSWR,31,29
    :SYSWR,6,6:SYSWR,8,7:
    SYSWR,8,4:REM SET 32 P
    IXEL NON INTERLACED
DF 120 SYSWR,64+16+7,25:SYSWR,
    63,0:SYSWR,40,1:SYSWR,5
    3,2:SYSWR,137,22:SYSWR,
    40,27:SYSWR,63,34:SYSWR
    ,52,35:REM DOUBLE WIDTH
MP 130 PRINT"{2 HOME}{CLR}":WI
    NDOW 0,0,39,5:END
HX 1000 RESTORE:I=4866:DO:READ
    A$:IFA$="END" THEN EXI
    T
RJ 1010 POKEI,DEC(A$):I=I+1:LO
    OP:RETURN
XP 1020 DATA C9,00,F0,1A,A2,00
    ,86,FB,86,FA,A2,02,20,
```

```
C6,FF,20
BS 1030 DATA CF,FF,E6,FA,D0,F9
    ,E6,FB,A6,FB,E0,10,90,
    F1,A2,00
BC 1040 DATA 86,FB,86,FA,A2,02
    ,20,C6,FF,20,CF,FF,48,
    20,CA,CD
AD 1050 DATA 68,20,CA,CD,E6,FA
    ,D0,F1,E6,FB,A6,FB,E0,
    10,90,E9
XR 1060 DATA 4C,CC,FF,END
```

Rick Kane has been programming 64s and 128s since 1983.

VERTISCROLL

By Daniel English

We've all seen programs that scroll text along the bottom of the screen or inside the screen's border. VertiScroll is a program for the 64 that takes this idea to another extreme by allowing a message to scroll smoothly down the left side of the screen. The scrolling message won't interfere with any text, character, or bitmap display.

As you may have guessed, the letters in the scroll are created with sprites. What you may not have guessed is that the entire message uses only a single sprite. The remaining seven sprites are unaffected by VertiScroll. VertiScroll efficiently uses the 64's raster interrupt feature to create its effects. You'll find that a smooth scrolling vertical message can enhance many programs.

Getting Started

VertiScroll consists of three programs: two machine language programs and a BASIC one. Of the two machine language files, one is a code file and one is a sprite file. To enter them, use MLX, COMPUTE'S machine language entry program. See "Typing Aids" elsewhere in this section. To enter VS.Code, respond with the following starting and ending addresses when MLX prompts.

Starting address: 4000
Ending address: 4217

To enter VS.Letters, respond with the following starting and ending addresses when MLX prompts.

Starting address: 5000
Ending address: 5CC7

PROGRAMS

The third program, VertiScroll, is the text editor. Since it is written in BASIC, use The Automatic Proofreader to help avoid typing errors. Again, see "Typing Aids." All three files should be saved to the same disk. Be sure to save the programs with the filenames as listed, since the VertiScroll editor searches for and loads these files.

The Editor

To do a quick test of VertiScroll, load the editor and type *RUN*. You will then be instructed to press the space bar to enter the text editor. When the screen clears, you may begin entering your message. All letters, numbers, and most punctuation are available.

When typing, don't attempt to wrap words from one screen line to the other; let them cut off. They will be continuous in the scroll. You may use a maximum of 12 lines.

When you have finished entering your message, end it with the @ symbol. This tells the computer when to repeat the message. When you press Return, your message will be stored.

Going Vertical

When your scroll has been stored, you have a chance to preview your message as it will appear. You will then be prompted to either edit your message or save it to disk.

After your message has been saved on disk, it's ready to be used in your own program. All you need to do is have your program load VS.LETTERS, VS.CODE, and your message.

The command to begin scrolling is SYS 16384. To disable the scrolling, enter SYS 16387. Don't press Run/Stop and Restore to disable the scroll, because this will crash the computer.

Custom Letters

VertiScroll was designed to be customized. The sprite data is stored in bank 1, at \$5000. You can edit all of the letters, numbers, and punctuation using a sprite editor.

Once the scroll has been installed using the command SYS 16384, you can change the color, size, and location of the message. Changing the values for the sprite 0 registers will change the entire scroll. For example, to move the scrolling text to the middle of the

screen, try POKE 53248,150.

You can change colors by altering the sprite color registers. See the table at the end of the article for a list of POKES.

The default location for the text is at \$4220. If you want to put your text somewhere else, POKE 16076, HI: POKE 16078,LO will change the pointer. You will also need to change the start and end in line 40 of the editor. Remember, there is still a 12-line (480 character) maximum.

When you enter SYS 16384, all graphic data including the text screen is moved to bank 1. When you disable the scroll, the data is restored to bank 0. The letters scroll independently, leaving the computer free for other tasks. Whether you're writing business software or just playing games, VertiScroll will create a dazzling display.

VertiScroll POKES

Here are a list of POKES that you might want to use to customize your on-screen message.

- POKE 53248, X—Move scroll left and right
- POKE 53264, 1—Move scroll beyond 255th x position
- POKE 53269, 0—Hide letters
- POKE 53269, 1—Show letters
- POKE 53275, 1—Display scroll under screen text
- POKE 53275, 0—Display scroll over screen text
- POKE 53287, X—Change first color of scroll message
- POKE 53285, X—Change second color
- POKE 53286, X—Change last color
- POKE 53277, 1—Double width scroll
- POKE 53277, 0—Normal width scroll

VS.CODE

```
4000:4C 9D 41 4C 78 40 00 26 B5
4008:A9 01 8D 19 D0 20 67 40 F6
4010:AD 06 40 C9 00 F0 19 C9 4D
4018:0A F0 27 AD 01 D0 18 69 7E
4020:15 8D 01 D0 8D 03 D0 8D 63
4028:12 D0 20 B5 40 4C 5A 40 6D
4030:AD 07 40 8D 01 D0 8D 03 93
4038:D0 8D 12 D0 20 B5 40 4C 78
4040:5A 40 AD 01 D0 18 69 15 92
4048:8D 01 D0 8D 03 D0 8D 12 4B
4050:DA 20 B5 40 20 CA 40 20 C8
4058:CA 40 AD 0D DC 29 01 F0 53
4060:03 4C 31 EA 4C BC FE EE 8C
4068:06 40 AD 06 40 C9 0B F0 42
```

```
4070:01 60 A9 00 8D 06 40 60 24
4078:A9 00 8D 15 D0 78 A9 31 BD
4080:8D 14 03 A9 EA 8D 15 03 82
4088:A9 81 8D 0D DC A9 00 8D DB
4090:1A D0 8D 0D DC A9 1B 8D 26
4098:11 D0 58 A9 15 8D 18 D0 5B
40A0:A9 C7 8D 0D DD A9 3F 8D 3B
40A8:02 DD A9 04 8D 88 02 A9 53
40B0:93 20 D2 FF 60 AC 06 40 5F
40B8:B9 BF 40 8D F8 47 60 40 CC
40C0:40 40 40 40 40 40 40 40 41
40C8:40 40 EE 07 40 AD 07 40 CE
40D0:C9 3B F0 01 60 A9 26 8D B6
40D8:07 40 A0 00 B9 BF 40 99 E7
40E0:A7 02 C8 C0 0A D0 F5 A0 FA
40E8:00 B9 A7 02 99 C0 40 C8 06
40F0:C0 0A D0 F5 A0 00 B1 02 38
40F8:AA E0 00 F0 44 E0 1B 90 82
4100:11 E0 23 90 15 E0 3C 90 E5
4108:19 E0 3F F0 1D A2 58 4C B6
4110:2F 41 8A 18 69 58 AA 4C 9B
4118:2F 41 8A 18 69 20 AA 4C C2
4120:2F 41 8A 18 69 1C AA 4C BA
4128:2F 41 A2 58 4C 2F 41 8A 98
4130:8D BF 40 A5 02 18 69 01 10
4138:85 02 A5 03 69 00 85 03 3C
4140:60 A0 42 A2 20 86 02 84 31
4148:03 60 AD 0E DC 29 FE 8D 12
4150:0E DC A5 01 29 FB 85 01 1B
4158:A0 D0 A2 00 86 FA 84 FB D8
4160:A0 48 A2 00 86 FC 84 FD C8
4168:A0 00 B1 FA 91 FC A5 FA E7
4170:18 69 01 85 FA A5 FB 69 A1
4178:00 85 FB A5 FC 18 69 01 52
4180:85 FC A5 FD 69 00 85 FD ED
4188:A5 FD C9 50 D0 DA A5 01 D9
4190:09 04 85 01 AD 0E DC 09 C1
4198:01 8D 0E DC 60 A9 00 8D C5
41A0:15 D0 8D 1B D0 A9 01 8D 02
41A8:1C D0 A9 1A 8D 0D A9 FB
41B0:00 8D 10 D0 A9 01 8D 27 39
41B8:D0 A9 0D 8D 25 D0 A9 05 4D
41C0:8D 26 D0 A9 C6 8D 00 DD 92
41C8:A9 3F 8D 02 DD A9 44 8D 6D
41D0:88 02 A9 93 20 D2 FF A9 7C
41D8:40 A0 00 99 BF 40 C8 C0 8E
41E0:0B D0 F8 20 41 41 20 4A D7
41E8:41 A9 13 8D 18 D0 78 A9 50
41F0:1B 8D 11 D0 A9 01 8D 1A 1A
41F8:D0 A9 FF 8D 06 40 A9 08 B3
4200:8D 14 03 A9 40 8D 15 03 B0
4208:A9 7F 8D 0D DC 58 A9 01 60
4210:8D 15 D0 60 00 00 00 00 C0
```

VS.LETTERS

```
5000:00 00 00 00 00 00 00 00 A0
5008:00 00 00 00 00 00 00 00 A8
5010:00 00 00 00 00 00 00 00 B0
5018:00 00 00 00 00 00 00 00 B8
5020:00 00 00 00 00 00 00 00 C0
5028:00 00 00 00 00 00 00 00 C8
5030:00 00 00 00 00 00 00 00 D0
5038:00 00 00 00 00 00 00 00 D8
5040:00 00 00 00 00 00 00 00 E0
5048:00 00 00 00 00 00 00 00 E8
5050:00 00 00 00 00 00 A0 00 73
5058:AA 40 00 AA 55 00 0A 55 1D
5060:3F 00 15 3F 00 00 3F 00 B5
5068:00 00 00 00 00 00 00 00 09
```

5070:00	00	00	00	00	00	00	00	11	52A0:FF	00	00	3C	00	00	00	00	09	54D0:00	00	AA	50	00	AA	55	00	00	29
5078:00	00	00	00	00	00	00	00	19	52A8:00	00	00	00	00	00	00	00	4D	54D8:AA	55	F0	A0	55	FF	A0	05	45	
5080:00	00	00	00	00	00	00	00	21	52B0:00	00	00	00	00	00	00	00	55	54E0:FF	A0	00	FF	A0	00	0F	A0	75	
5088:00	00	00	00	00	00	00	00	29	52B8:00	00	00	00	00	00	00	00	5D	54E8:00	00	A0	00	00	A0	00	00	28	
5090:00	00	00	00	00	A8	00	00	D3	52C0:00	00	00	00	00	00	80	00	66	54F0:00	00	00	00	00	00	00	00	99	
5098:AA	00	00	AA	00	00	00	00	39	52C8:00	A0	00	00	A8	00	00	AA	85	54F8:00	00	00	00	00	00	00	00	A1	
50A0:00	00	00	00	AA	00	00	AA	41	52D0:00	00	2A	40	00	0A	50	00	87	5500:00	00	00	00	00	00	00	00	AA	
50A8:00	00	A8	00	00	00	00	00	5E	52D8:02	54	00	00	55	00	00	15	53	5508:00	00	00	0A	01	F0	2A	13		
50B0:00	00	00	00	00	00	00	00	51	52E0:C0	00	05	F0	00	01	FC	00	93	5510:45	FC	2A	55	FC	A8	55	FF	6C	
50B8:00	00	00	00	00	00	00	00	59	52E8:00	FF	00	00	3F	00	00	0F	96	5518:A8	14	3F	A0	14	0F	A0	14	40	
50C0:00	00	00	00	00	00	00	00	61	52F0:00	00	03	00	00	00	00	00	F5	5520:0F	A0	14	0F	A8	14	0F	A8	4A	
50C8:00	00	00	00	00	00	00	00	69	52F8:00	00	00	00	00	00	00	00	9D	5528:55	3F	2A	55	FF	2A	41	FC	10	
50D0:00	00	00	00	00	00	00	00	71	5300:00	00	00	00	00	00	00	00	A6	5530:0A	00	F0	00	00	00	00	00	FD	
50D8:2A	00	00	AA	40	00	A8	40	CC	5308:00	00	00	00	0A	55	F0	2A	60	5538:00	00	00	00	00	00	00	00	E2	
50E0:00	20	40	00	00	00	00	00	91	5310:55	FC	2A	55	FC	AA	40	3F	8D	5540:00	00	00	00	00	00	00	00	EA	
50E8:00	00	00	00	00	00	00	00	89	5318:A2	50	0F	A0	54	0F	A0	15	45	5548:00	00	00	00	0A	55	F0	2A	A4	
50F0:00	00	00	00	00	00	00	00	91	5320:0F	A0	05	CF	A0	01	FF	A8	C5	5550:55	FC	AA	55	FC	A8	15	3F	83	
50F8:00	00	00	00	00	00	00	00	99	5328:00	FF	2A	55	FF	2A	55	FC	B9	5558:A8	14	3F	A0	14	0F	A0	14	80	
5100:00	00	00	00	00	00	00	00	A2	5330:0A	55	F0	00	00	00	00	00	4F	5560:0F	A0	14	0F	A8	14	3F	AA	BC	
5108:00	00	00	00	00	00	00	00	AA	5338:00	00	00	00	00	00	00	00	DE	5568:54	3F	2A	50	FC	2A	50	FC	85	
5110:00	00	00	00	00	00	00	00	B2	5340:00	00	00	00	00	00	00	00	E6	5570:0A	40	F0	00	00	00	00	00	4E	
5118:80	00	03	A0	00	0F	2A	55	4B	5348:00	00	00	00	00	00	00	0F	00	5578:00	00	00	00	00	00	00	00	23	
5120:FC	0A	55	F0	00	00	00	00	7D	5350:00	0F	00	00	0F	00	00	0F	42	5580:00	00	00	00	00	00	00	00	2B	
5128:00	00	00	00	00	00	00	00	CA	5358:AA	55	FF	AA	55	FF	AA	55	A9	5588:00	00	00	00	00	00	00	00	33	
5130:00	00	00	00	00	00	00	00	D2	5360:FF	28	00	0F	08	00	0F	08	68	5590:00	00	00	00	00	00	00	00	3B	
5138:00	00	00	00	00	00	00	00	DA	5368:00	0F	00	00	0F	00	00	0F	5A	5598:0A	41	F0	0A	41	F0	0A	41	7A	
5140:00	00	00	00	00	00	00	00	E2	5370:00	00	00	00	00	00	00	00	17	55A0:F0	00	00	00	00	00	00	00	C3	
5148:00	00	00	00	00	00	00	00	EA	5378:00	00	00	00	00	00	00	00	1F	55A8:00	00	00	00	00	00	00	00	53	
5150:00	00	00	00	00	00	00	00	F2	5380:00	00	00	00	00	00	00	00	27	55B0:00	00	00	00	00	00	00	00	5B	
5158:00	00	00	0A	55	F0	2A	55	B3	5388:00	00	00	00	0A	40	0F	2A	C8	55B8:00	00	00	00	00	00	00	00	63	
5160:FC	A0	00	F0	80	00	03	00	A4	5390:50	0F	2A	50	0F	AA	54	0F	48	55C0:00	00	00	00	00	00	00	00	6B	
5168:00	00	00	00	00	00	00	00	0B	5398:A8	15	0F	A0	15	0F	A0	05	EF	55C8:00	00	00	00	00	00	00	00	73	
5170:00	00	00	00	00	00	00	00	13	53A0:0F	A0	05	CF	A0	01	CF	A8	E5	55D0:00	00	00	00	00	00	00	00	7B	
5178:00	00	00	00	00	00	00	00	1B	53A8:01	FF	A8	01	FF	2A	00	FF	9D	55D8:0A	41	F0	0A	41	FC	0A	41	EA	
5180:00	00	00	00	00	00	00	00	23	53B0:2A	00	FF	00	00	00	0F	00	A8	55E0:FC	00	00	0C	00	00	00	00	CA	
5188:00	00	10	00	00	10	00	08	75	53B8:00	00	00	00	00	00	00	00	5F	55E8:00	00	00	00	00	00	00	00	93	
5190:10	C0	0A	11	C0	02	55	00	76	53C0:00	00	00	00	00	00	00	00	67	55F0:00	00	00	00	00	00	00	00	9B	
5198:00	54	00	2A	55	F0	00	54	B5	53C8:00	00	00	00	0A	01	F0	2A	CF	55F8:00	00	00	00	00	00	00	00	A3	
51A0:00	02	55	00	0A	11	C0	08	8C	53D0:45	FC	2A	55	FC	A8	55	FF	29	5600:00	00	00	00	00	00	00	00	AC	
51A8:10	C0	00	10	00	00	10	00	A4	53D8:A8	14	3F	A0	14	0F	A0	14	FC	5608:00	00	00	00	0A	40	00	2A	30	
51B0:00	00	00	00	00	00	00	00	53	53E0:0F	A0	14	0F	A0	00	3F	A8	17	5610:50	00	2A	50	00	A8	54	00	7A	
51B8:00	00	00	00	00	00	00	00	5B	53E8:00	3F	28	00	3F	2A	00	FC	04	5618:A8	14	30	A0	14	00	A0	14	1E	
51C0:00	00	00	00	00	00	00	00	63	53F0:0A	00	FC	00	00	00	00	00	3C	5620:00	A0	14	00	A8	15	CF	A8	59	
51C8:00	00	00	00	00	00	00	00	6B	53F8:00	00	00	00	00	00	00	00	9F	5628:15	CF	2A	15	CF	2A	00	00	11	
51D0:14	00	00	14	00	00	14	00	E6	5400:00	00	00	00	00	00	00	00	A8	5630:0A	00	00	00	00	00	00	00	E1	
51D8:00	14	00	0A	55	F0	0A	55	F8	5408:00	00	05	00	00	05	00	AA	10	5638:00	00	00	00	00	00	00	00	E4	
51E0:F0	00	14	00	00	14	00	00	CE	5410:55	FF	AA	55	FF	AA	55	FF	63	5640:00	00	00	00	00	00	00	00	EC	
51E8:14	00	00	14	00	00	14	00	FE	5418:A8	05	00	2A	05	00	2A	05	7A	5648:00	00	00	0F	00	00	0F	00	E5	
51F0:00	00	00	00	00	00	00	00	93	5420:00	0A	45	00	0A	45	00	02	5B	5650:05	FF	00	55	F0	0A	55	C0	EF	
51F8:00	00	00	00	00	00	00	00	9B	5428:55	00	02	55	00	00	55	00	BB	5658:AA	51	C0	AA	01	C0	AA	01	D2	
5200:00	00	00	00	00	00	00	00	A4	5430:00	55	00	00	15	00	00	00	D6	5660:C0	AA	01	C0	AA	51	C0	AA	6A	
5208:00	00	00	00	00	00	00	00	AC	5438:00	00	00	00	00	00	00	00	E0	5668:55	C0	00	55	F0	00	05	FF	D6	
5210:00	00	00	00	00	00	00	00	B4	5440:00	00	00	00	00	00	00	00	E8	5670:00	00	FF	00	00	0F	00	00	59	
5218:00	00	FC	00	01	FF	00	01	65	5448:00	00	01	C0	A0	05	F0	A0	B8	5678:00	00	00	00	00	00	00	00	25	
5220:F3	00	00	C0	00	00	00	00	CA	5450:15	FC	A0	15	FC	A0	54	3F	7A	5680:00	00	00	00	00	00	00	00	2D	
5228:00	00	00	00	00	00	00	00	CC	5458:A0	54	3F	A0	50	0F	A0	50	A8	5688:00	0A	00	F0	2A	41	FC	AA	C1	
5230:00	00	00	00	00	00	00	00	DC	5460:0F	A0	50	0F	A0	50	3F	A0	19	5690:41	FF	A0	55	3F	A0	14	0F	FA	
5238:00	00	00	00	00	00	00	00	D4	5468:50	3F	AA	50	3F	AA	50	FC	A5	5698:A0	14	0F	A0	14	0F	A0	14	B8	
5240:00	00	00	00	00	00	00	00	E4	5470:AA	50	FC	00	00	00	00	00	22	56A0:0F	A0	14	0F	A0	14	0F	A0	84	
5248:00	00	00	00	00	00	00	00	EC	5478:00	00	00	00	00	00	00	00	21	56A8:14	0F	AA	55	FF	AA	55	FF	23	
5250:14	00	00	14	00	00	14	00	68	5480:																		

PROGRAMS

