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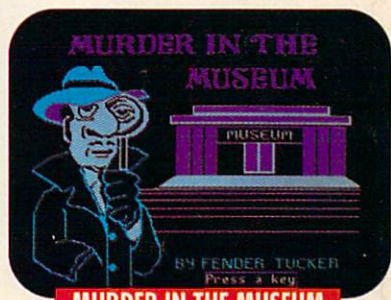
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COMPUTE

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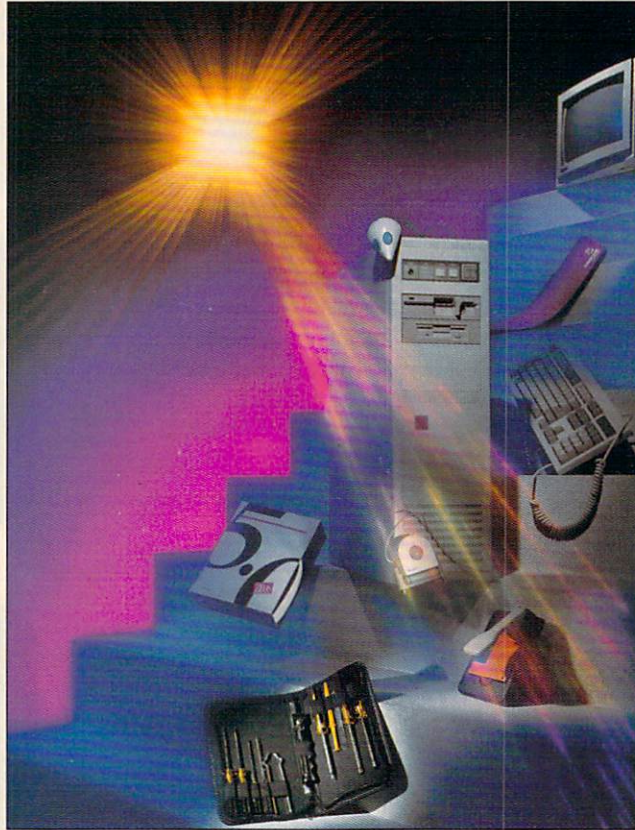
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You must have heard how SOUND BLASTER took the PC market by storm...

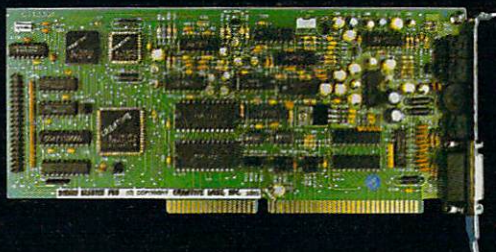
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Computer Gaming World
August 1991



"With its associated software, it has quietly (no pun intended, but what the heck) become the standard sound system for advanced PCs."
Jerry Pournelle, **BYTE** June 1991



COMPUTE August 1991

"...Creative Labs is now turning up the volume with the Sound Blaster Pro. It's basically two Sound Blasters on a single card with additional multimedia features thrown in. It has twin FM chips capable of creating 22 individual voices, two DACs for stereo voice and sound-effects playback, a stereo microphone jack, and a built-in stereo mixer that can adjust the volume of all your Sound Blaster audio sources (stereo DAC, stereo FM, microphone, stereo line-in, CD-Audio and PC internal speaker).

The built-in mixer makes the Sound Blaster Pro fully compliant with Microsoft's Multimedia Level 1 Extensions to Windows. Multimedia software will be able to fade-in, fade-out and pan the various audio sources to create elaborate sound montages.

The Sound Blaster Pro includes a CD-ROM interface for either an internal or external CD-ROM player. There's also an internal connector for CD-Audio. The MIDI interface is compatible with the original Sound Blaster's MIDI interface but adds the MIDI time-stamp that's part of Microsoft's new multimedia standard.

All in all, the Sound Blaster Pro is chock-full of new features, yet it's fully compatible with its younger brother."