```

5700:00 00 00 00 00 00 00 AE
5708:00 00 55 00 0A 55 F0 2A 13
5710:55 FC 2A 41 FC A8 00 3F CB
5718:A8 00 3F A0 00 0F A0 00 8A
5720:0F A0 00 0F A0 00 0F AA 3D
5728:55 FF AA 55 FF AA 55 FF 81
5730:A0 00 0F A0 00 0F 00 00 57
5738:00 00 00 00 00 00 00 E6
5740:00 00 00 00 00 00 00 EE
5748:00 A8 00 3F A8 00 3F A0 79
5750:00 0F A0 55 0F A0 55 0F E0
5758:A0 14 0F A0 14 0F A0 14 7A
5760:0F A0 14 0F A0 14 0F A0 46
5768:14 0F AA 55 FF AA 55 FF E4
5770:A0 00 0F A0 00 0F 00 00 97
5778:00 00 00 00 00 00 00 27
5780:00 00 00 00 00 00 00 2F
5788:00 A8 00 00 A8 00 00 A0 47
5790:00 00 A0 55 00 A0 55 00 D5
5798:A0 14 00 A0 14 00 A0 14 9C
57A0:00 A0 14 00 A0 14 0F A0 0E
57A8:14 0F AA 55 FF AA 55 FF 25
57B0:A0 00 0F A0 00 0F 00 00 D7
57B8:00 00 00 00 00 00 00 67
57C0:00 00 00 00 00 00 00 6F
57C8:00 0A 05 FC 2A 05 CC 2A 93
57D0:05 F0 A8 05 FC A8 05 3F 77
57D8:A0 05 3F A0 00 0F A0 00 88
57E0:0F A8 00 3F A8 00 3F A8 A1
57E8:00 3F 2A 00 0F 2A 55 FC E4
57F0:0A 55 F0 02 55 C0 00 00 E5
57F8:00 00 00 00 00 00 00 A7
5800:00 00 00 00 00 00 00 B0
5808:00 A0 00 0F A0 00 0F AA 9F
5810:55 FF AA 55 FF AA 55 FF 6B
5818:A0 14 0F A0 14 00 00 14 BE
5820:00 A0 14 00 A0 14 0F AA 99
5828:55 FF AA 55 FF AA 55 FF 83
5830:A0 00 0F A0 00 0F 00 00 59
5838:00 00 00 00 00 00 00 E8
5840:00 00 00 00 00 00 00 F0
5848:00 A8 00 3F A8 00 3F A0 7B
5850:00 0F A0 00 0F A0 00 0F E2
5858:A0 00 0F AA 55 FF AA 55 3B
5860:FF AA 55 FF A0 00 0F A0 2A
5868:00 0F A0 00 0F A0 00 0F FA
5870:A8 00 3F A8 00 3F 00 00 E4
5878:00 00 00 00 00 00 00 29
5880:00 00 00 00 00 00 00 31
5888:00 A8 00 00 A8 00 00 A0 49
5890:00 00 A0 00 00 AA 55 F0 9B
5898:AA 55 FC AA 55 FF A0 00 2A
58A0:3F A0 00 0F A0 00 0F A0 D5
58A8:00 0F A8 00 0F 00 14 3F 12
58B0:00 15 FC 00 15 F0 00 00 B2
58B8:00 00 00 00 00 00 00 69
58C0:00 00 00 00 00 00 00 71
58C8:00 A0 00 0F A8 00 0F A8 9E
58D0:00 3F 2A 00 3C 0A 00 FC 9D
58D8:0A 40 F0 02 51 F0 02 55 84
58E0:C0 00 55 C0 00 55 00 00 FD
58E8:15 00 AA 55 FF AA 55 FF 24
58F0:A0 00 0F A0 00 0F 00 00 1A
58F8:00 00 00 00 00 00 00 A9
5900:00 00 00 00 00 00 00 B2
5908:00 00 00 3F 00 00 3F 00 2D
5910:00 0F 00 00 0F 00 00 0F 0E
5918:00 00 0F 00 00 0F 00 00 E8
5920:0F A0 00 0F A0 00 0F AA 41
5928:55 FF AA 55 FF AA 55 FF 85
5930:A0 00 0F A0 00 0F 00 00 5B
5938:00 00 00 00 00 00 00 EA
5940:00 00 00 00 00 00 00 F2
5948:00 00 00 0F AA 55 FF AA 41
5950:55 FF 2A 55 FF 0A 40 00 F0
5958:02 40 00 02 50 00 00 54 13
5960:00 02 54 00 02 50 00 0A 79
5968:40 00 2A 55 FF AA 55 FF 2B
5970:AA 55 FF 00 00 0F 00 00 0A
5978:00 00 00 00 00 00 00 2B
5980:00 00 00 00 00 00 00 33
5988:00 AA 55 FF AA 55 FF AA E5
5990:55 FF A0 00 FC A0 01 F0 5F
5998:00 05 C0 00 15 00 00 54 A1
59A0:00 02 50 00 0A 40 00 2A 59
59A8:55 FF AA 55 FF AA 55 FF 06
59B0:00 00 0F 00 00 0F 00 00 81
59B8:00 00 00 00 00 00 00 6B
59C0:00 00 00 00 00 00 00 73
59C8:00 0A 55 F0 2A 55 FC 2A 82
59D0:55 FC A8 00 3F A8 00 3F 5E
59D8:A0 00 0F A0 00 0F A0 00 45
59E0:0F A0 00 0F A0 00 0F A8 FF
59E8:00 3F 28 00 3C 2A 55 FC A2
59F0:0A 55 F0 02 55 C0 00 00 E9
59F8:00 00 00 00 00 00 00 AB
5A00:00 00 00 00 00 00 00 B4
5A08:00 0A 50 00 2A 54 00 2A 16
5A10:54 00 AA 55 00 A8 15 00 66
5A18:A0 05 00 A0 05 00 A0 05 D6
5A20:00 A0 05 00 A0 05 00 A0 57
5A28:05 00 AA 55 FF AA 55 FF 5F
5A30:A0 00 0F A0 00 0F 00 00 5D
5A38:00 00 00 00 00 00 00 EC
5A40:00 00 00 00 00 00 00 F4
5A48:00 0A 55 C3 2A 55 FF 2A 37
5A50:55 FC A8 00 0F A8 01 FF A8
5A58:A0 01 CF A0 00 0F A0 00 1F
5A60:0F A0 00 0F A0 00 0F A8 81
5A68:00 3F 28 00 3C 2A 55 FC 24
5A70:0A 55 F0 02 55 C0 00 00 6B
5A78:00 00 00 00 00 00 00 2D
5A80:00 00 00 00 00 00 00 35
5A88:00 00 00 0F 0A 40 0F 2A C7
5A90:50 3F AA 50 3C A0 14 FC 21
5A98:A0 14 F0 A0 15 F0 A0 15 8D
5AA0:C0 A0 15 C0 A0 15 00 A0 86
5AA8:15 00 AA 55 FF AA 55 FF E7
5AB0:A0 00 0F A0 00 0F 00 00 DD
5AB8:00 00 00 00 00 00 00 6D
5AC0:00 00 00 00 00 00 00 75
5AC8:00 00 00 00 0A 01 F0 2A DD
5AD0:05 FC 2A 05 FC A8 15 3F D0
5AD8:A8 14 0F A0 14 0F A0 14 05
5AE0:0F A0 14 0F A8 14 0F A8 15
5AE8:54 3F 2A 50 3F 2A 50 FC 22
5AF0:0A 40 FC 00 00 00 00 5A
5AF8:00 00 00 00 00 00 00 AD
5B00:00 00 00 00 00 00 00 B6
5B08:00 A8 00 00 A8 00 00 A0 CE
5B10:00 00 A0 00 00 A0 00 0F 6C
5B18:A0 00 0F AA 55 FF AA 55 01
5B20:FF AA 55 FF A0 00 0F A0 EF
5B28:00 0F A0 00 00 A0 00 00 39
5B30:A8 00 00 A8 00 00 00 00 C5
5B38:00 00 00 00 00 00 00 EE
5B40:00 00 00 00 00 00 00 F6
5B48:00 AA 55 C0 AA 55 F0 AA 97
5B50:55 F0 A0 00 3C 00 00 3F 23
5B58:00 00 0F 00 00 0F 00 00 2D
5B60:0F 00 00 0F 00 00 3F A0 AE
5B68:00 3C AA 55 FC AA 55 F0 07
5B70:AA 55 C0 00 00 00 00 E9
5B78:00 00 00 00 00 00 00 2F
5B80:00 00 00 00 00 00 00 37
5B88:00 A0 00 00 AA 40 00 A0 68
5B90:54 00 AA 55 C0 00 55 FC C9
5B98:00 05 FF 00 00 FF 00 00 90
5BA0:3F 00 00 FF 00 05 FF 00 0B
5BA8:55 FC AA 55 C0 AA 54 00 4D
5BB0:AA 40 00 A0 00 00 00 00 D6
5BB8:00 00 00 00 00 00 00 6F
5BC0:00 00 00 00 00 00 00 77
5BC8:00 A0 00 00 AA 55 FF AA FC
5BD0:55 FF AA 55 FC A0 01 F0 3A
5BD8:00 05 C0 00 15 C0 00 15 A9
5BE0:00 00 05 C0 00 01 C0 A0 6A
5BE8:01 F0 AA 55 FC AA 55 FF 44
5BF0:AA 55 FF A0 00 00 00 00 5C
5BF8:00 00 00 00 00 00 00 AF
5C00:00 00 00 00 00 00 00 B8
5C08:00 A0 00 0F A8 00 0F A8 E5
5C10:00 0F 2A 00 3C 0A 40 FC 59
5C18:02 51 F0 00 55 C0 00 15 07
5C20:00 00 15 00 00 55 C0 02 54
5C28:51 F0 0A 40 FC 2A 00 3F DA
5C30:A8 00 0F A0 00 0F 00 00 65
5C38:00 00 00 00 00 00 00 F0
5C40:00 00 00 00 00 00 00 F8
5C48:00 00 00 00 A0 00 00 A8 AE
5C50:00 00 2A 00 00 0A 40 0F 06
5C58:02 50 0F 00 55 FF 00 15 C7
5C60:0F 00 15 FF 00 54 0F 02 2D
5C68:50 0F 0A 40 00 2A 00 00 FA
5C70:A8 00 00 A0 00 00 00 00 87
5C78:00 00 00 00 00 00 00 31
5C80:00 00 00 00 00 00 00 39
5C88:00 A8 00 FF AA 00 FF AA 6B
5C90:00 0F A2 40 0F A2 40 0F F7
5C98:A0 50 0F A0 50 0F A0 14 B5
5CA0:0F A0 14 0F A0 05 0F A0 54
5CA8:05 0F A0 01 CF A0 01 FF CE
5CB0:AA 00 FF AA 00 3F 00 00 66
5CB8:00 00 00 00 00 00 00 71
5CC0:00 00 00 00 00 00 00 79

```

VERTISCRROLL

```

MS 10 REM COPYRIGHT 1993 - COM
      PUTE PUBLICATIONS INTL L
      TD - ALL RIGHTS RESERVED
PX 20 IF A=0THENA=1:LOAD"VS.CO
      DE",8,1
DH 30 IF B=0THENB=1:LOAD"VS.LE
      TTERS",8,1
DG 40 S=16928:E=17407
BE 50 PRINT"{CLR}{3 DOWN}{WHT}
      {4 SPACES}VERTISCRROLL -
      {SPACE}SCROLL TEXT EDITO
      R"
QH 60 PRINT"{3 DOWN} PRESS SPA
      CE TO ENTER THE TEXT EDI
      TOR."
RC 70 PRINT"{DOWN} YOU CAN USE
      12 LINES MAXIMUM."
KS 80 PRINT"{DOWN} PLEASE TYPE
      AN @ AT THE END OF YOUR
QS 90 PRINT"{DOWN} TEXT AND PR
      ESS RETURN TO STORE."
FP 100 GET A$:IF A$<>" THEN10

```

```

0
MX 110 PRINT "{CLR}";:OPEN 1,0:
INPUT#1,T$:CLOSE1
DB 120 FOR X=1024 TO 1503:POKE
S+X-1024,PEEK(X):POKE
{SPACE}X,42:NEXT
AM 130 PRINT "{CLR}{3 DOWN}PRES
S SPACE TO SEE YOUR VER
TISCROLL."
EQ 140 GET A$:IF A$<>" "THEN14
0
FX 150 SYS16384
JC 160 PRINT "{CLR}{3 DOWN}PRES
S 'S' TO SAVE, OR 'E' T
O EDIT."
SE 170 GET K$:IFK$=""THEN170
QA 180 IF K$="E"THEN SYS 16387
:GOTO40
PF 190 SYS16387
RR 200 INPUT "{2 DOWN}SAVE FILE
NAME";F$
JP 210 F$="@0:"+F$:OPEN1,8,1,F
$:POKE252,S/256:POKE251
,S-PEEK(252)*256
XM 220 POKE782,E/256:POKE781,E
-PEEK(782)*256:POKE780,
251:SYS65496:CLOSE1
JB 230 PRINT "{7}"
CH 240 IF ST<>0THEN PRINT"
{2 DOWN}ERROR DURING SA
VE!":END

```

Daniel English is a frequent contributor. He hopes someday to open his own business to create and distribute software for the 64 and Amiga. He lives in Moreno Valley, California.

EASY DOES IT

By Hugh Rountree

Erasable programmable read only memory, better known as EPROM, is a great concept. It lets you load your favorite programs onto a cartridge that plugs into your 64 or 128, and these programs are instantly available whenever you boot your computer. Whatever is stored in an EPROM chip acts like regular ROM, but you can erase the chip and refill it with other programs whenever you wish.

I purchased a Promenade C1 EPROM programming device about six or seven years ago from the Jason-Ranheim Company, but I'll have to confess that I've used it very little until recently. There are two main reasons for this.

First of all, Motorola's EPROM 68766, the 24-pin 8K x 8-bit version of the 2764 found in early Commodores, was priced at five times the cost of the 2764 original. The Motorola chip was the only EPROM that would exactly replace the ROM IC's

used in Commodore's early computers and disk drives.

Second, the original Promos software that came with Promenade was for experienced programmers. It was complicated to use. You had to swap back and forth from the Promos' BASIC environment to a machine language monitor such as Micromon, Supermon, or Hesmon.

During the past several years, however, the price of the 68766 has dropped from approximately \$25.00 to less than \$5.00 each. The last ones that I purchased from Jameco cost \$4.75 each. So now I can afford to program all of the EPROMs that I wish for all of my Commodore equipment.

In contacting Jason-Ranheim, I learned that they now have a version 2 of Promos, which has many added commands, including most of those found in a ML monitor. Also Promos had been altered so that you can enter manual commands with hexadecimal numbers instead of decimal. Another improvement is that commands can be executed from within a BASIC program using integer variables, which of course work only with decimal numbers.

Since I prefer entry in hex instead of decimal, that meant I had to use a hex-to-decimal conversion routine. So when I got the new Promos software, I began writing Easy Does It to augment the superb qualities of Promos V2.0.

Typing It In

Easy Does It is written entirely in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you attempt to run it. I have also included a boot program that will automatically load and run Easy Does It and Promos. Make sure that all of these programs are on the same disk.

When Easy Does It loads Promos, you'll see the following menu.

```

Zero Socket—Z
Fill Memory(Zero)—F
Check Eprom/Erasable—E
Load Disk File—L
Save Disk File—S
Set Eprom PaRAMeter—P
Set Ram Addresses—ADD

```

```

Read Eprom—R
Write Eprom—W
Write Eprom/Verify—VER
Verify Eprom/Ram—V
? h

```

If you notice, the letter *H* appears beneath the cursor. If you hit the Return key with the *H* showing, you'll find yourself viewing an auxiliary help screen. It looks something like the following.

COMMAND ADDENDUM

(M/I/D/A/C/T)

TOGGLE (CHECKSUM OFF)

Each letter is a different command to enter. These commands are similar to those found in ML Monitors such as Supermon or Micromon. M is the memory command used to view the hex value of memory addresses.

I displays the ASCII value of these same addresses.

D for data lets you view the hex value of addresses read directly from an EPROM installed in the Promenade socket.

A displays the ASCII value of these EPROM addresses.

C lets you compare one range of RAM addresses to another range.

T transfers the data from one RAM address range to another.

Toggle will in effect enable the checksum and hash total reporting built into Promos. This feature is normally lost when Promos commands are executed from BASIC.

Be careful using the Toggle command because it works by taking the computer out of BASIC mode and putting it into manual mode. If you have a DOS wedge installed with Promos and operate a BASIC program in manual mode, should you inadvertently enter a wedge command from the keyboard, the DOS command may respond with disastrous results. I have had a whole disk directory scrambled by inadvertently entering a DOS command in these circumstances. I recommend operating in Checksum Off mode when possible.

Using Easy Does It

Easy Does It makes it no longer necessary to figure out and enter the correct

control word or program method numbers. They are automatically selected from a built-in database within the program. All that is required for automatic selection of these values is entry of the program voltage and the EPROM type.

When you enter a *P* to set EPROM parameters, you will be asked to enter the voltage, EPROM type, and also the EPROM start address. The EPROM end address will be automatically set for the last byte of the EPROM itself. The RAM hex start and end addresses control how many bytes will be programmed, which you are asked to enter upon entry of the Add command or Set RAM Addresses.

The Zero Socket command, *Z*, sets all pins of the EPROM socket to 0 voltage. The Fill Memory command, *F*, fills the memory address range between the RAM hex start address and the RAM hex end address. The Check EPROM/Erasure command, *E*, checks to see if the EPROM is in an erased state (all FF) from the EPROM start address to the EPROM end address.

The Load Disk File command, *L*, will load a disk file with the specified filename to RAM beginning at the RAM hex start address. The Save Disk File will save RAM contents beginning with the RAM hex start address and ending with the RAM hex end address. If you enter any disk file commands accidentally, you may return to the menu by pressing Return on a blank filename.

The Read EPROM command, *R*, reads data from the EPROM start address to RAM beginning at the RAM hex start address and ending at the RAM hex end address.

The Write EPROM command, *W*, programs an EPROM beginning at the EPROM start address with code beginning at the RAM hex start address and ending at the RAM hex end address. The Write EPROM/Verify command, *VER*, first performs an Erasure, *E*, command, and then if it passes this command, it begins a *W* command. After this command finishes, it then does a *V* command.

The Verify EPROM/RAM command, *V*, verifies that the code in the EPROM beginning at the EPROM start address is identical with code beginning with the RAM hex start address and ending

with the RAM hex end address.

Once entered, all of the data except for the main menu input and the filename inputs will stay with the last entered value. Simply press Return to retain the earlier data at the appropriate prompt.

I could have created a much longer BASIC program with more features, but I decided that it was best to keep it as short as possible and leave a larger RAM buffer for use in holding code for programming EPROMs. Jason-Ranheim advises leaving 14K of RAM for the BASIC program. Warning: Promos V2.0 will not allow disk file saves above \$CFFF.

Upon running, Easy Does It sheds a little excess baggage by deleting the first seven lines (10-70) of the program when they execute. Otherwise, the program would give an *OUT OF MEMORY* error message and refuse to run before all of the variables were executed. The first 70 lines are REM statements for information on the program, creating the RAM buffer by moving the top of BASIC down to \$1FFF, filling memory from hex 2000 to hex DFFF with zeros, and finally deleting the first 70 lines, whereupon the program runs again beginning with line 80.

If you own a Promenade EPROM device and don't have the latest Promos V2.0 software with a manual, you may order it for \$29.95 on a 5¼-inch disk or \$32.95 on a 3½-inch disk. The address is Jason-Ranheim Company, 3105 Gayle Lane, Auburn, California 95602; (800) 421-7731. The company also carries EPROM supplies.

BOOT

```
PK 5 REM COPYRIGHT 1993 - COMP
UTE PUBLICATIONS INTL LTD
- ALL RIGHTS RESERVED
QS 10 REM BOOT PROGRAM FOR EAS
Y DOES IT & PROMOS V2.0
{SPACE}BY HUGH ROUNTREE
DF 20 DS="8":D=PEEK(186):IFD>7
THENDS=RIGHT$(STR$(D),LE
N(STR$(D))-1)
FR 30 PRINTCHR$(147):PRINT:PRI
NT"LOAD";CHR$(34);"PB";C
HR$(34);",";"DS",1"
KE 40 FORI=1TO9:PRINTCHR$(13);
:NEXT:PRINT"POKE56,32:NE
W":PRINT:PRINT
CP 50 PRINT"LOAD";CHR$(34);"EA
SY DOES IT";CHR$(34);",";"
D$;CHR$(19);
```

```
KJ 60 FORI=631TO633:READD:POK
EI,DA:NEXTI:POKE198,3:NE
W:DATA13,13,131
```

EASY DOES IT

```
KD 10 REM EASY DOES IT BY HUGH
ROUNTREE COPYRIGHT 1993
- COMPUTE PUBLICATIONS
RS 20 REM*ENABLE PROMOS V2.0 P
REVIOUSLY*LINES 10-70 AU
TO-DELETE WHEN PROGRAM R
UNS*
AA 30 REM*SET W=1 IN LINE 90 T
O DISABLE SOUND TONE*
HG 40 PRINTCHR$(147);"
{7 SPACES}AUTO-DELETING
{SPACE}LINES{2 SPACES}10
-70":PRINT
PX 50 PRINT"10":PRINT"20":PRIN
T"30":PRINT"40":PRINT"50
":PRINT"60":PRINT"70"
GR 60 PRINT"F 2000,DEFF,00:RUN
";CHR$(19);
DD 70 FORI=1TO8:POKE630+I,13:N
EXT:POKE198,8:POKE56,32:
END
HS 80 DIMH(15),W(8,3),PM(8,3),
CA(7),AS(4),DS(2),RS(7),
XS(4):FORI=1TO4:READDV(I
)
PX 90 NEXT:FORI=1TO8:READE$(I)
:FORIA=1TO3:READW(I,IA),
PM(I,IA):NEXT:NEXT:W=0
RR 100 DATA4096,256,16,1,"07FF
",42,70,0,0,40,71,"0FFF
",226,70,225,7,224,7
XA 110 DATA"1FFF",6,14,5,14,20
,14,"3FFF",6,14,5,14,0,
0,"7FFF",230,70,229,70,
0,0
GP 120 DATA"FFFF",226,6,0,0,0,
0,"1FFF",0,0,0,0,48,70,
"03FF",0,0,0,0,40,7
PR 130 TGS(0)="OFF":TGS(1)="
{SPACE}ON":IA=48:FORI=
0TO15:H(I)=I+IA:IFI=9TH
ENIA=55
MM 140 NEXT:DS(1)="COMPARE":DS
(2)="TRANSFER":RS(1)="L
OW UNERASED BYTE"
CK 150 RS(2)="HIGH BYTE LOADED
":RS(3)="HIGH BYTE SAVE
D":RS(4)="HIGH BYTE REA
D"
FJ 160 RS(5)="FAIL ADDRESS":RS
(6)=RS(5):RS(7)=RS(5)
XF 170 AS(1)="START":AS(2)="EN
D":AS(3)="COMPARE":AS(4
)="TRANSFER"
KD 180 CS(1)="ERASURE":CS(2)="
DISK LOAD":CS(3)="DISK
{SPACE}SAVE":CS(4)="REA
D EPROM"
AX 190 CS(5)="WRITE EPROM":CS(
6)="VERIFY EPROM":CS(7)
="COMPARE RAM":SS="
{8 SPACES}"
```

```

SK 200 K$(1)="PASSED":K$(2)="F
      AILED":DN%=8:DN=PEEK(18
      6):IFDN>7THENDN%=DN
AH 210 PRINTCHR$(147)CHR$(14)S
      $$$"PROMENADE"
PQ 220 PRINT:PRINT$$"ZERO SOCK
      ET----->Z"
CD 230 PRINT:PRINT$$"FILL MEMO
      RY(ZERO)--->F"
EF 240 PRINT:PRINT$$"CHECK EPR
      OM/ERASER->E"
KF 250 PRINT:PRINT$$"LOAD DISK
      FILE----->L"
MA 260 PRINT:PRINT$$"SAVE DISK
      FILE----->S"
SC 270 PRINT:PRINT$$"SET EPROM
      PARAMETER->P"
AG 280 PRINT:PRINT$$"SET RAM A
      DDRESSES--->ADD"
EC 290 PRINT:PRINT$$"READ EPRO
      M----->R"
EA 300 PRINT:PRINT$$"WRITE EPR
      OM----->W"
EG 310 PRINT:PRINT$$"WRITE EPR
      OM/VERIFY-->VER"
BK 320 PRINT:PRINT$$"VERIFY EP
      ROM/RAM---->V"
FH 330 PRINT:PRINT$$"
      {2 SPACES}H{3 LEFT}";:I
      NPUT C$
FP 340 IFC$="Z"THENGOSUB540:GO
      SUB550
PK 350 IFC$="F"THENGOSUB540:GO
      SUB830:GOSUB560
SE 360 IFC$="E"THENGOSUB540:CM
      =1:GOSUB600:CM=0
BJ 370 IFC$="L"THENGOSUB540:CM
      =2:GOSUB620:CM=0
CB 380 IFC$="S"THENGOSUB540:GO
      SUB1380:IFEA<53248THENC
      M=3:GOSUB650:CM=0
JB 390 IFC$="P"THENGOSUB540:GO
      SUB680
HP 400 IFC$="ADD"THENGOSUB540:
      GOSUB830
AR 410 IFC$="R"THENGOSUB540:CM
      =4:GOSUB890:CM=0
MJ 420 IFC$="W"THENGOSUB540:CM
      =5:GOSUB900:CM=0
GP 430 IFC$="VER"THENGOSUB540:
      CM=1:GOSUB910:CM=0
BH 440 IFC$="V"THENGOSUB540:CM
      =6:GOSUB970:CM=0
HE 450 IFC$="H"THENGOSUB540:GO
      SUB980
RD 460 IFC$="M"THENGOSUB540:GO
      SUB1290
PB 470 IFC$="I"THENGOSUB540:GO
      SUB1300
RB 480 IFC$="D"THENGOSUB540:GO
      SUB1310
DB 490 IFC$="A"THENGOSUB540:GO
      SUB1320
DG 500 IFC$="C"THENGOSUB540:CM
      =7:GOSUB1350:CM=0
SJ 510 IFC$="T"THENGOSUB540:GO
      SUB1370
SR 520 IFC$="TOGGLE"THENGOSUB5
      40:GOSUB1400
BC 530 GOTO210
BS 540 PRINTCHR$(147)CHR$(142)
      :RETURN
QQ 550 Z:RETURN
FQ 560 BY%=0:PRINT"{2 SPACES}E
      NTER VALUE FOR MEMORY F
      ILL"
EM 570 PRINT"{2 SPACES}HEX ($0
      0-$FF) ";:INPUTB$:L=LEN
      (B$):IFL<>2THENGOTO560
MG 580 H$="00"+B$:HA=0:GOSUB10
      40:IFHA<0ORHA>255THEN56
      0
DF 590 BY%=HA%:F BA%,EA%,BY%:R
      ETURN
EX 600 IFEE%=0ORCW%=0THENGOSUB
      680
JF 610 E ES%,EE%,CW%:GOSUB1220
      :RETURN
HQ 620 IFBA%=0THENGOSUB830
AA 630 GOSUB1000:IFN$=""THENRE
      TURN
HG 640 L N$,DN%,BA%:GOSUB1220:
      RETURN
JE 650 IFBA%=0ANDEA%=0THENGOSU
      B830
QR 660 GOSUB1000:IFN$=""THENRE
      TURN
DX 670 S N$,DN%,BA%,EA%:GOSUB1
      220:RETURN
QG 680 PRINT"{2 SPACES}ENTER P
      ROGRAM VOLTS(12.5/21/25
      )":PRINT"{2 SPACES}";:I
      NPUTV$
CJ 690 IFV$<>"12.5"ANDV$<>"21"
      ANDV$<>"25"THENGOTO680
RQ 700 PV=1:IFVAL(V$)>12.5THEN
      PV=2:IFVAL(V$)>21THENPV
      =3
XM 710 PRINT:PRINT"{2 SPACES}E
      NTER EPROM TYPE(2758/27
      16/2732/2764)"
EG 720 PRINT"{2 SPACES}(27128/
      27256/27512/68764/68766
      /68769)"
JQ 730 PRINT"{2 SPACES}";:INPU
      TP$:IFP$="68764"ORP$="6
      8769"THENP$="68766"
GC 740 OK=1:IFP$<>"2758"ANDP$<
      >"2716"ANDP$<>"2732"AND
      P$<>"2764"THENOK=0
QS 750 IFOK=0ANDP$<>"27128"AND
      P$<>"27256"ANDP$<>"2751
      2"ANDP$<>"68766"THENGOT
      0710
SS 760 BT=16:S=1:PRINT"
      {2 SPACES}";:L=LEN(P$):
      ET=VAL(RIGHT$(P$,L-2)):
      ML=2:GOSUB1130
JH 770 PRINT:IFCW%=0ORPM%=0THE
      NGOSUB1160:GOTO680
HE 780 H$=E$(S):EA$(2)=H$:HA=0
      :GOSUB1040:MA=HA:EE%=HA
      %:A1=1:GOSUB790:ES%=HA%
      :RETURN
XM 790 PRINT"{2 SPACES}ENTER E
      PROM "A$(A1)" ADDRESS":
      E$=H$:IFAL=1THENLA=0:E$
      ="00"
QK 800 PRINT"{2 SPACES}(S"E$"-
      $";E$(S);") ";:INPUTEA$
      (A1)
BD 810 PRINT:H$=RIGHT$("0000"+
      EA$(A1),4):HA=0:GOSUB10
      40:IFHA<LAORHA>MATHEN79
      0
MJ 820 RETURN
AC 830 A1=1:CA=8192:GOSUB840:B
      A=HA:BA%=HA%:A1=2:CA=BA
      :GOSUB840:EA=HA:EA%=HA%
      :RETURN
QF 840 PRINT"{2 SPACES}ENTER R
      AM "A$(A1)" HEX ADDRESS
      ":X$=X$(1):IFAL<>2THENX
      $="2000"
CB 850 PRINT"{2 SPACES}$"X$"-
      $DFFF) ";:INPUTX$(A1):PR
      INT
HG 860 L=LEN(X$(A1)):IFL<>4THE
      N840
FP 870 H$=X$(A1):HA=0:GOSUB104
      0:IFHA<CAORHA>57343THEN
      840
CX 880 RETURN
RR 890 GOSUB930:R BA%,EA%,ES%,
      CW%:GOSUB1220:RETURN
HA 900 GOSUB930:GOSUB960:RETUR
      N
CC 910 GOSUB600:CM=5:IFCK=2THE
      N1170
XP 920 GOSUB930:GOSUB960:CM=6:
      GOSUB970:RETURN
XE 930 IFBA%=0OREA%=0THENGOSUB
      830
AA 940 IFCW%=0ORPM%=0THENGOSUB
      680
CD 950 RETURN
FM 960 P BA%,EA%,ES%,CW%,PM%:G
      OSUB1220:RETURN
PF 970 GOSUB930:V BA%,EA%,ES%,
      CW%:GOSUB1220:RETURN
QP 980 PRINT$$"3 SPACES}COMMA
      ND{2 SPACES}ADDENDUM":P
      RINT:PRINT"{7 SPACES}({
      {SPACE}M / I / D / A /
      {SPACE}C / T)"
FJ 990 PRINT:PRINT$$" TOGGLE (
      CHECKSUM "TG$(TG):GOTO1
      170
KP 1000 N$="" :PRINT:PRINT"
      {2 SPACES}ENTER FILENA
      ME"
GB 1010 PRINT"{2 SPACES}";:INP
      UTN$:PRINT:IFN$=""THEN
      RETURN
DH 1020 IFN$="","ORN$="?"ORN$="
      *"ORN$="@ORN$="";ORN$
      ="."THENGOTO1000
SB 1030 RETURN
QR 1040 L=LEN(H$):FORI=LTO1STE
      P-1:B=16:A=ASC(MID$(H$
      ,I,1)):IFA>47ANDA<58TH

```

```

EN1060
SP 1050 FA=0:IFA<65ORA>70THENF
A=1:GOTO1070
AP 1060 GOSUB1090
FB 1070 NEXTI:IFFATHENFA=0:HA=
-1:RETURN
RP 1080 GOSUB1120:RETURN
QE 1090 B=B-1:IFH(B)>ATHEN1090
XE 1100 GOSUB1110:RETURN
GX 1110 HA=HA+(B*DV(I)):RETURN
PR 1120 HA%=HA+65536*(HA>32767
):RETURN
CK 1130 RE=ET-BT:BT=BT*ML:IFRE
THENS=S+1:IFS>6THENML=
1:BT=766:IFS>7THENBT=5
8
JH 1140 IFRETHENGOTO1130
XM 1150 CW%=W(S,PV):PM%=PM(S,P
V):ML=2:RETURN
DS 1160 PRINTS$"SELECTED EPROM
TYPE AND":PRINTS$"PGM
. VOLTAGE NOT VALID."
ER 1170 PRINT:PRINT"{6 SPACES}
-PRESS ANY KEY TO CONT
INUE-":PRINT:IFWTHEN12
00
FQ 1180 POKE54296,15:POKE54278
,89:POKE54276,33
AG 1190 POKE54273,34:POKE54272
,75:FORI=1TO100:NEXT:P
OKE54273,45:POKE54272,
90
KD 1200 GETAS:IFAS=""THENONW+1
GOTO1190,1200
XG 1210 POKE54296,0:RETURN
GH 1220 AD=PEEK(166)+256*PEEK(
167)
CP 1230 IFPEEK(165)=0THENCK=1:
IFCM>4THEN1260
GG 1240 PRINT:IFPEEK(165)=255T
HENCK=2
PB 1250 IFCM>1ORCK=2THENPRINT"
"AD"= ADDRESS OF "R$(
CM)
QQ 1260 POKE165,0:POKE166,0:PO
KE167,0:IFCM<>4THENPRI
NT"{2 SPACES}"C$(CM)"
{SPACE}COMMAND "K$(CK)
MJ 1270 IFC$="VER"THENIFCM=1OR
CM=5THENRETURN
KC 1280 GOTO1170
JD 1290 GOSUB830:M BA%,EA%:PRI
NT:GOTO1170
BS 1300 GOSUB830:I BA%,EA%:PRI
NT:GOTO1170
PA 1310 GOSUB1330:D ES%,EE%,CW
%:GOTO1170
PS 1320 GOSUB1330:A ES%,EE%,CW
%:GOTO1170
ED 1330 PRINT:IFCW%=0THENGOSUB
680
DA 1340 A1=1:GOSUB790:ES%=HA%:
LA=HA:A1=2:GOSUB790:EE
%=HA%:RETURN
HB 1350 GOSUB830:CA=8192:LA=57
343:A1=3:GOSUB840:CT%=
HA%

```