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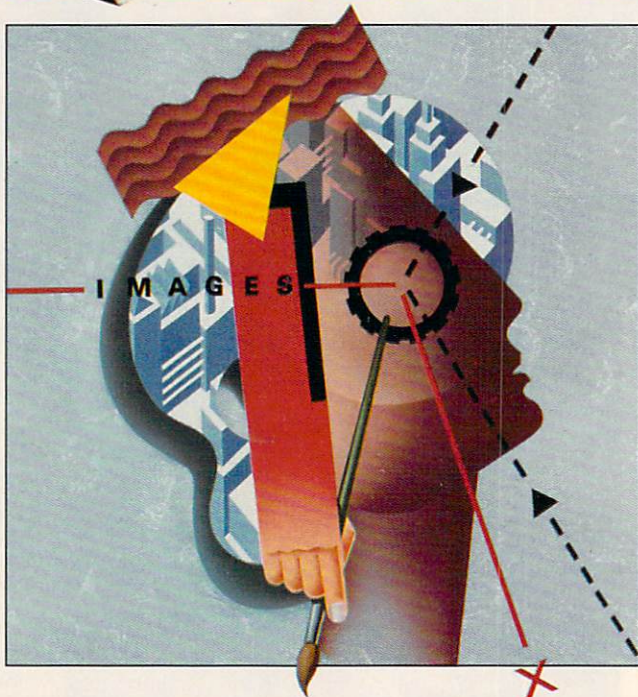
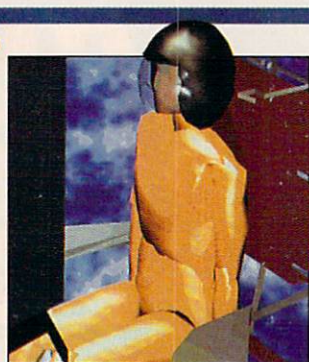
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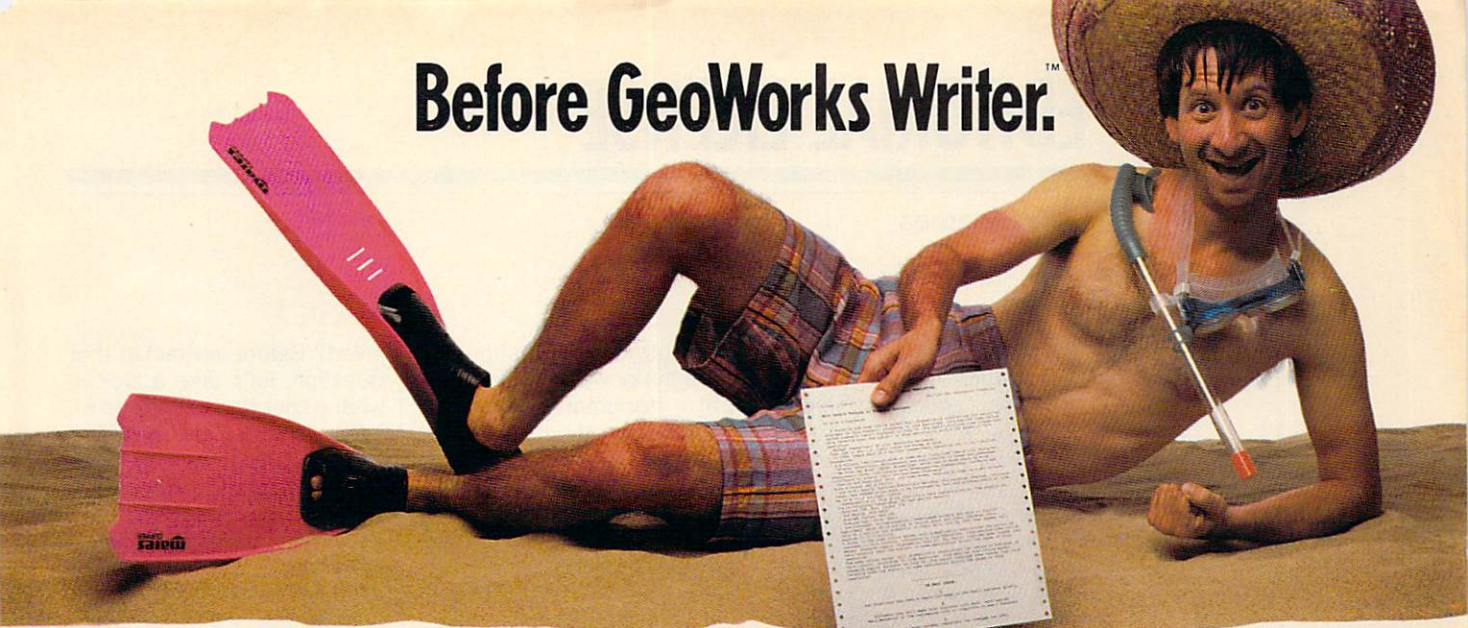
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software,
hardware, and books.