```

QM 1360 C BA%,EA%,CT%:PRINT:GO
SUB1220:RETURN
JA 1370 GOSUB830:CA=8192:A1=4:
GOSUB840:CT%=HA%:T BA%
,EA%,CT%:PRINT:RETURN
IFEA>53247THENPRINT"
{2 SPACES}-DATA SAVE N
OT ALLOWED ABOVE $CFFF
-":PRINT:GOSUB1170
XK 1390 RETURN
DQ 1400 TG=TG+1:TG%=128:IFTG>1
THENTG=0:TG%=0
AR 1410 POKE157,TG%:GOSUB990:R
ETURN

```

Hugh Rountree lives in Perry, Florida.

RAM-D

By Joseph Bolin

RAM-D is a RAM disk program for saving programs under ROM, I/O, and the block of memory at 49152 and recalling them at speeds 80 times faster than a 1541 disk drive. You can use a utility, store it in RAM-D, run another program, and then call back the first one almost instantaneously. There's no waiting for long disk saves and loads.

Just remember that a RAM disk is volatile; it's a temporary storage device. That means you'll lose the data or program should you turn off your computer without first saving it to disk.

RAM-D is written entirely in machine language for the 64. To enter it, use MLX, COMPUTE's machine language entry program. See "Typing Aids" elsewhere in this section. When MLX asks for the starting and ending address, respond with the following values.

Starting address: 0801

Ending address: 0C88

When you have finished entering it, save a copy to disk before exiting.

Using a RAM Disk

To run RAM-D, load it and enter **SYS 2051, DEVICE, AUTOSAVE**. Device is the device number of the RAM disk. It can be any device number normally used for a disk drive. Using 1 for Auto-save automatically stores in RAM-D any program as it is loaded off a disk. When you access the program for the second time, the program is removed from RAM-D. This keeps the last program that you've accessed from disk ready for reuse in RAM. Enter a 0 to dis-

able this feature.

You can load and save to RAM disk with the normal format, but to scratch files, you must type **SAVE"S:FILENAME",DEVICE**. Filename is the name of the file to be scratched, and device is the device number of the RAM disk. To erase all the files on the RAM disk, type **SAVE"N:",DEVICE**.

To list the directory, type **LOAD"←",DEVICE**. This lists the directory to the screen and does not erase the program in memory. You can pause the listing by pressing any control key. This listing provides the number of bytes in each file, the filename, the saved address, and the number of bytes free. With no files in RAM-D, it will report 24K of space for storage.

You can also save a specified area of memory to the RAM disk by typing **SAVE"FILENAME",DEVICE,1,SA,EA**. SA is the starting address, and EA the ending address.

You can load a file into a specified area of memory from RAM-D by typing **LOAD"FILENAME",DEVICE,1,LA**. LA is the loading address. RAM-D saves the load and save vectors, so the program can be used with TurboDisk and TurboSave if you relocate and load them first.

If you want to enable or disable the automatic saving feature, type **POKE 3110,1** to enable or **POKE 3110,0** to disable. To change the device number without erasing the disk, then enter **POKE 3110,DEVICE**. To see the gain you get with the automatic saving feature, enable it and load a program off the disk twice.

RAM-D

```

0801:00 00 AD 30 03 8D 3F 0C A2
0809:AD 31 03 8D 40 0C AD 32 35
0811:03 8D 41 0C AD 33 03 8D BC
0819:42 0C A9 77 8D 32 03 A9 DE
0821:08 8D 33 03 A9 C6 8D 30 E2
0829:03 A9 84 85 2B A9 00 8D 9B
0831:83 0E 20 FD AE 20 9E B7 55
0839:8E 3E 0C 20 FD AE 20 9E 2D
0841:B7 8E 3D 0C A9 0E 85 2C F5
0849:A9 09 8D 31 03 20 59 08 88
0851:A9 00 20 42 A6 4C 7B E3 9F
0859:A9 84 8D 39 0C A9 0C 8D 51
0861:3A 0C A9 00 8D 3B 0C A9 E1
0869:A0 8D 3C 0C A9 00 8D 84 62
0871:0C 18 60 6C 41 0C A5 BA A0
0879:CD 3E 0C D0 F6 A0 00 B1 7A
0881:BB C9 53 D0 0A C8 B1 BB EB
0889:C9 3A D0 0E 4C 53 0A C9 95
0891:4E D0 07 C8 B1 BB C9 3A B4

```

0899:F0 BE A5 B9 F0 11 20 7B A9
08A1:0C 84 FB 85 FC 20 7B 0C 1C
08A9:84 FD 85 FE 4C C0 08 A5 37
08B1:2B 85 FB A5 2C 85 FC A5 A9
08B9:2D 85 FD A5 2E 85 FE 20 81
08C1:0F 0C E6 FD D0 02 E6 FE 74
08C9:A5 FD 38 E5 FB 85 03 A5 33
08D1:FE E5 FC 85 04 A5 A3 18 E8
08D9:65 03 48 A5 A4 65 04 B0 34
08E1:44 48 A4 B7 88 B1 BB 91 4A
08E9:05 88 10 F9 A4 B7 A9 00 97
08F1:91 05 C8 A5 A3 91 05 C8 B5
08F9:A5 A4 91 05 C8 C8 68 91 54
0901:05 88 68 91 05 C8 C8 A5 60
0909:FB 91 05 C8 A5 FC 91 05 F3
0911:C8 A9 00 91 05 98 A2 05 DF
0919:20 50 0C 78 A9 34 85 01 82
0921:A0 00 4C 39 09 4C 7E B9 D0
0929:B1 FB 91 A3 E6 FB D0 02 4A
0931:E6 FC E6 A3 D0 02 E6 A4 0E
0939:B1 FB 91 A3 A5 FB C5 FD 36
0941:D0 E6 A5 FC C5 FE D0 E0 A6
0949:A9 37 85 01 58 20 24 0C 56
0951:18 60 4C 04 F7 AD 3D 0C 4E
0959:F0 68 A6 BB A4 BC 20 97 7E
0961:0B 90 6F A5 BA C9 08 D0 43
0969:59 A9 00 35 90 A4 B7 D0 42
0971:03 4C 10 F7 A6 B9 20 AF A5
0979:F5 A9 60 85 B9 20 D5 F3 43
0981:A9 08 20 09 ED A5 B9 20 98
0989:C7 ED 20 13 EE 85 AE A5 C0
0991:90 4A 4A B0 BD 20 13 EE 56
0999:85 AF 8A D0 08 A5 C3 85 9C
09A1:AE A5 C4 85 AF A5 AE 85 5C
09A9:FB A5 AF 85 FC 20 F0 F4 B0
09B1:90 03 4C F9 E0 86 FD 84 97
09B9:FE 20 C0 08 A6 FD A4 FE 61
09C1:18 60 6C 3F 0C 85 93 48 5F
09C9:68 D0 F7 A5 BA CD 3E 0C 33
09D1:D0 83 20 0F 0C A5 B9 F0 7D
09D9:19 A0 00 B1 7A C9 2C D0 DF
09E1:0C 20 7B 0C 85 FE 84 FD 61
09E9:A0 01 4C FD 09 A0 00 4C 0D
09F1:FD 09 A0 01 A5 2B 85 FD 4C
09F9:A5 2C 85 FE 84 AA A0 00 9A
0A01:B1 BB C9 5F D0 03 4C 17 4E
0A09:0B A6 BB A4 BC 20 97 0B AE
0A11:90 03 4C CA 0B 78 A9 34 26
0A19:85 01 A0 00 B1 FB 91 FD E2
0A21:E6 FB D0 02 E6 FC A5 FB 54
0A29:C5 A8 D0 06 A5 FC C5 A9 1B
0A31:F0 09 E6 FD D0 02 E6 FE 18
0A39:4C 1D 0A A6 FD A4 FE A5 8C
0A41:AA F0 07 A9 37 85 01 58 8C
0A49:18 60 00 A6 2D A4 2E 4C 90
0A51:44 0A A9 01 85 AA C8 98 50
0A59:A4 BC 18 65 BB 90 01 C8 33
0A61:AA C6 B7 C6 B7 20 97 0B 58
0A69:90 03 4C CA 0B A5 A8 38 35
0A71:E5 FB 85 03 A5 A9 E5 FC F4
0A79:85 04 A5 A5 48 A5 A6 48 CE
0A81:C8 98 85 A7 A2 05 20 5A 0F
0A89:0C A4 A7 B1 A5 A0 00 91 1E
0A91:A5 A5 A5 C5 05 D0 06 A5 10
0A99:A6 C5 06 F0 0A A2 A5 A9 12
0AA1:01 20 50 0C 4C 8A 0A 68 12
0AA9:85 A6 68 85 A5 A0 00 B1 F0
0AB1:A5 F0 2C 20 08 0C B1 A5 D5
0AB9:38 E5 03 91 A5 C8 B1 A5 36
0AC1:E5 04 91 A5 C8 B1 A5 38 E6

0AC9:E5 03 91 A5 C8 B1 A5 E5 5C
0AD1:04 91 A5 C8 C8 C8 98 A2 CA
0AD9:A5 20 50 0C 4C AE 0A 78 3D
0AE1:A9 34 85 01 B1 A8 91 FB E7
0AE9:A5 A8 C5 A3 D0 06 A5 A9 81
0AF1:C5 A4 F0 0F E6 FB D0 02 EB
0AF9:E6 FC E6 A8 D0 02 E6 A9 2E
0B01:4C E5 0A A9 37 85 01 58 BC
0B09:A5 FB 85 A3 A5 FC 85 A4 AC
0B11:20 24 0C 4C 7B E3 A9 01 46
0B19:85 AA A9 84 85 A5 A9 0C 3C
0B21:85 A6 AD 8D 02 D0 FB A9 27
0B29:0D 20 D2 FF A0 00 B1 A5 36
0B31:F0 49 20 08 0C 20 DA 0B 38
0B39:88 A4 A7 A5 A8 38 E5 FB F1
0B41:AA A5 A9 E5 FC 20 CD BD 6B
0B49:A9 20 20 D2 FF A9 22 20 78
0B51:D2 FF A6 A5 A4 A6 20 68 68
0B59:0C A9 22 20 D2 FF A9 20 30
0B61:20 D2 FF A4 A7 B1 A5 AA 80
0B69:C8 B1 A5 C8 84 A7 20 CD 62
0B71:BD A2 A5 A5 A7 20 50 0C 88
0B79:4C 23 0B A9 12 20 D2 FF 31
0B81:A5 A3 49 FF AA A5 A4 49 FA
0B89:FF 20 CD BD A2 43 A0 0C 97
0B91:20 68 0C 4C 7B E3 86 BB 4C
0B99:84 BC A9 84 85 A5 A9 0C C0
0BA1:85 A6 A0 00 B1 A5 F0 26 64
0BA9:B1 A5 F0 24 B1 BB C9 2A 9C
0BB1:F0 4C C9 3F F0 4E D1 A5 8A
0BB9:F0 4A 20 08 0C 98 18 69 BB
0BC1:06 A2 A5 20 50 0C 4C A3 29
0BC9:0B A2 04 4C 37 A4 38 60 70
0BD1:C4 B7 F0 04 88 4C BB 0B 8E
0BD9:C8 B1 A5 85 FB C8 B1 A5 D9
0BE1:85 FC C8 B1 A5 85 A8 C8 8B
0BE9:B1 A5 85 A9 18 C8 A6 AA 69
0BF1:D0 0A B1 A5 85 FD C8 B1 EA
0BF9:A5 85 FE 60 C8 60 20 08 3A
0C01:0C 4C DA 0B C8 D0 A1 C8 D3
0C09:B1 A5 D0 FB C8 60 AD 3B 9B
0C11:0C 85 A3 AD 3C 0C 85 A4 A1
0C19:AD 39 0C 85 05 AD 3A 0C 8F
0C21:85 06 60 A5 A3 8D 3B 0C B9
0C29:A5 A4 8D 3C 0C A5 05 8D 41
0C31:39 0C A5 06 8D 3A 0C 60 CB
0C39:00 00 00 00 00 00 00 51
0C41:00 00 20 42 59 54 45 53 7B
0C49:20 46 52 45 45 2E 00 18 9C
0C51:75 00 90 02 F6 01 95 00 3D
0C59:60 85 02 38 55 00 E5 02 42
0C61:B0 02 D6 01 95 00 60 8E 39
0C69:71 0C 8C 72 0C A0 00 B9 92
0C71:FF FF F0 F2 20 D2 FF C8 EB
0C79:D0 F5 20 FD AE 20 9E AD 3C
0C81:4C F7 B7 00 00 00 00 00 B4

Joseph Bolin lives in Rockwell, Iowa. □

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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 free printed copies of both of these handy programs for you to type in. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope. Send a self-addressed disk mailer with postage to receive these programs on disk.

Write to Typing Aids, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

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Here's a special program that you'll find only on Gazette Disk.

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By James T. Jones
Klondike, TX

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HOW TO TYPE IN GAZETTE PROGRAMS

Each month, Gazette publishes programs for the Commodore 128 and 64. Each program is clearly marked as being written for the 128, 64, or both. Be sure to type in the correct version for your machine. All 64 programs run on the 128 in 64 mode. Be sure to read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

At irregular intervals, we publish two programs designed to make typing in our programs easier: The Automatic Proofreader, for BASIC programs, and a 128 and 64 version of MLX, for entering machine language programs. In order to make more room for programs, we do not print these handy utilities in every issue of the magazine. Copies of these programs are available on every Gazette Disk. If you don't have access to a disk, write us, and we'll send you free copies of both of these programs. Please enclose a stamped, self-addressed envelope. Write to Typing Aids, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

When entering a BASIC program, be especially careful with DATA statements, as they are extremely sensitive to errors. A mistyped number in a DATA statement can cause your machine to "lock up" (you'll have no control over the com-

puter). If this happens, the only recourse is to turn your computer off and then on, erasing what was in memory. This could cause you to lose valuable data, so be sure to *save a program before you run it*. If your computer crashes, you can always reload the program and look for the error.

Special Characters

Most of the programs listed in each issue contain special control characters. To facilitate typing in any programs from Gazette, use the following listing conventions.

The most common type of control characters in our listings appear as words within braces: {DOWN} means to press the cursor-down key; {5 SPACES} means to press the space bar five times. {RVS} means to enter Reverse mode by simultaneously pressing the Ctrl key and the 9 key.

To indicate that a key should be shifted (hold down the Shift key while pressing another key), the character is underlined>. For example, A means hold down the Shift key and press A. You may see strange characters on your screen, but that's to be expected. If you find a number followed by an underlined key enclosed in braces (for example, {8 A}), type the key as many times as indicated (in our example, enter eight shifted A's).

If a key is enclosed in special brack-

ets, [<>], hold down the Commodore key (at the lower left corner of the keyboard) and at the same time press the indicated character.

Rarely, you'll see a single letter of the alphabet enclosed in braces. This can be entered on the Commodore 64 by pressing the Ctrl key while typing the letter in braces. For example, {A} means to press Ctrl-A.

The Quote Mode

You can move the cursor around the screen with the Crsr keys, but you may want to move it under program control, as in examples like {LEFT} and {HOME} in the listings. The only way the computer can tell the difference between direct and programmed cursor control is the quote mode.

Once you press the quote key, you're in quote mode. It can be confusing when you are in this mode if you mistype a character and cursor left to change it. You'll see a graphics symbol for cursor left. Use the delete key to back up and edit the line from the beginning. Type another quotation mark to get out of quote mode.

If things get too confusing, exit quote mode by pressing Return; then cursor up to the mistyped line and fix it. If the mistake involves cursor movement, however, you must press the quote key to reenter quote mode. □

When You Read:	Press:	See:	When You Read:	Press:	See:	When You Read:	Press:	See:
{CLR}	SHIFT CLR/HOME		{PUR}	CTRL 5		←	←	
{HOME}	CLR/HOME		{GRN}	CTRL 6		↑	SHIFT ↑	
{UP}	SHIFT ↑ CRSR ↓		{BLU}	CTRL 7				
{DOWN}	↑ CRSR ↓		{YEL}	CTRL 8				
{LEFT}	SHIFT ← CRSR →		{ F1 }	f1				
{RIGHT}	← CRSR →		{ F2 }	SHIFT f1				
{RVS}	CTRL 9		{ F3 }	f3				
{OFF}	CTRL 0		{ F4 }	SHIFT f3				
{BLK}	CTRL 1		{ F5 }	f5				
{WHT}	CTRL 2		{ F6 }	SHIFT f5				
{RED}	CTRL 3		{ F7 }	f7				
{CYN}	CTRL 4		{ F8 }	SHIFT f7				

For Commodore 64 Only		
⌘ 1	COMMODORE 1	
⌘ 2	COMMODORE 2	
⌘ 3	COMMODORE 3	
⌘ 4	COMMODORE 4	
⌘ 5	COMMODORE 5	
⌘ 6	COMMODORE 6	
⌘ 7	COMMODORE 7	
⌘ 8	COMMODORE 8	

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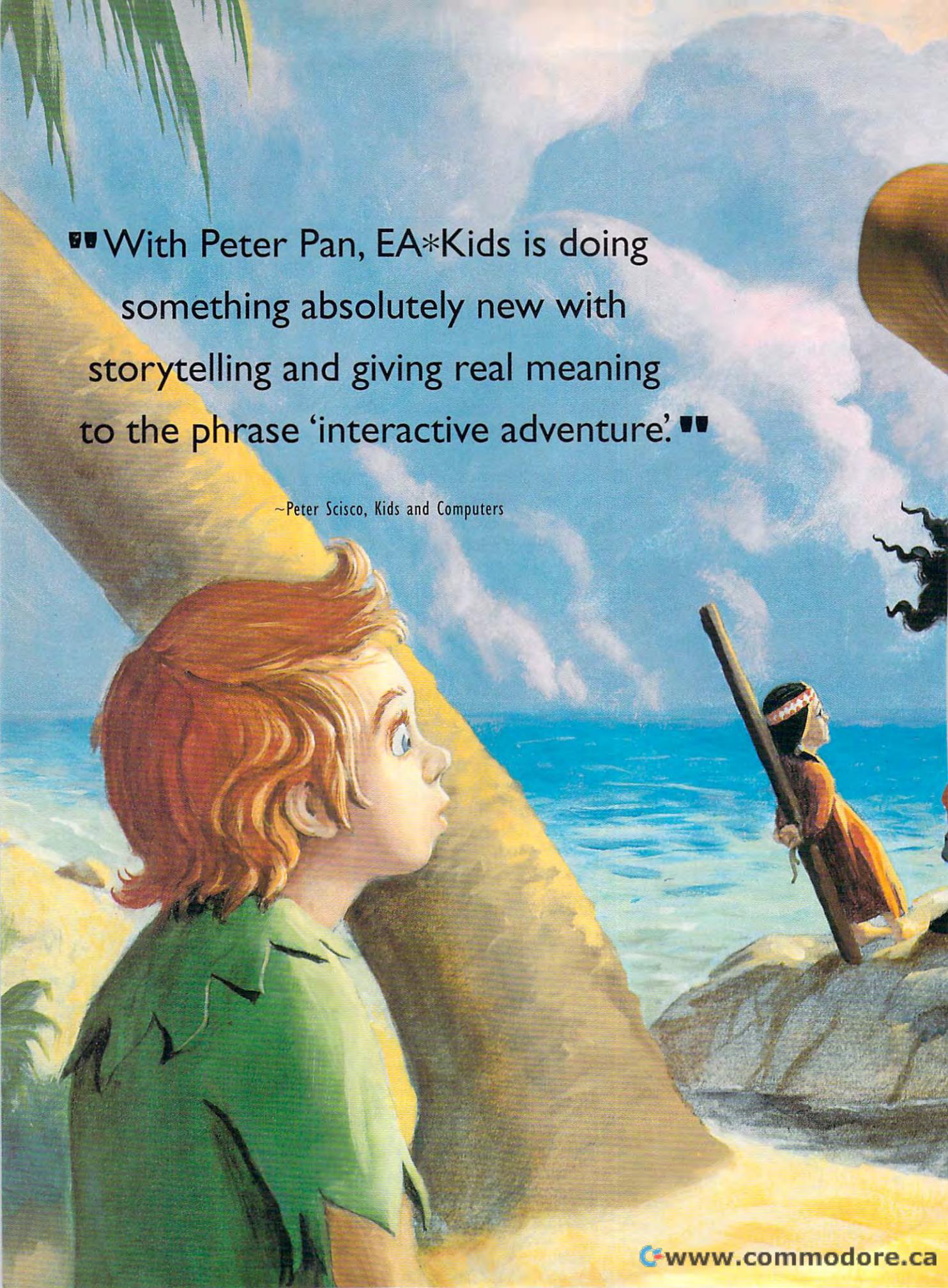


Ages
3-7
IT TALKS!



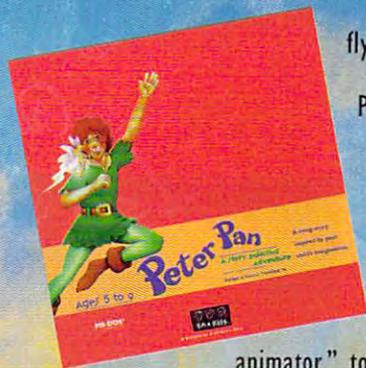
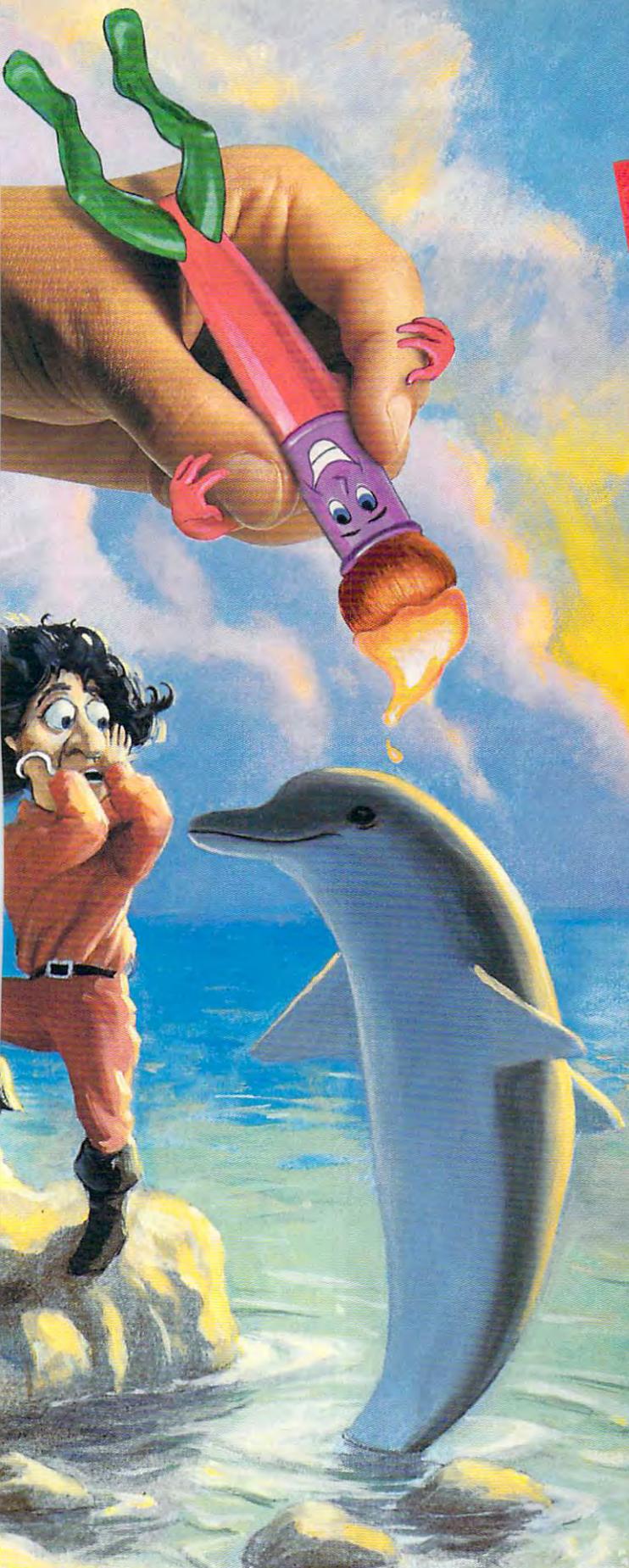
Circle Reader Service Number 259

Humongous Entertainment™ Creating software that doesn't underestimate your child. Available on Disk or CD-ROM for Macintosh and IBM PC systems. SRP \$49.95 Disk/ \$54.95 CD-ROM. To purchase, visit our favorite software retailer, or order direct from Humongous Entertainment, 13110 NE 177th Pl. Box 180, Woodinville, Wa. 98072. (206) 485-1212. www.humongous.com

A painting depicting Peter Pan in a green tunic looking out over a tropical beach. In the distance, a Native American woman in a brown dress and headband stands on a rock, holding a long wooden staff. The scene is set against a backdrop of a blue sky with white clouds and a bright sun. The overall style is reminiscent of classic children's book illustrations.

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(Actual computer screen shot)

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THE KIDS SOFTWARE EXPERTS

Circle Reader Service Number 165

ALR EVOLUTION IV MPC

ALR's Evolution IV MPC boasts good looks, power, and an attractive price. However, it's the system's expandability, quality, and great software bundle that make it a standout in the crowded MPC market.

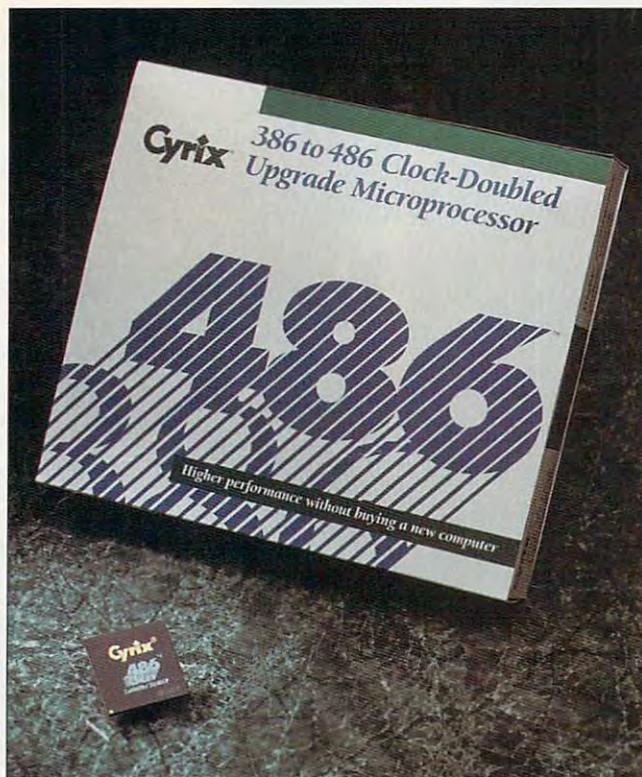
Let's start with the basics. The standard Evolution IV MPC package comes with an Intel 486DX/33, 4MB of RAM, and six drive bays (three accessible from the front). The system sports six 16-bit ISA-bus slots, two of which can be used with VL-Bus extensions and one of which can be used with ALR's proprietary local-bus extension. The ZIF socket lets you upgrade the CPU with one of Intel's OverDrive chips (including the 32- or 64-bit P24T version of the Pentium), and you can upgrade memory all the way to 52MB on the motherboard.

My review system was fully decked out with a 240MB Western Digital Caviar drive, a VL-Bus ATI Mach 32 video adapter, 8MB of RAM, and the optional 256K cache, which provides zippy performance even in demanding multimedia applications. It also came with a 3½-inch floppy drive, a Sony CDU 31-A2 CD-ROM drive (the system now ships with a Texel DM-3024 dual-speed drive), a Media Vision Pro AudioSpectrum 16 sound card, and a Labtec microphone. ALR routes the audio board's sound through the PC's speaker (which is very good, as PC speakers go), and you can hook up your own external speakers. I found the system's case solid and accessible.

A standout feature is the TriCombo card, which occu-



ALR's Evolution IV packs great multimedia performance into an attractive package with an attractive price.



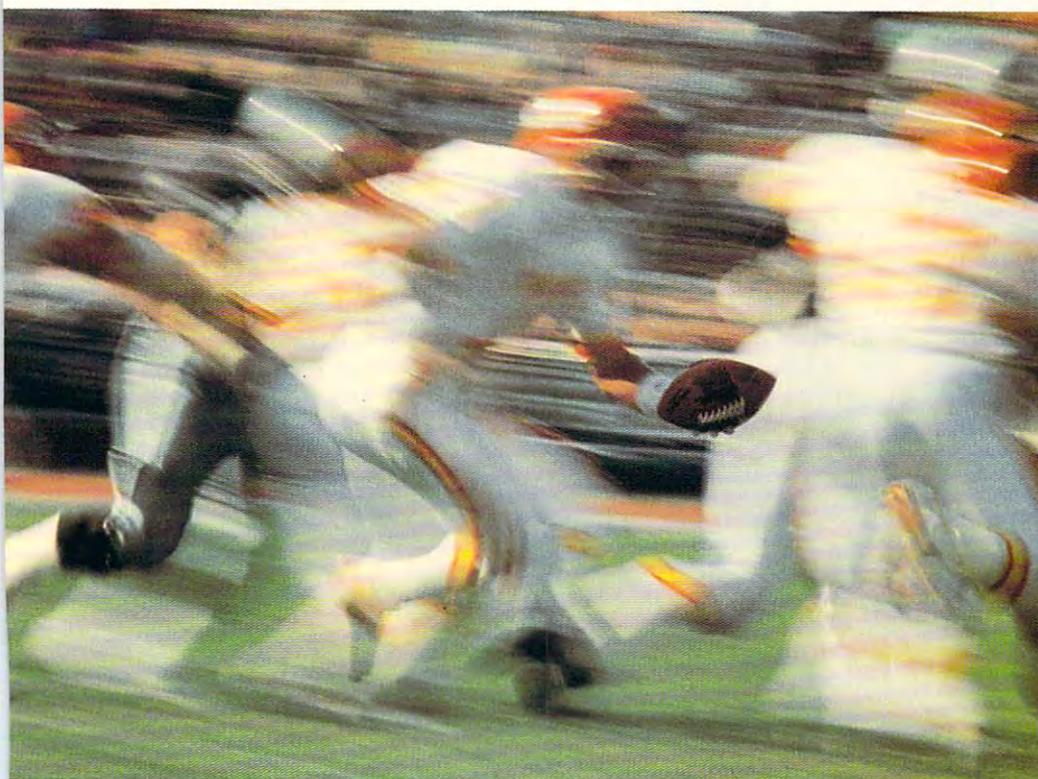
The Cyrix Cx486DRx² replacement microprocessor brings 486 performance and compatibility to your current 386DX system.

pies the proprietary local-bus slot and provides ATI local-bus video, a 256K processor cache, and an Ethernet networking adapter.

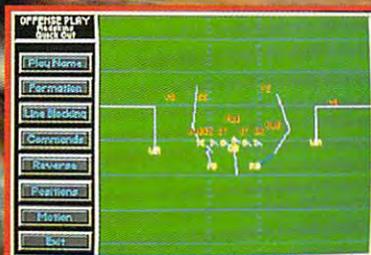
While a number of manufacturers—even some of the big names—have had trouble with quality control in the form of faulty motherboards, short-lived hard drives, and similar problems, I encountered no such difficulties with this MPC. The components come from respected, reliable manufacturers, and ALR offers a limited five-year (chassis, motherboard, and power supply)/15-month (labor costs and peripherals) warranty with optional on-site service and available extended-warranty options. While there was a longer-than-usual delay in switching from graphics to text mode on the bundled ALR 14-inch noninterlaced SVGA monitor, that's only a very minor quibble; generally, I found it sharp, stable, and easy to look at. I liked the feel and action of the keyboard, and the two-button mouse worked fine.

Preinstalled on the system are MS-DOS 6, Windows 3.1, WinCIM (for access to CompuServe, if you opt for a modem), and several CD-ROM titles, including Cinemania, Works for Windows, Multimedia Beethoven, Bookshelf for Windows, Kodak Photo CD ACCESS software, and Microsoft's Multimedia Pack 1.0. If you opt for a fax/data modem, you'll also receive Eclipse Fax for Windows. If you'd rather avoid the hassle of installing a number of hardware and software items on your new system, this may be the MPC for you. I thoroughly enjoyed this system and found it ready for the most demanding applications. ALR offers a multitude of system options; contact the company for a system configured to

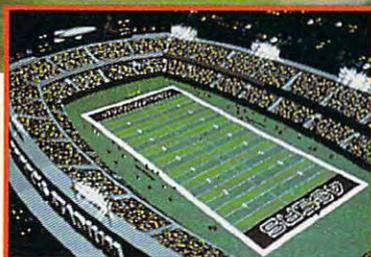
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CYRIX CX486DRx²

It's no fun owning a 386 anymore. With today's more powerful software, 386 machines feel slow. You could sell your 386 and buy a new 486, or you could buy a new 486 motherboard and swap out your old one. But there's a third solution that's much less complicated.

Cyrix has a single-chip upgrade that can bring 486-level performance to your 16-MHz, 20-MHz, or 25-MHz 386DX system. All you do is pull out your old CPU (a chip puller is included), put the new Cx486DRx² chip in its place, install the heat sink on top of the chip (20-MHz and 25-MHz upgrades only), and install the cache software (which simply turns on the processor's cache; it doesn't take up any memory).

The new chip speeds up your computer in three ways. First, it acts as a clock doubler, so your 16-MHz machine will run at 32 MHz, your 20-MHz machine will run at 40 MHz, or your 25-MHz machine will run at 50 MHz. Second, the chip includes a built-in 1K cache, which isn't found on 386 chips. (A true 486 has a built-in 8K cache, which gives it a greater advantage in this area.) Finally, the Cx486DRx² has an instruction set that's compatible

with Intel's 486 instruction set. According to Cyrix, all DOS, Windows, and OS/2 software will work with its upgrade chip.

The upgrade chip doesn't include a math coprocessor (which the 486DX has, but the 486SX doesn't have). However, it is

getting the Cyrix 486 upgrade chip is the best way to speed things up.

DAVID ENGLISH

Cyrix
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Wing Commander Academy lets you create your own custom missions against cunning, feline Kiltrathi opponents.