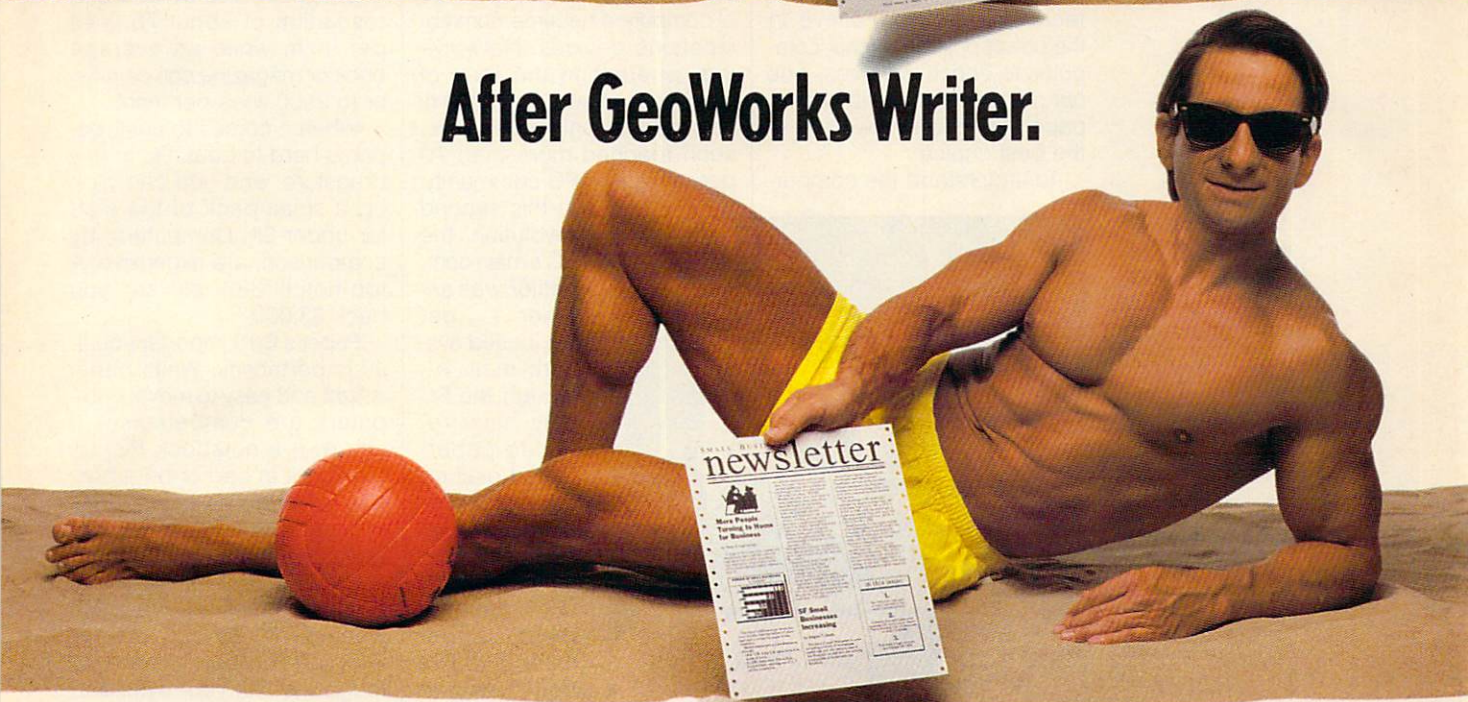
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computing.

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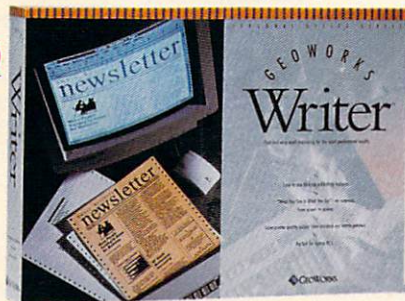
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lishing features like multi-column layouts, easy importing of graphics (it comes with clip art!)... even its own award-winning graphical environment* that makes using it as easy as clicking a mouse. And if you think it's amazing alone, just wait until you see it working with the rest of the Personal Office Series team.

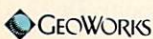
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Clifton Karnes

In the not-too-distant future, computers will replace books and magazines. That's a statement I've heard dozens of times in the last ten years, but since the advent of multimedia, I've heard it more often.

At COMPUTE, computers and paper are both important, and we're committed to both technologies. We believe in the power of the personal computer to enrich our lives, and our magazine is distributed on paper, the medium we feel is the best choice.

To understand the comput-

ers unquestionably have the power to replace paper documents in the workplace, they have not done so. In fact, PCs have enabled us to produce more paper, and we have.

The initial shot of the second computer revolution was fired when the first BBS went online. In a few years, personal computers became communications devices. Networking, whether in the form of local area networks (LANs) or commercial online services, soon reached more than 70 percent of the PC community.

In this second revolution, the PC's main competitor was another paper-based system: mail. Although the PC may have reduced paper-based mail for some businesses, personal computers, again, are actually creating *more* paper mail. If you've been going to the mailbox for the last ten years, compare the amount of junk mail you receive now with what you were getting in 1981.

In 1991, we've waged the first battles of computing's third, and most dramatic, revolution: multimedia. Although multimedia PCs may look like their predecessors, multimedia machines are radically different from previous computers, in that they're bona fide delivery systems for information. Because of this, they're more like paper. Will these newest PCs replace paper where their ancestors have

failed? Before we tackle that question, let's take a look at what paper has to offer as an information delivery system.

First, paper has tremendous information density. A page of paper can hold about 33 times as much information as a Super VGA screen. For example, an 800 x 600 VGA display sports a resolution of about 75 lines per inch, while an average book or magazine comes closer to 2500 lines per inch.

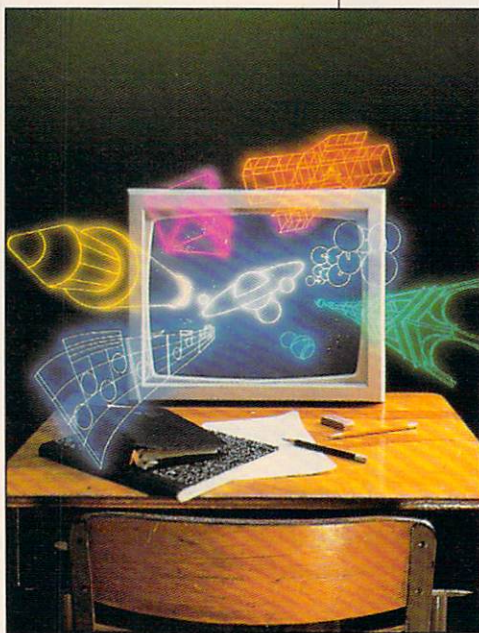
When it comes to cost, paper is hard to beat. Go to any drugstore, and you can pick up a small pack of the stuff for under \$1. Computers, by comparison, are expensive. A top-notch 386 will set you back \$3,000.

Paper's third important quality is portability. While paper is light and easy to move, computers are cumbersome. If you own a notebook PC, try reading it in bed or on a bus, and you'll agree that a book or magazine is a much more graceful traveling companion.

Paper's last outstanding quality is the relative ease with which you can scan it. Flipping through a book or magazine lets your eyes dart from page to page. This type of top-down, random access is nearly impossible on a PC.

Does all this mean that the PC is in some way a failure? Not at all. It's unquestionably the empowering tool of the century, and it ranks with the invention of the wheel in importance. Its strengths have always been the powerful ways it can transform and combine information. What this does mean, however, is that paper will continue to be a partner, rather than a casualty, of the computer revolution. But if paper isn't in the computer's line of sight, is something else? Yes. And the endangered species is sitting right in your living room: TV. □

In the last ten years, the PC has instigated no less than three revolutions, and in each, it has gone head-to-head with paper.



er-versus-paper question, it's necessary to look at the PC's history. In the last ten years, the PC has instigated no less than three revolutions, and in each, it has gone head-to-head with paper.