compatible with Intel's 387 math coprocessors and Cyrix's own FasMath 83D87 math coprocessor.

I tested a Cx486DRx² 20/40 chip on a four-year-old ZEOS 386DX system. Before I installed the Cyrix chip, Norton Utilities showed an Intel 20-MHz 386DX with a speed of 8.9. After the installation, Norton showed a Cyrix 40-MHz 486 with a speed of 47.9. With the 386DX, WindSock reported speeds of CPU: 85, Video: 37, Disk: 82, Memory: 35, and Overall: 70. With the 486DRx², WindSock reported CPU: 268, Video: 86, Disk: 113, Memory: 35, and Overall: 160.

As you can see from the WindSock numbers, a faster processor can even accelerate your system's video and hard drive performance. Short of buying a new motherboard or a new computer,

WING COMMANDER ACADEMY

Piloting two ponderous Crossbow attack ships, you and your wingman drop out of autopilot at Nav Point 4. As you survey the starscape, a strange sense of déjà vu overcomes you. Two Ralatha capital ships, your primary targets, hang motionless in the distance. Between you and your targets swarm a mess of Kiltrathi fighters, like angry bees protecting their queen. You give Hobbes the order over the communication circuit to break and attack, then pull the ship hard to the right and do the same . . .

That sense of déjà vu could be caused by a number of things. Perhaps you spent many hours playing

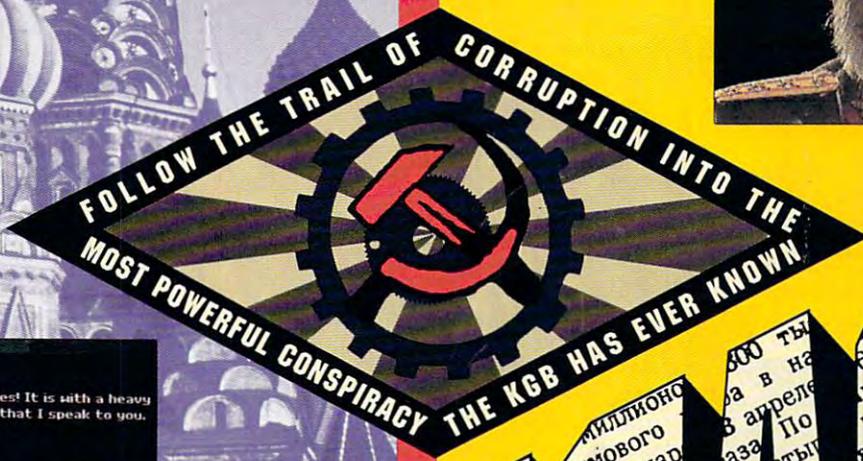
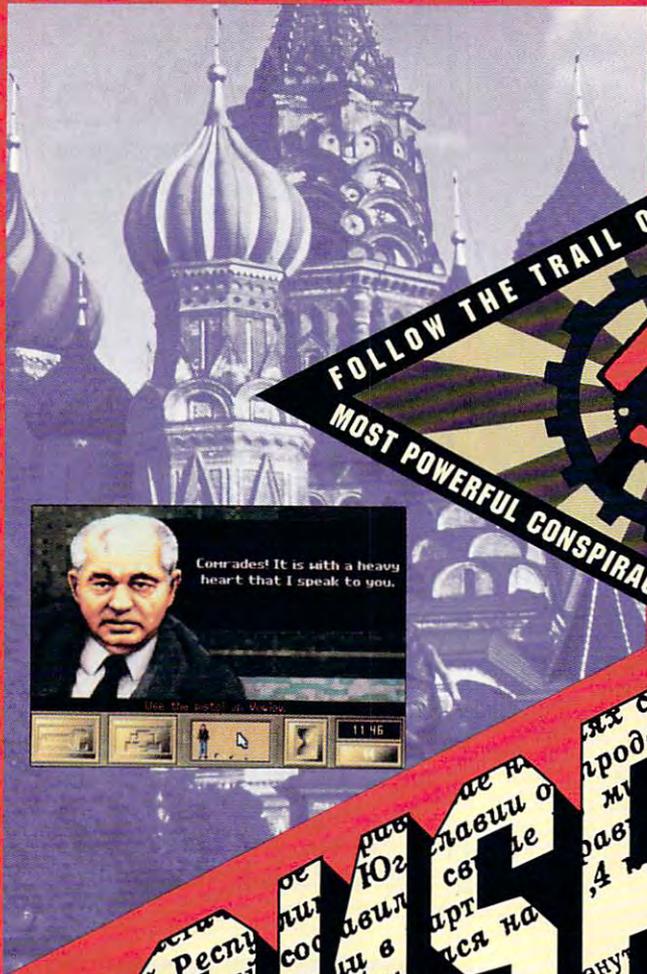
one of the first two Wing Commander games, and you've encountered the feline Kiltrathi before. Or maybe it's just the tenth time in an hour that you've tried to make it through this specific mission. Cursing as you explode yet again, you have no one to blame but yourself—after all, in Wing Commander Academy, you're the one who made it so tough.

In Academy, you aren't flying in the persona of "old blue brow," the familiar hero from the preceding games. Instead, you're a cadet at the Confederation Academy. Rather than facing actual combat, you experience missions courtesy of a holodeck-style simulator. Designing these missions is up to you.

Academy uses the Wing Commander II engine and scraps the story line that wraps around the missions in the earlier games in favor of an elegant, albeit simplistic, mission design editor. You design your own missions and then play them through. Missions can be saved to disk and shared with friends. Gamers looking for cinematic drama won't find it in Academy; Wing Commander fans, however, will find combat scenarios limited only by their imagination and skill.

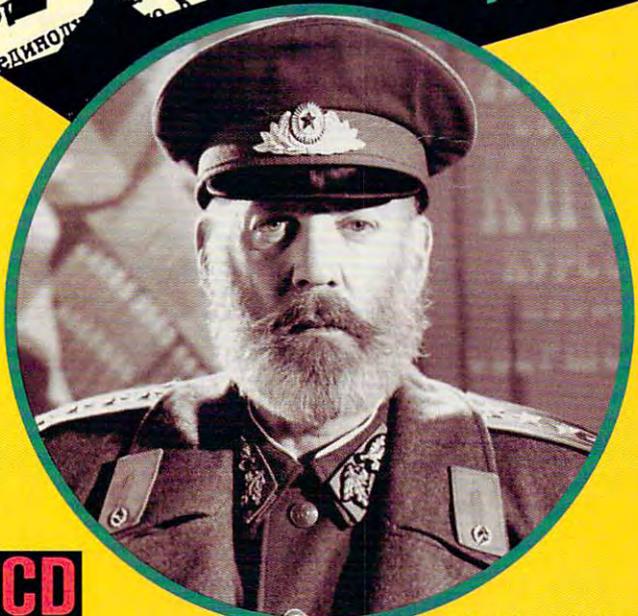
In Design mode, you place enemy craft and obstacles at each navigation point as you see fit. There are 16 ship types to choose from, including two new designs. Adding variety and challenge are asteroids and minefields, retrievable data pods and ejected pilots, and a space station to defend. You can choose wingmen—simulated versions of the sidekicks from the first two games—or choose to

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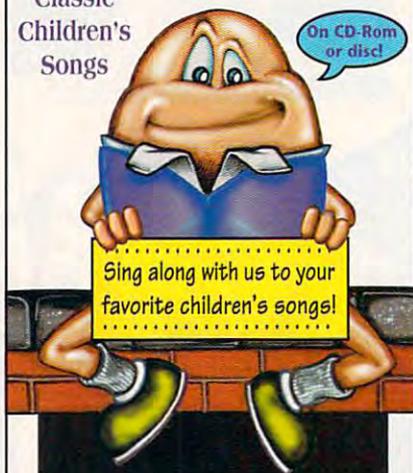
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REVIEWS

go it alone. The relative skill of each enemy pilot is also selectable.

Turning tradition on its head, you can fly missions as a Kilrathi pilot up against Confederation fighters. If you just want to dive in and start shooting, the Wave mode skips the mission design altogether. You face progressively tougher ships in progressively larger numbers and shoot for the highest score.

Taking the story *out* of a game is a bold move by Origin and a concept that would be anathema to many of today's top designers. Narrative framework almost always helps to bridge the emotional distance between player and game. Yet *Academy* succeeds because designing the missions puts some of "you" into the game. An added benefit is that jettisoning story animation lets *Academy* fit in just under 5MB of hard drive space.

If you're looking for some outer space action while you await Wing Commander III, you'll find that *Wing Commander Academy* is a great, all-action playground where you can keep your battle skills honed.

DAVID GERDING

Origin
Distributed by Electronic Arts
(512) 335-5200
\$49.95

Circle Reader Service Number 436

SYNDICATE

The recent trend in science fiction has been to paint the near future as a dark, dirty dystopia. Electronic Arts' science-fiction strategy game, *Syndicate*, is no exception. Created by Bullfrog, which brought us *Populous* and *PowerMonger*, *Syndicate* is a dark, bloody, Ridley Scott-esque strategy game set in 2096. You take on the role of a pseudogodfather, riding herd on a crime syndicate looking to cash in on a world made ripe for plundering by megacorporations.

The task is simple: You must conquer the globe through a series of covert assassination, bloodbath, and persuasion missions. The tools of your trade are genetically augmented cyborgs, outfitted with a neural control device which allows you to alter the brain chemistry of the agents, boosting their intelligence, perception, and adrenaline levels. While the agents battle it out on the streets of tomorrow's cities, you hover safely overhead in an ultra-modern airship.

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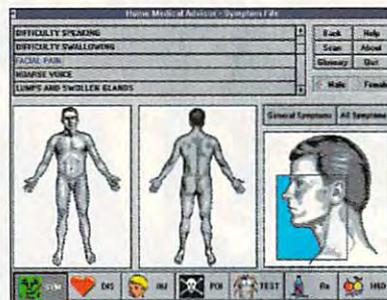
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SATISFACTION GUARANTEED



The Windows version of Dr. Schueler's Home Medical Advisor may be the closest thing to a modern house call.

OOPS!

In our August 1993 issue, we ran a review of the Windows version of Doctor Schueler's Home Medical Advisor, but we showed a screen shot from the DOS version. Here's the Windows screen shot that should have appeared with the review.

Doctor Schueler's Home Medical Advisor,
Windows Version

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(800) 788-2099
(407) 779-0310
\$87.50

Circle Reader Service Number 437

pleting a specific mission plan, and as your sphere of influence grows, so does your revenue from taxes. Revenue is important, because the only way to succeed in the series of increasingly difficult missions is to have stronger and faster agents armed with more and better firepower. The cyborg agents can be updated in any number of ways, from cybernetic limbs to en-



Syndicate's futuristic cities are full of numerous deadly challenges.

hanced computerized brains. Weapons range from simple automatic pistols to high-powered laser rifles and beyond. To have access to these toys, though, you must research the technology, and as any good technohead knows, research costs serious money.

Once the agents have been outfitted with the tools of the trade necessary for the mission, they're delivered to the scene of the mission, and you assume control. The play screen is divided into three main windows. The first gives control of the agents, either singly or as a group. You can alter the agents' chemical levels and may even choose to induce a state of controlled panic, pumping all drug levels to maximum. When pumped up, the cyborgs really fly, but when the drug wears off, they slow down considerably. The second window is an overhead sensor display which shows the direction of the object or person that is your mission objective and indicates the location of civilians, police, and rival cyborgs. The main window shows a skewed 3-D overhead view of the city, rendered in crisp, brooding Super VGA. The attention to details—such as working levitation cars, magnetic-levitation trains, and neon billboards—is impressive, but the cities are just a touch too clean and sharp-edged for such a bleak future.

You control the movement of the agents, as well as which weapons they shoulder and whom they fire upon. Often missions become bloodbaths, with rival agents and police officers descending from all corners. The AI is decent, although not brilliant. I do like the way the civilians run away when you level your sights on them.

Syndicate is a lot of fun. The game

Most People Can't See a Single Reason to Try Something Besides SimCity®

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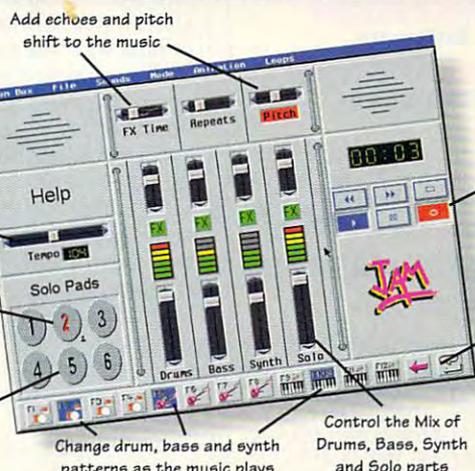
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INLINE SOFTWARE

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Available for Macintosh and Windows.

Circle Reader Service Number 155

REVIEWS

is easy to learn, but the missions are challenging enough to keep the interest level high. While scenarios are centered on offensive firepower, you've got to develop a unique defensive strategy for each mission. You may, for instance, need to split your agents, hiding one behind a corner to rush in and flank the enemies. As you battle, weapons run dry pretty quickly, but you can always use the rather nasty tactic of cop hunting. One shot will take a policeman out, and your agent can then retrieve a fully loaded shotgun to pursue more important targets. This isn't a game to use as a morality lesson for the kids—it's bloody, it requires you to be ruthless, and some people may take issue with the use of drugs to control your agents. But it's a ball to play.

PAUL C. SCHUYTEMA

Electronic Arts
(800) 245-4525
\$59.95

Circle Reader Service Number 438

PANASONIC KX-P2023

If I had the same luck with light switches as I do with DIP switches, I'd have to learn to read in the dark and sleep with the lights on. So I was pleasantly surprised to see the Panasonic KX-P2023 dot-matrix printer has no DIP switches at all. None. The printer comes with a 3½ floppy disk with a DOS setup program that takes the place of the missing—but not missed—DIP switches and lets you control the printer from your computer.

The control panel on the printer is easy to understand and operate—not one of the five buttons has more than two functions, and they're all clearly labeled. In addition to simplicity, the P2023 offers 24-pin quality and several useful features, including paper parking, tear-off advance, and automatic loading for both single-sheet and tractor-fed paper. It has four letter-quality typefaces resident, and with 360x360 dpi resolution, TrueType and other graphic soft fonts print beautifully, albeit slowly.

The P2023 offers a Super Quiet print mode; but it's an inherently quiet printer even in standard mode, and I don't think the slight reduction of printing noise in Super Quiet mode is enough to justify its slower printing.

In spite of its quiet, easy operation, the P2023 can arouse some typical dot-matrix frustrations. If you like precise margins, you can expect to fiddle with your software's margin settings and the

paper position for each application that uses its own printer driver. The included Windows 3.1 driver offers greater control over default settings than the printer's DOS setup program (it offers Epson and IBM printer emulations), so once you get the paper positioned and margins tweaked, you shouldn't have to adjust them each time you change Windows applications.



The KX-P2023 comes with disk-based software for easy configuration.

On the printer I tested, tractor-paper jams were another frequent annoyance. The problem appeared to be the clear-plastic paper guide above the platen, which often caught the top edge of the paper. (It didn't seem to cause a problem with single sheets.) Avoid the problem by swinging the guide out of the way to keep the first sheet from catching.

Paper feeding problems aside, the KX-P2023 is a good choice for home or small-business use if you want to forego the extra expense of an ink-jet or if you need to print multi-copy forms.

PHILLIP MORGAN

Panasonic
(800) 222-0584
\$249.95

Circle Reader Service Number 439

THE NORTON UTILITIES 7.0

The Norton Utilities 7.0 is Symantec's counterpoint to DOS 6, DoubleSpace, Stacker, and SuperStor. It's true that you'll find minor improvements in most of the 7.0 utilities, but if you're using DOS 6 and one of these compression programs, you'll have more reason to upgrade.

The best of 7.0's compression-savvy utilities is the Norton Disk Doctor (NDD). NDD is a one-stop hard disk hospital that offers everything from diagnostics to surgery—all packaged in an automated, easy-to-use shell. The new NDD has all the powerful discovery and repair tools of its predecessors, plus it's aware of compressed

Over one hundred
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your reflexes
and intelligence.

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will keep your gears
spinning!

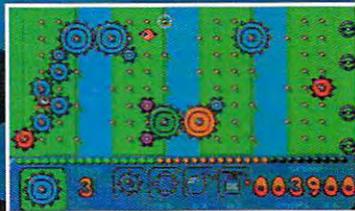
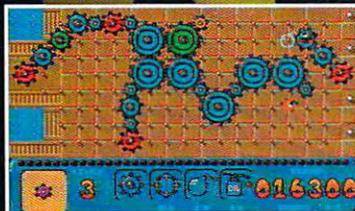
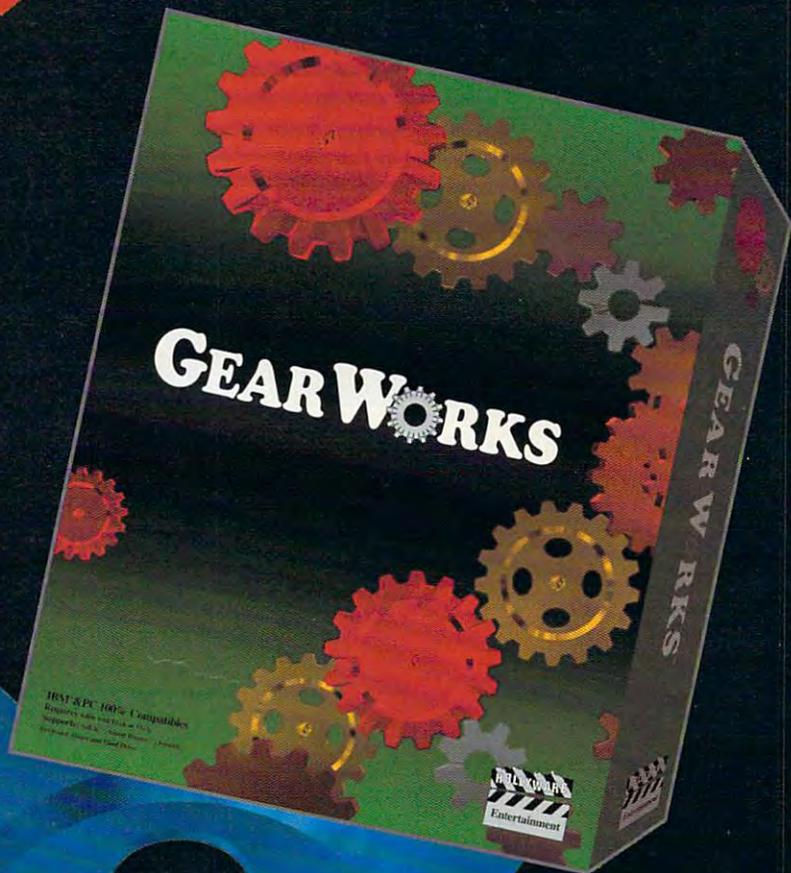
Gear Works is the most unique puzzle game to hit the market in years. In Gear Works you will connect gears of various sizes and colors together in order to transform Twelve Wonders of the Ancient and Modern world into time pieces, while racing against time and friction. Watch out for the Pottins, two gremlin like creatures, that will torment you by rusting the gears and breaking off the mounting pegs.

Game features: Various gear types, over one hundred puzzles to solve, bombs to blow up incorrectly placed gears and a gun to shoot those pesky Pottins off the play area.

Available in IBM PC and Amiga computers.

Check your local retail stores for Jonny Quest[®]-*Curse of the Mayan Warriors* and other HOLLYWARE Games.

Circle Reader Service Number 117



HOLLYWARE ENTERTAINMENT P.O. Box 9148 Marina Del Rey, Ca. 90295 (310) 822-2200

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drives and handles them intelligently. If you ask NDD to scan a compressed drive, for example, it not only scans the compressed drive but also scans the host drive and tests the data structures on the compressed drive.

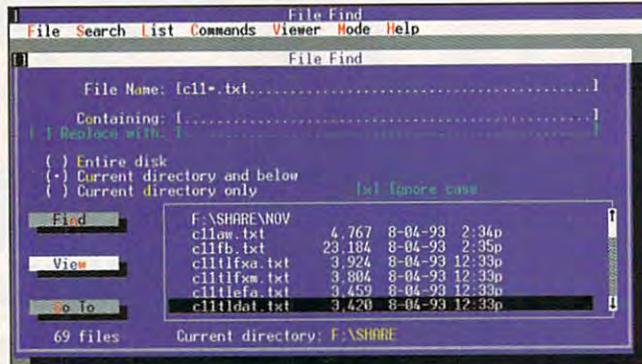
It's worth noting, however, that with Stacker, I've encountered some problems that NDD couldn't fix but Stac's Check could. Many users run NDD in their AUTOEXEC.BAT files to catch disk errors on startup, so that they can be fixed before they multiply.

Like NDD, SpeedDisk is hip to compressed drives, but you might feel safer using the defragger that comes with your compression program.

Of the other utilities, the most improved is Disk Editor. This program lets you edit your hard disk on the physical level (sides, tracks, and sectors), the organizational level (partitions, boot sectors, and FATs), and the logical level (files and directories). New in 7.0 is ARM, Advanced Recovery Mode, an automated system that makes recovering data easier. Learning to use Disk Editor may well save your bacon some day.

Arrrrrrgh! That's the sound most of us make when we accidentally delete a file. Peter Norton made his reputation in 1982 by turning this sound into a sigh of relief with Undelete. Naturally, no edition of The Norton Utilities would be complete without undeleting tools, and this version boasts new incarnations of Undelete and SmartCan, which is the Norton equivalent of Delete Sentry in DOS 6.

To mention just a few of the remaining tools, you'll find NDOS (a powerful COM-



The updated version of File Find is just one of many enhanced utilities included with The Norton Utilities 7.0.



Funny, but sometimes gory, animated sequences play when you capture a piece in Chess Maniac 5 Billion and 1.

MAND.COM replacement based on COMPUTE Choice Award winner 4DOS), much improved system diagnostics, a new version of File Find, and my favorite, NCD, the Norton Change Directory. I wouldn't be caught dead at the DOS prompt without NCD.

For a set of time-tested DOS utilities, The Norton Utilities is a solid choice. And if you're using DOS 6 or a disk compression program, it's definitely worth owning.

CLIFTON KARNES

Symantec
(800) 441-7234
\$179
\$49 (upgrade)
\$99 (for DOS 6 owners)

Circle Reader Service Number 440

NATIONAL LAMPOON'S CHESS MANIAC 5 BILLION AND 1