The first revolution was sparked by the birth of the personal computer itself. These early machines were limited in power, but their potential was obvious. Before the revolution was more than a few years old, we heard the cry of the paperless office. Although

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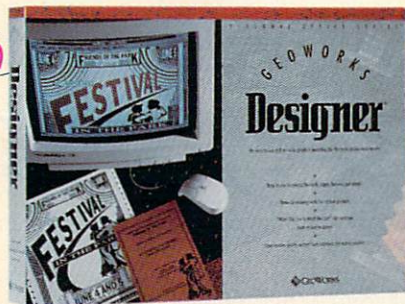
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projects, but has all the features you need to get fancy... even its own award-winning* graphical environment that makes using it as easy as clicking a mouse. And if you think it's super alone, just wait until you see it working with the rest of the Personal Office Series team.

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For more information, contact Logitech, 6505 Kaiser Drive, Fremont, California 94555; (415) 795-8500.

JILL CHAMPION

PC Esquire

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ALAN BECHTOLD

Stop, Look, Listen

If multimedia has been mostly smoke and mirrors so far, two new multimedia boards from ATI may help clear the air. The AUDIO FX provides high-quality stereo sound recording and playback with sampling rates as high as 44 kHz and built-in filters to help reduce noise and distortion. It's fully compatible with Ad Lib and Sound Blaster sound boards and Microsoft's new multimedia specifications.

VGAUDIO FX includes the audio capabilities of the AUDIO FX, as well as the graphics features of ATI's innovative VGAWONDER XL board, including high-resolution 15-bit color (for 32,768 simultaneous colors) and fast video-graphics processing. The VGAUDIO FX also includes a built-in mouse port, a 400-dpi mouse, and extensive driver support.

The AUDIO FX and the VGAUDIO FX boards should be available by the time you read this for \$199 and \$499 respectively. For more information, contact ATI Technologies, 3761 Victoria Park Avenue, Scarborough, Ontario, Canada M1W 3S2; (416) 756-0718.

DAVID ENGLISH

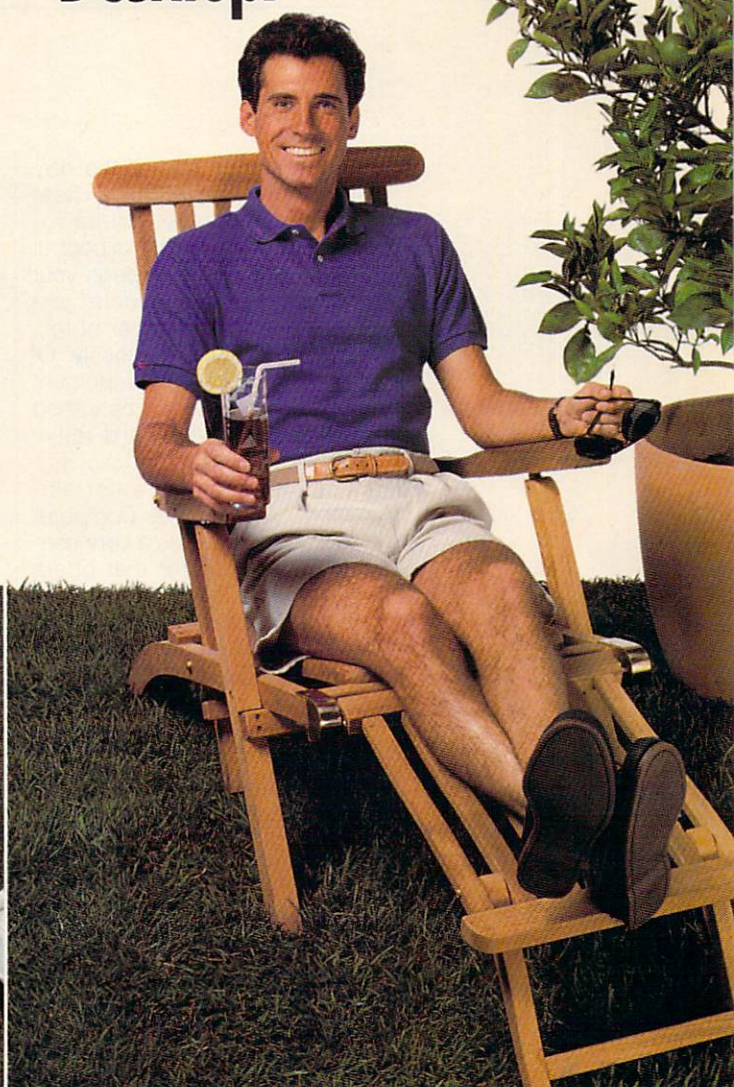
Computing on the Far Side

Far Side fans take note: Gary Larson's bizarre world is now a computer calendar, complete with all the bugs, mammals, amoebas, nerds, and nagging spouses that have made Larson one of America's favorite cartoonists.