Chess Maniac is a chess program that refuses to take itself seriously. In a market dominated by programs with an emphasis on speed and strength, a chess game with a definite sense of humor is a welcome break.

The manual for Chess Maniac, written in the style of *National Lampoon* magazine, is a delightful parody of everything pompous about intense chess players; however, the program itself is disappointing. It ships on 12 disks and re-

quires 27MB of hard drive space—the installation process took over two hours on my system. Like too many games, it requires EMS, so I had to reconfigure my start-up files to play.

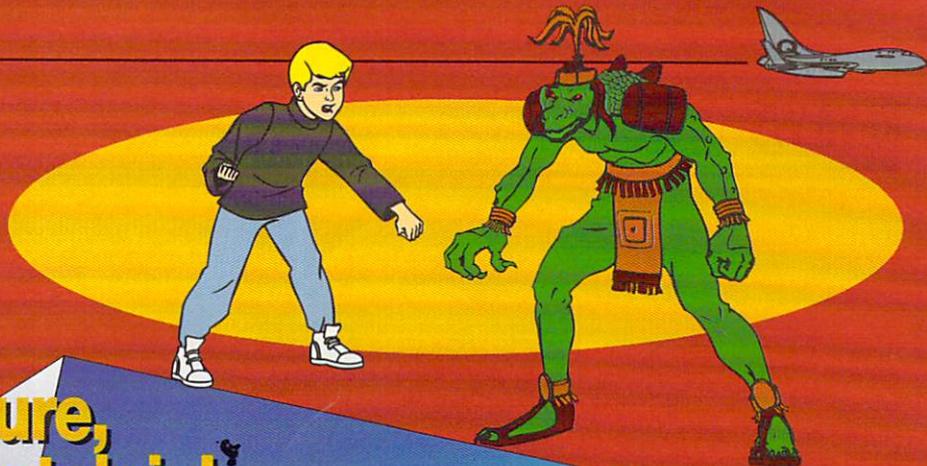
The game is a fairly simple chess game which offers a choice of standard or animated character sets in either two- or three-dimensional views. You choose from ten opponent strength levels (the opponents tend to be weaker than those in other chess programs). Of course, if Chess Maniac was the chess program that grabbed your attention at the local computer emporium, you may be more interested in watching the on-screen antics of the chess pieces than in searching for a cybernetic Bobby Fischer anyway.

The pieces capture each other in unusual ways, ranging from a deathly lambada by the belly-dancing pawn to gory decapitations by the sickle-wielding rook. Frequently, animated distractions flash across the screen, and the program occasionally cheats by stealing your pieces. This is an interesting feature, but it isn't very useful to your computer opponent, since you can easily use the program's board editor to get your pieces back. Moving the pieces with the mouse can be very difficult, and at times it seems impossible to place a piece on the correct square. Two-dimensional and standard chess sets are available to help keep you oriented, as the character board is often cluttered and difficult to see.

Chess Maniac doesn't play world-class chess, but it does add some hilarious touches to what can be a staid, stuffy game. Unfortu-



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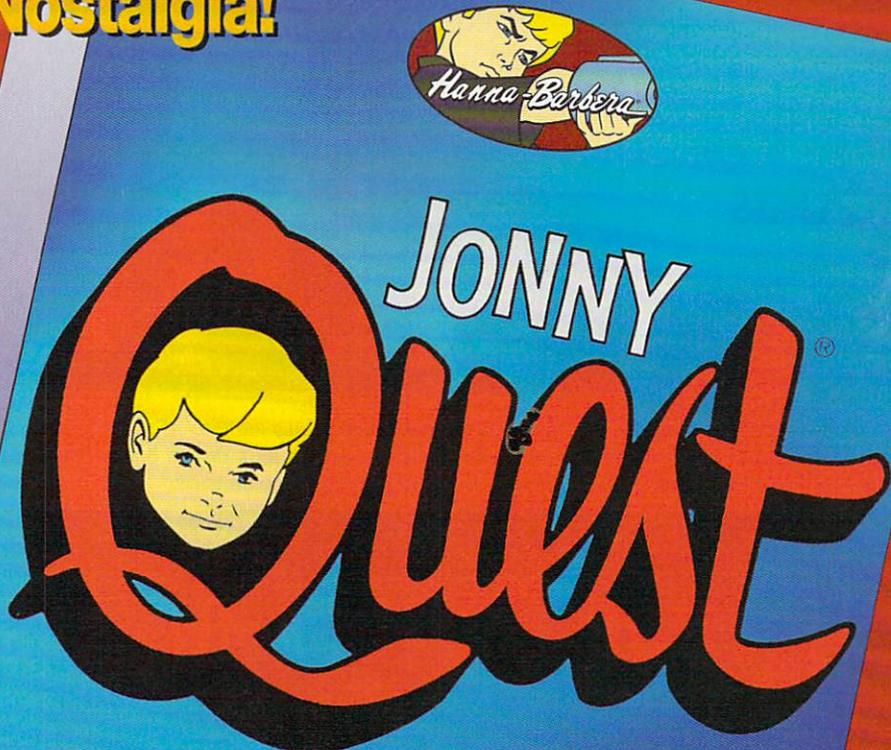
Join Jonny and Team Quest as they fearlessly trek through the Guatemalan jungle as they seek to solve the mysterious "Curse of the Mayan Warrior".

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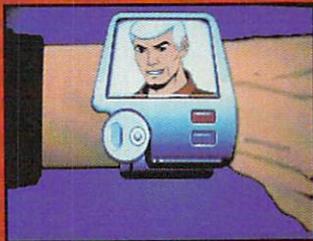
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REVIEWS

nately, the difficulty of discerning piece positions, along with the stiff hard drive requirements, puts a bit of a damper on the fun.

JIM SMITH

Spectrum HoloByte
(800) 695-GAME
\$69.95 (disk version)
\$59.95 (CD-ROM version)

Circle Reader Service Number 441

BATTLE CHESS 4000

Not long ago, Interplay revamped chess, giving the classic game a whole new look and feel. Instead of stolid bishops and banal queens of plastic, ivory, or stone, the original Battle Chess brought pieces to lus-



Interplay's spaced-out Battle Chess 4000 takes the classic animated chess challenge into a weird, distant chess future that's full of robots, aliens, and futuristic humanoids.

trous, violent life and breathed a bit of magic into the standard affairs of play. Today, Interplay takes us far beyond the medieval visions of its earlier offering, beyond the Asian feel experienced in its Chinese variant, and headlong into an unearthly future. A.D. 4000, here we come!

If you're familiar with classic chess, you'll be right at home in Battle Chess. The primary graphic innovation is obvious, with each piece a futuristic humanoid of some sort. These pieces possess their own unique characteristics: rough-and-tumble queens that always mean business, leechlike pawns that squish around the board, self-assured bish-

IF YOUR  IDEA OF A GOOD TIME

IS SITTING ALONE IN THE DARK,



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'TIL THE SUN  COMES UP >>>

ops that practice a science so advanced it seems magical. When the pieces clash, a combat sequence is certain to follow, so keep your eyes on the screen. In Battle Chess 4000 these combat sequences run on the hilarious side. The rook—which transforms from a tiny, inert form into a towering, ambling robot—seems to have the greatest sense of humor. Unfortunately, the combat ends as you might predict; the attacking piece always wins. This predetermination, common to all versions of Battle Chess, marks the ceiling for innovation. Everyone knows a monster robot will squash a leech. As a variant, Interplay could offer chess with more

tactical considerations, such as how many attacks a rook can sustain before collapsing or how many attacks a bishop can make before he needs a recharge. Even in A.D. 4000, Battle Chess remains merely computer chess with impressive graphics.

The graphics here are outstanding. The SVGA version provides extreme detail, right down to the grimaces and smirks on the pieces' outsize faces. The overall look seems a bit cartoonish, but that, in turn, makes the explosions, decapitations, and general violence more acceptable. Some may find it disturbing that both this game and Spectrum Holobyte's National Lampoon's

Chess Maniac 5 Billion and 1 both feature violence at the level of decapitation.

An outstanding array of options including moves by the computer, and hints on demand makes Battle Chess 4000 a chess game for everyone. It allows you to take back moves, explore what-if possibilities, and choose from a list of more than 300,000 moves. When the combat animations lose their appeal, you can activate the standard two-dimensional playing field, the familiar face of computer chess. We can hope, however, that the next version will allow us to adjust the speed of the animations. While watching the rook unfold into a robot and

walk across the screen proves initially delightful, after only a game or two, the time required for the animation is just aggravating.

If you haven't encountered Battle Chess before, you might want to pick up a copy of Battle Chess 4000. If your tastes run toward the more exotic or to the medieval, consider the other members of the product line. Any version of Battle Chess provides a worthy computer opponent for potential grand masters.

DAVID SEARS

Interplay
(714) 553-6678
\$59.95 (SVGA version)
\$49.95 (VGA version)

Circle Reader Service Number 442

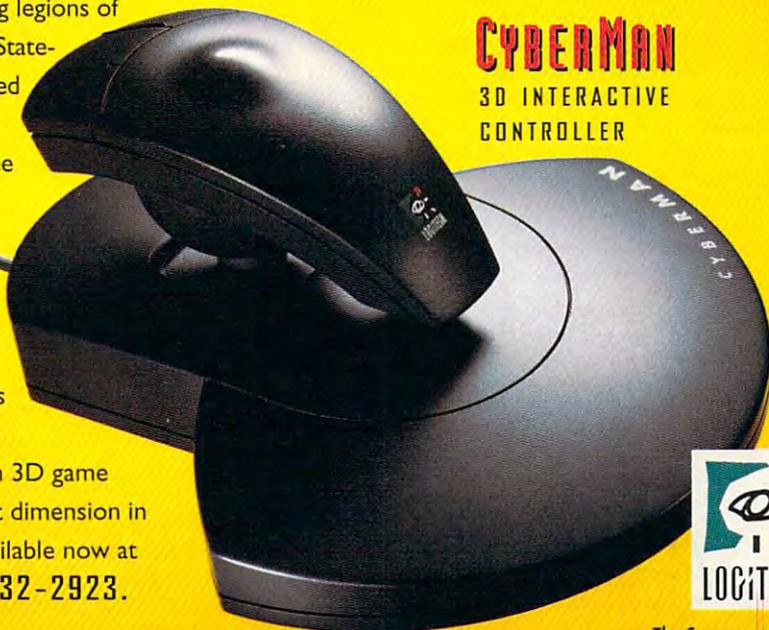
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KIPLINGER'S CA-SIMPLY MONEY

Some would say that you'd have to give away a new program to get any kind of market penetration in today's ultracompetitive PC software marketplace. That's exactly what Computer Associates decided to do with its new personal finance manager program: Through November 4, 1993, the company is giving away up to a million copies of Kiplinger's CA-Simply Money. The only charge is a \$6.95 fee for postage and handling.

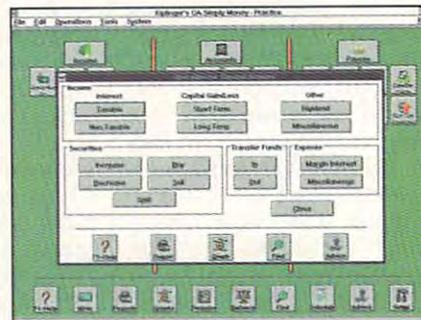
The incredible price doesn't mean you're stuck with a limited, special-version package, either. It's the full-blown package, complete with a thick, heavy, and well-written reference manual. CA-Simply Money is a personal finance manager that also helps you make decisions about mortgages, refinancing, retirement, debt payoff, investments, college tuition, and even household help and payroll. Along with the usual electronic check register, the program includes the Kiplinger Financial Advisor, which tracks all your transactions and offers you personalized financial advice.

CA-Simply Money runs under Windows 3.1 and provides a simple, icon-based user interface. Instead of forcing you to scroll through long lists of accounts looking for the one you need, CA-Simply Money provides Browsers; typing one or more letters produces a pop-up window which contains a list of related buttons, categories, or classifications. This makes recording transactions much faster and easier. And you can easily call up any of 50 preprogrammed reports which provide quick, useful information about your accounts to help control and direct financial matters.

For the novice in financial recordkeeping, CA-Simply Money goes a step past the automatic budgeting systems of other financial programs by automatically prompting for repetitive payments and drafts. Repetitive transactions are recorded so that payees and account distributions are processed automatically. You'll have to compute percentages manually for transactions involving a home office or automobile that's used for business purposes, though; it would be nice if the program had a data feature that would compute these automatically.

The Financial Advisor feature provides context-sensitive advice and comments written by the prestigious Kiplin-

ger editorial staff. Its handy Alert feature can optionally pop up whenever you start Windows, warning you when you need to take care of pending items such as payments or deposits. Financial Advisor will warn you if a recurring transaction seems overly large or small, alerting you, for example, if your normally \$80 phone bill jumps to \$553. The Advisor feature looks at your cur-



Kiplinger's CA-Simply Money is a powerful, but easy to learn, finance program.

rent financial situation and offers tips for saving money. For instance, it might advise you to take out a home equity loan to pay off your credit cards, lowering the amount of interest you pay each month. Unfortunately, the financial advice can't currently be printed out for offline review.

I did run into a few quirks when using the program. Check numbers aren't automatically assigned when you enter transactions, a limitation which a company representative said will be corrected in a future release. Also, when I entered after-the-fact transactions, automated date functions became confusing, making entries more difficult than necessary.

CA-Simply Money imports and exports files in Quicken format, exports to any tax-exchange-format (TXF) tax preparation program, and can use DDE to communicate with databases and spreadsheets. Of course, you can print checks on your printer, but CA-Simply Money also works with Prodigy's BillPay USA system to pay bills electronically. You can also use it with CompuServe's online financial database and stock quote system to get updates on stock prices and live financial advice.

For the lucky million or so purchasers who order the program before November 4, CA-Simply Money is the least expensive finance manager program available. But CA-Simply Money is by far the easiest-to-use, most advanced financial recordkeeping and money management package available today—so it's worth taking a look at even at the full retail price.

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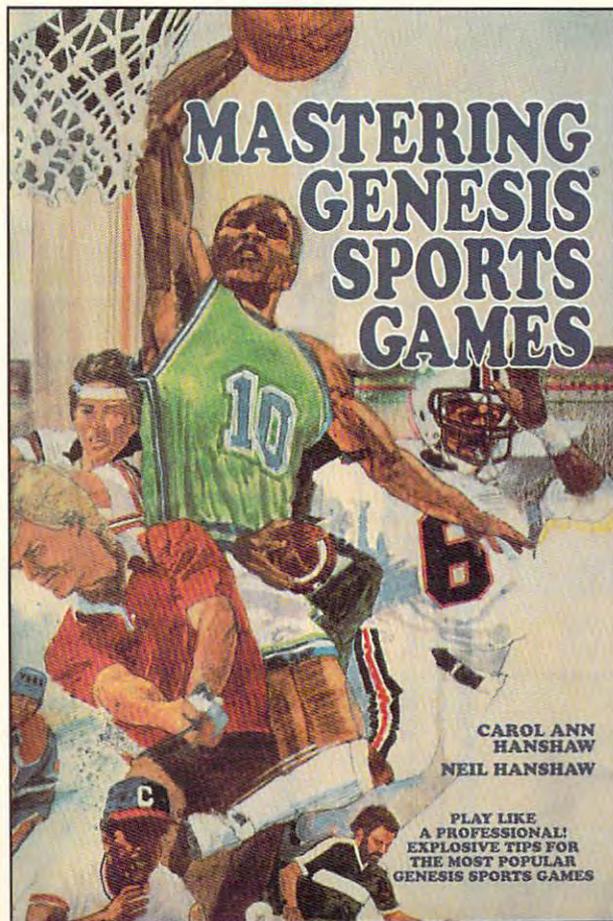
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REVIEWS

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\$69.99
(\$6.95 through November 4, 1993)
Circle Reader Service Number 443

STYLUS 800

The Stylus 800, a 48-nozzle ink-jet printer from Epson, was hard at work in my office just minutes after it arrived. I had been using my 24-pin dot-matrix printer to print several letters, but I decided to finish the job with the new Epson. All I did was disconnect the printer cable and plug it into the Stylus 800, which performed flawlessly. I had to adjust the margins from my word processor, but I never even switched printer drivers.

Many older applications may not have a Stylus 800 driver, but the manual suggests more than a dozen Epson SQ- and LQ-series drivers that should work with most applications. I had no problem printing out banners, correspondence, and graphics with the driver that I had used with my dot-matrix printer. For convenience, the Stylus package includes drivers for ten popular applications, including Windows 3.1, AutoCAD 2.5 or higher, WordPerfect 5.1 or higher, Microsoft Word for DOS 5.5, and Lotus 1-2-3 3.1 and 3.1+.

The Stylus 800 delivers crisp 360-dpi text and graphics. Overall print quality is not quite laser-sharp, but it's pretty darned close. The drop-in ink cartridge is rated at 700 pages with 1000 characters per page. I've been cranking out page after page for weeks now, and the print quality is still high. When the ink supply is low, a light on the panel lets you know. Replacing a cartridge shouldn't put much of a dent in your budget; the suggested retail price of a new one is less than \$20.

You can load as many as 100 sheets of paper into the 800's built-in paper holder. This is fine for most printing jobs. If you prefer, you can feed single sheets and envelopes manually without disturbing the other paper.

Paper quality does affect print quality, however. If the paper is porous or rough, you may see some blurring. Most conventional computer paper works fine. Should the print quality start to diminish, you can press two buttons on the control panel to clean the printhead. This simple 30-second procedure assures a good stream of ink through the nozzles.

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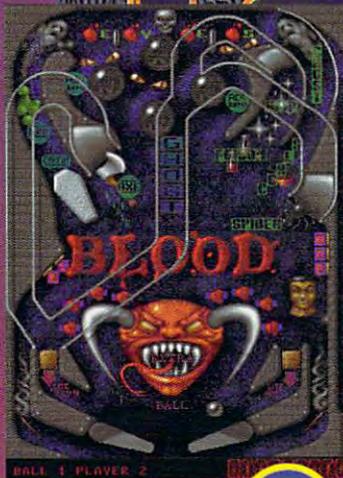
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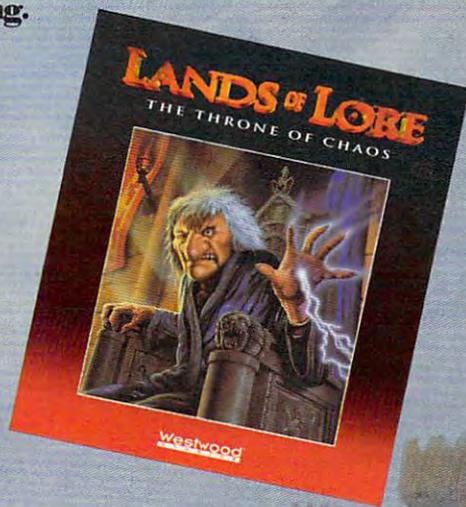
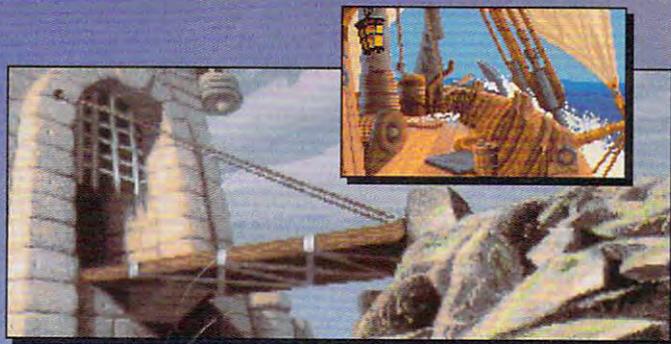
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REVIEWS

lus quiet and reasonably fast. Printing speed is rated at 180 characters per second. The compact size lets the Stylus fit easily into most any work area.

The Stylus has seven built-in character fonts; four of them are scalable from 8 to 32 points in 2-point increments. There's also an economy mode that uses less ink for draft copies and a condensed mode that's handy for printing spreadsheets. Many of the printer's controls can be set by your program rather than from the control panel.

Internal settings control the character tables for different language applications and similar settings. If your software has problems printing scalable font text combined with graphics, the Stylus has a mixed text and graphics mode that should help. There's even a setting for using the printer with several computers on a network.

If you're used to the large size of many dot-matrix or laser printers, you may wonder about the strength and reliability of the Stylus. Don't let its small footprint and light weight fool you. This little gem is a real workhorse. It's proved itself in my office.

TOM NETSEL

Epson America
(800) 922-8911
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THUNDER BOARD

Do you find that hearing "bleep, beep, bloop, buzz" sort of ruins the fantasy when you're playing your favorite flight simulator? Are you tired of watching your computer grind to a halt every time the Windows sound driver plays a digitized sound? It's time to join the multimedia party and purchase a sound card. If you're looking for a quality sound card at a low price, check out Media Vision's Thunder Board.

This half-size 8-bit ISA card includes an Ad Lib-compatible 11-voice FM synthesizer and supports 22-kHz digital audio. The back of the card has audio input and output jacks, a volume-control dial, and a joystick port. An internal connector allows you to mix sound from a CD-ROM drive or Pro AudioSpectrum card.

The card is advertised as being fully compatible with the industry-standard Sound Blaster. It worked perfectly with all the games with which I tried it, as well as with Windows, using the Sound Blaster setting. And like Windows, many games now directly sup-

port the Thunder Board as well. I've seen a few reports of problems with Falcon 3.0 and the Thunder Board in some systems, but it worked fine with Falcon when I tried it. Hardware compatibility is no problem; the board functioned perfectly in both a 16-MHz 386SX and a 66-MHz 486DX2 system and even in an Amiga 4000 with a 386SX Bridgeboard. Dynamic filtering on the digital inputs and outputs makes for sound about as clean and crisp as you can expect from an 8-bit sound system.

You can edit digitized sound files using the bundled Thunder Master software. The real fun comes, though, when you plug a microphone into the input jack and sample your own sounds. Your kids will love it, for example, if their own voices welcome you to Windows when you start up your system. You can save disk space by compressing sounds at a 2 : 1, 3 : 1, or 4 : 1 ratio; the Thunder Board will decompress the sounds in realtime.

If you're looking for a card just to play with sampled sounds or add some background music to your games, a 16-bit card is probably overkill. For banishing beeps and buzzes, the Thunder Board is an 8-bit bargain.

DENNY ATKIN

Media Vision
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Circle Reader Service Number 445

MICHAEL JORDAN IN FLIGHT

Air Jordan is flying Electronic Arts off the bench and into the middle of the action in the competitive sports game arena. Michael Jordan in Flight's cutting-edge technology makes it a championship-quality sports simulation.

The one-player game lands you in the thick of three-on-three action, directing Jordan and friends on their hometown team from Wilmington, North Carolina. You compete in exhibition or tournament games against seven fictional teams playing the country's hottest pickup basketball. Although informal in spirit, the action unfolds on a squeaky-clean indoor half court, complete with all the professional trimmings: multiple camera angles, instant replays, highlight films, and sportscaster Ron Barr's end-of-game stats.

The designers depart from previous efforts in the genre with full-size animated players, digitized from live-action video. No rotoscoped, computer-enhanced characters here; you see and

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control photorealistic images of actual players. The technique is visually stunning, but the task of simultaneously animating six digitized figures weighs heavily on system resources. Don't expect smooth play on anything less than a 33-MHz 386 machine with as much expanded memory as you can muster. The game also offers limited support for SVGA cards. Hi-res mode looks great, but it's virtually unplayable on an average PC, with characters moving as if glued to the floor.

True to its roots in street basketball, gameplay is mostly improvised, featuring only four preset offensive plays. Unfortunately, there's no provision for designing your own shots. You can control either Jordan exclusively or the player closest to the ball. Jordan's trademark moves are all here, but unless you're next to the bucket, control is limited to generic passing, jumping, and attempted steals. One of the game's best attributes is its crisp sampled sound effects, including Jordan's own colorful digitized asides during the heat of play; "Thanks for the Nike poster!" he exclaims when he makes a particularly pretty jump shot.

Given the power to drive its high-end graphics engine, Michael Jordan in Flight soars beyond any hoops action seen on the computer screen. However, the game's scant features and unfinished, experimental feel suggest that the best may be coming in Michael Jordan II.

SCOTT A. MAY

Electronic Arts
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\$69.95

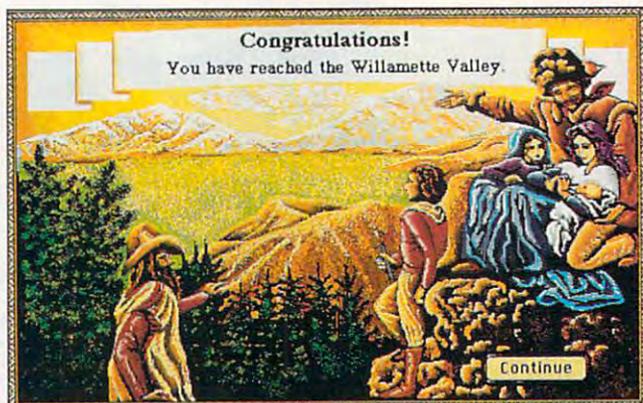
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THE OREGON TRAIL

Migrating westward across the United States in the 1840s was a hardship few of us today can appreciate. When you consider the treacherous trail through the

sions to make and hardships to overcome before reaching Oregon's Willamette Valley.

On the trail, you must hunt for food, cross rivers, repair your wagon, rest in order to heal sick companions, fight bad weather, and handle any number of other



The Oregon Trail, one of the first educational computer games, is available in a new VGA edition.

wilderness between Missouri and Oregon—a trail fraught with danger, sickness, and even death—it's a wonder this great country ever managed to grow from sea to shining sea. While the trip today is as easy as hopping on the interstate, MECC's Oregon Trail (in a new deluxe VGA edition) on your computer will let you experience the trials that the pioneers faced on the 2000-mile journey across America's unsettled frontier.

You start your journey by assigning your character one of eight occupations; your choice determines the game's overall difficulty. Then it's off to Matt's General Store, where you purchase supplies, including oxen, clothes, bullets, food, and various wagon parts. Once supplied, you hit the road and hope for the best. You and your four companions will have many deci-

difficulties. Disasters, too, need to be dealt with. You never know, for example, when a fire in your wagon may destroy supplies or when death will strike sick companions. Luckily, you can stop at various landmarks and forts along the way to rest and stock up on supplies. The online guidebook provides historical background on these nineteenth century locales. In addition, you can talk to people during your travels to gather information.

In this new VGA edition, the Macintosh-like displays feature a colorful minwindow that shows a map of your journey or a graphic of the current landmark. Digitized sound effects have been added to the program, although they're sparse; they include simple effects such as gunshots and wagon wheels breaking. Still, the new graphics add much

to a classic educational game, a game that's easy for older elementary-school children to learn and interesting enough for adults to enjoy as well.

CLAYTON WALNUM

MECC
(800) 685-6322
(612) 569-1500
\$59.95

Circle Reader Service Number 447

A PLACE FOR MY STUFF

A Place for My Stuff is just what its name implies: a place (relational database) for your stuff (random information you want to store). Since it's not a full-blown database like Access or FoxPro, it requires no programming knowledge. This makes it easier to use but more limited than a more structured database.

Adding an entry to a database is as simple as typing a sentence. The program converts the sentence into grammatical elements and places the words in their appropriate fields, cutting the extraneous verbiage. For example, you could activate the sentence template and type *101 Dalmatians is a great video for kids*, create a new category called Videos, and start tracking your videotape collection. Or you could use the name-and-address template to enter address data.

You can view your records one at a time in detail or in a list format. You can set filters to search for items that share common characteristics. Unrelated items can be linked by clicking on them in a list and saving them as a group.

Reports are easier to format than in a traditional database, but they aren't com-

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SOFTWARE

Circle Reader Service Number 300

Not Recommended for Younger Viewers Due to Realistic Depictions of Violence

Wolfenstein 3-D requires an IBM or 100% compatible computer with 640K RAM, a VGA graphics card, and a hard disk drive. Extended memory (XMS), expanded memory (EMS), joystick, and mouse are optional. IBM is a registered trademark of International Business Machines Corp. Sound Blaster is a registered trademark of Creative Labs, Inc. AdLib is a registered trademark of AdLib, Inc.

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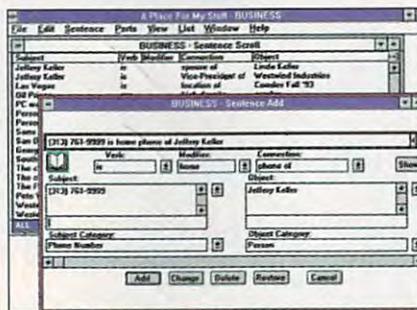
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REVIEWS

pletely automatic. You'll still have to define headers and footers, margins, column width, and spacing.

A Place for My Stuff uses a standard Windows interface, with pull-down menus, dialog boxes, and pick lists for commonly used responses. Data can be imported from and exported to other cop-



A Place for My Stuff lets you create database entries using normal sentences.

ies of the program, or in ASCII format.

By sacrificing power and customizability for simplicity, A Place for My Stuff cripples itself. Its sole notable advantage over low-cost PIMs lies in its ability to interpret complete sentences. But even users who appreciate not having to learn a database language might be frustrated its limitations.

Still, it's capable at what it does. It's easy to use, once you understand its structure. And if you're more enamored with writing a sentence and viewing data in that format than more rigid database screen shapes, it may be a good choice for you, especially with its low street price of about \$79.

Quadrangle has compiled several add-on databases that contain information on topics like PC software and hardware, vacation and travel, and sports. These range from \$9.95 to \$17.95, and, if they sound useful to you, might make A Place for My Stuff the right place for your database information.

KATHY YAKAL

Quadrangle
(313) 769-1675
\$129

Circle Reader Service Number 448

COMPUTERWORKS

If you're mystified by your computer's inner workings, curious about the many boards and peripherals you can add to it, or interested in the development of computers, Software Marketing's ComputerWorks can be your graphic guide.

ComputerWorks packs diagrams of

everything from connector cables to motherboards, a time line that starts with the abacus and ends with the latest microprocessors, and loads of information on related topics. You can browse through screens of text and illustrations, use an index to locate specific topics, or follow lesson plans. Many text entries include hypertext—highlighted words or phrases on which you can click to see a definition



ComputerWorks is an online reference that tells you all about your computer.

or a cross-referenced illustration.

With so much information, getting through ComputerWorks in one sitting would be a daunting task. It's best suited for browsing in your spare time, and its tools include bookmarks to keep your place or mark a screen to which you want to return. A button bar at the bottom of the screen makes navigation a breeze. After you've spent some time with the program, you can test what you've learned by taking one of its eight topical quizzes. (Watch out for the history quiz!)

You can print any of the text or graphics from within the program or export them for use in your word processor or desktop publishing software. The graphics are colorful and detailed and would be useful as computer hardware clip art.

Unfortunately, ComputerWorks' many graphics make it a fairly large program to keep on your hard drive, taking up about 5MB. Installation is easy and relatively quick, so you can take the program off your hard drive after you've gone through it a few times and reinstall it if you need it later.

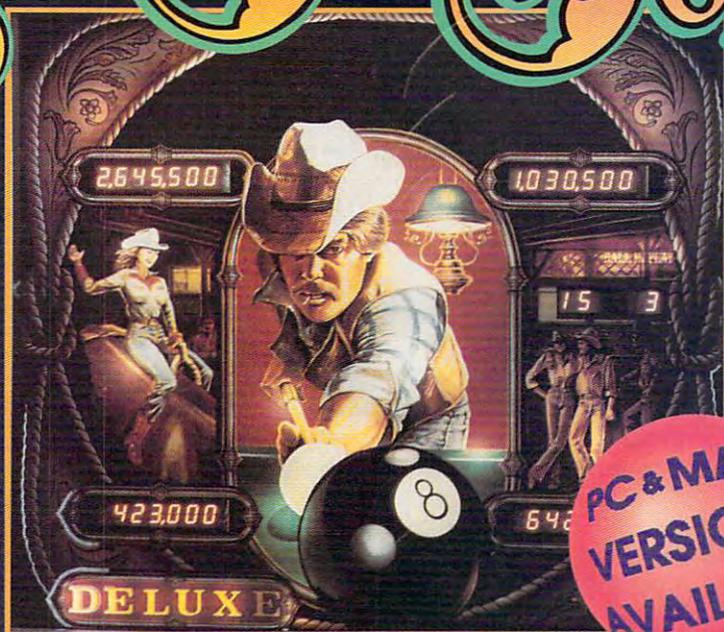
ComputerWorks is filled with useful information, but it won't take the place of a manual or reference book. One mail-order outlet was selling it for \$55. That seems a bit pricey compared to a good book, particularly if you're the only one who will use it. But ComputerWorks is a good introduction to computers, and for a teacher or family, it might prove more flexible and accessible than most introductory books. Although it contains an abundance of information, ComputerWorks is general

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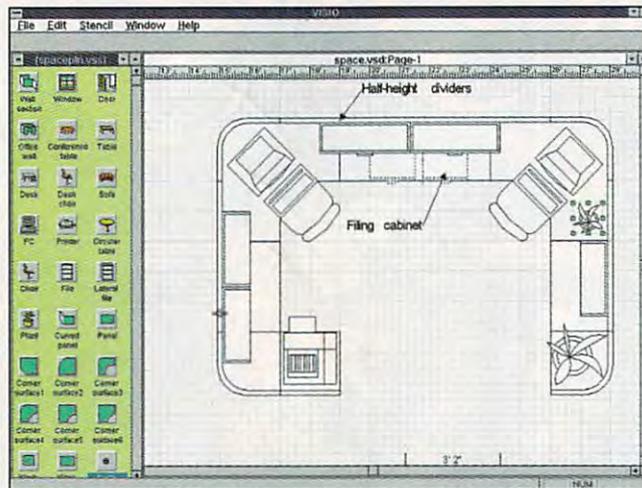
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VISIO

Few tasks are more daunting to nonartists than having to create good-looking business or technical graphics. For all their claimed ease of use, most drawing programs—with their multiple tools, drawing modes, and nested sets of features—aren't easy at all. Worse, with most applications it takes way too much time to create anything more complex than a pie chart, and if you're not artistically inclined, the results are likely to look amateurish.

Visio is one drawing program that does just what it says: It makes creating business graphics a snap. The key to Visio's simplicity is its drag-and-drop approach to drawing. If you've ever used technical-drawing stencils—those green plastic sheets with cutouts of flow chart symbols, architectural shapes, and the like—then you already know how to use Visio. Visio has its own versions of those plastic stencils, with intelligent symbols (called SmartShapes in Visio-speak) for engineering schematics, flow charts, organization charts, network layouts, and 11 other common types of drawings. Additional stencils are available from Shapeware, or you can create your own.

The stencil floats in a window next to the main drawing area, and all you have to do is drag the desired SmartShape from the stencil to its



You don't have to be an artist to create impressive charts and pictures with Visio, thanks to its shape library.

place on the drawing. You can drag the shapes around, group them, add text, and attach connecting lines that extend and contract as adjustments are made to the drawing. Each SmartShape is backed by a minispreadsheet that defines the shape's geometry, text style, and other characteristics. Spreadsheet users can program shapes to perform and display calculations. Though Visio lacks most of the mode-based drawing tools contained in other drawing programs, it does have a smart pencil tool that knows when you are trying to draw a straight line or a curve and creates a geometrically perfect line.

No professional artist will want to use Visio as his or her only drawing tool. It lacks many high-end features, such as 24-bit color and PostScript support, gradient blends, and object blending. But if you have to crank out lots of technical drawings of low-to-moderate complexity and don't want to spend a lot of time or money doing it, then Visio is for you.

STEVEN ANZOVIN

Shapeware
(206) 467-6723
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SHERLOCK

MS-DOS has seen many improvements over the years, but unfortunately, it's still saddled with the painful filename limitation of eight-plus-three characters. When you create a file, you must make up some clever abbreviation to remind yourself of the file's contents. But a few months later, you probably can't remember whether you stored your expense report as M07EXP.EXC or EXPRT7.EXC and you're forced to go on a tedious search.

Sherlock is designed to solve this problem. It organizes your hard disk files just as you would your paper-based files in an office. Files go into folders, folders go into drawers, drawers go into cabinets, and cabinets go into offices.

The program runs under Windows and comes up as a TSR when you use the Save As command from a

Windows application. I used Sherlock often with Lotus Ami Pro, for example. The Sherlock Save card asks you for a document description, which can be many words; document type (memo, car expenses, or anything else you like); contact; user name; format; and keywords. Most of these are optional, and when you finish the task, the program asks where you wish to store the document.

The first time through, you name an office, a file cabinet, a drawer, and a folder. Each of these names can consist of several words. Sherlock remembers these, and when you save your next document, it offers you your earlier system, which you can change or supplement at any time.

The fun comes when you wish to retrieve a document. Perhaps you've forgotten which folder or drawer or cabinet you used. Sherlock will find documents for you on the basis of words in the description, document type, or keyword list and present you with a list of those documents which meet your specifications. Choose one, and Sherlock will tell you where it is filed and open it if you wish. (The newest release also supports standard MS-DOS filenames.)

Sherlock is a very good program. It's fast, friendly, and easy to learn. The manual is well written, and the tutorial is very helpful. Sherlock offers a solution to your filing problems that's better than a file clerk—and much better than trying to remember MS-DOS filenames.

CHARLES IDOL

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