The Far Side Computer Calendar is a personal appointment calendar that includes a year's collection of Larson's funniest, most artful truisms from the 1992 desktop calendar. Along with the cartoon-a-day humor, the program is bound to induce plenty of sporadic laughter when Larson's eccentric characters make random appearances on the com-

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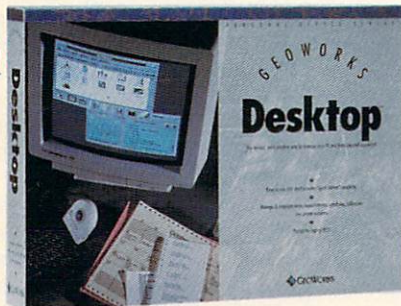
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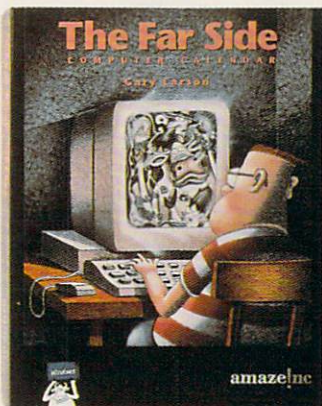
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Circle Reader Service Number 157

puter screen during the day. A flock of penguins float across the screen on an ice floe when you least expect it; meteorites crash through your appointment schedule just when you're in danger of taking yourself too seriously. Of course, this surprise element of the program can be turned off at any time if you'd rather do without the interruptions.

In addition to entertainment, *The Far Side Computer Calendar* provides a very useful day organizer that offers day-, week-, month-, and year-at-a-glance modes, each of which can be edited and printed out in different sizes. You can program in recurring events for weekly, biweekly, and monthly schedules and set sound alarms to remind

Far Side fans can get a daily dose of Gary Larson's off-the-wall bug, cow, and nerd humor with *The Far Side Computer Calendar*.



yourself of upcoming tasks and events. Every calendar function is accessed through its own animated icon.

Once the current calendar year expires, graphical refills for the cartoon-a-day feature are available for another year of *Far Side* humor. Complete versions of *The Far Side Computer Calendar* are available in DOS, Microsoft Windows, and Macintosh versions. Suggested retail price is \$69.95.

For more information, contact Amaze!nc, 11810 115th Avenue NE, Kirkland, Washington 98034; (206) 820-7007.

DANA STOLL

Braille in Your Pocket

The visually impaired will benefit from the pocket computer revolution if TeleSensory Systems has anything to do with it. The company's new BrailleMate PC is a one-pound computer, small enough to fit in a coat pocket, that can be used for note taking; compiling names, addresses, and phone numbers; and communicating with other computers. It also has a calculator and a clock/calendar.

Instead of a slate-and-stylus method, BrailleMate's Braille keyboard enables rapid writing into a solid-state memory using a built-in editor. It acknowledges what has been written into its memory with a speech synthesizer and an electronically operated Braille cell.

By combining both Braille and speech outputs, the accuracy of Braille and the speed of speech are achieved. The computer stores up to 128 Braille pages in its internal memory, and credit card-sized memory cards can be slipped into the bottom for extended memory.

In addition to helping visually impaired persons, BrailleMate can also be used to help students learn Braille. The computer's synthetic speech can be used to instruct a student verbally, while the Braille cell and Braille keyboard allow drill and practice exercises. BrailleMate also has serial and parallel ports for connecting to printers, PCs, and modems. Suggested price is \$1,595.

For more information on BrailleMate, contact TeleSensory Systems, 455 North Bernardo Avenue, P.O. Box 7455, Mountain View, California 94043; (415) 960-0920.

ALAN BECHTOLD

Human Computers

Cars that see and avoid accidents, ear implants that allow the deaf to hear—those are

just two of the countless possibilities that could emerge from the work of scientists studying the human brain at the Los Alamos National Laboratory in New Mexico.

Bryan Travis and other scientists from the Laboratory's Earth and Environment Sciences Division are using computer programs that mimic human vision and hearing to understand how the brain works. Travis, Susan Coghlan of the Los Alamos Center for Non-linear Studies, and graduate student Maureen Gremillion have developed a computer-based brain function simulator, called a NeuroBuilder, to model a variety of brain functions.

Since the brain assimilates most information through the senses, creating a computer model of the visual and auditory processes is the first step toward developing more complicated models to study how the human brain assimilates, encodes, and disseminates information.

Using the NeuroBuilder, scientists can put together their own models of multilevel neurobiological brain networks, experimenting with different neuron connections to see what the results would be in a human brain.

According to spokesperson Catherine Baldwin, once they are perfected, the models might be used to create seeing and hearing computer chips that use processing similar to the brain's. Computer chips as implants would be able to send impulses through the human nervous system, mimicking brain circuitry—still unknown territory.

What is known is that the brain manages massive amounts of information simultaneously. Hopefully, the NeuroBuilder will help scientists unravel the brain's mysteries. That's the goal, Baldwin says.

JILL CHAMPION

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Create fractal landscapes, write shareware, save graphics screens, emulate other computers, format selectively, and much more

No Hard Format

Several years ago I picked up a little program that restricted the FORMAT command so that it would apply only to drives A and B. An entirely separate command was used to format the hard disk. I used it very successfully until my hard disk crashed. Then, when I looked for the program, either someone had borrowed it or it was thrown out during housecleaning in the computer room.

S. L. MOOTHART
FLORISSANT, MO

As somebody once said, lost programs, like lost socks, are an unavoidable result of keeping things tidy. If you wash your socks, you inevitably lose one. If you clean your computer room, you'll always lose the one irreplaceable piece of software you can't live without. The moral: Never clean your computer room or your socks.

Newer versions of DOS always pause to ask for confirmation before formatting a disk, but if that isn't enough protection, here's a trick that has preserved the contents of many a hard disk. Change to the directory that contains FORMAT.EXE, the program that does the formatting. At the command line, type

REN FORMAT.EXE DOORMAT.EXE

Then hit Enter. Next, we'll write a batch file that checks to make sure you haven't specified a hard disk. At the command line, type

COPY CON FORMAT.BAT

Then enter the following lines:

```
ECHO OFF
IF (%1)==( ) GOTO DROP
IF %1==C GOTO DROP
IF %1==c GOTO DROP
```

```
REM REMEMBER TO COPY ABOVE
LINES,
REM REMOVING C: AND REPLACING
IT WITH
REM REMAINING HARD DISK
DESIGNATIONS
:DOIT DOORMAT %1
:DROP
```

When you're finished, save the file by pressing F6 and Enter. Now, when you want to format a disk, if there's no argument after the FORMAT command, the program won't run. The same thing happens if you attempt to format any of your hard disks (assuming that you followed the instructions in the REM statements). However, you can still format your C drive by entering the command DOORMAT C: or entering DOORMAT while logged to the C drive.

Stashgraph

Is it possible to save a portion of a graphics screen to memory within a BASIC program? Please keep in mind that I don't have QuickBASIC. Also, is there a difference between a 386SX-20 and a 386-20?

PATRICK YANER
GENESE, BELGIUM

You need to use the BASIC command GET to place some part of the graphics screen in RAM and the command PUT to copy that clipping back to the screen. These commands are very complicated to use, and most manuals present these commands in a confusing way. Although you use an array variable to store the data, you type it in the GET and PUT statements as if it were a normal one-dimensional floating-point variable. Here's an example in GW-BASIC:

```
10 DIM A(100)
20 SCREEN 2:CLS:
PRINT"COMPUTE"
30 GET (0,0)-(56,8),A
```

```
40 FOR I = 0 TO 639 STEP 80
50 PUT (I,50),A
60 NEXT
```

Turning to your second question, the difference between a 386 and a 386SX is that a 386SX chip can only address memory and the expansion bus 16 bits at a time. A true 386 (also known as a 386DX or an i386DX) can address both memory and the expansion bus 32 bits at a time. This doubles the speed of some operations.

Catch the Red-Eye to Mars

I read Steven Anzovin's "Path-Ways" column about using your PC as a ticket to Mars in the May issue of COMPUTE. I liked the idea of creating fractal landscapes from the United States Geologic Survey's Digital Elevation Mapping files. But I don't own an Amiga. I have an IBM compatible (286 with VGA). I was wondering if you could give me the names and prices of any software titles that are similar to Vista but made to run on the IBM.

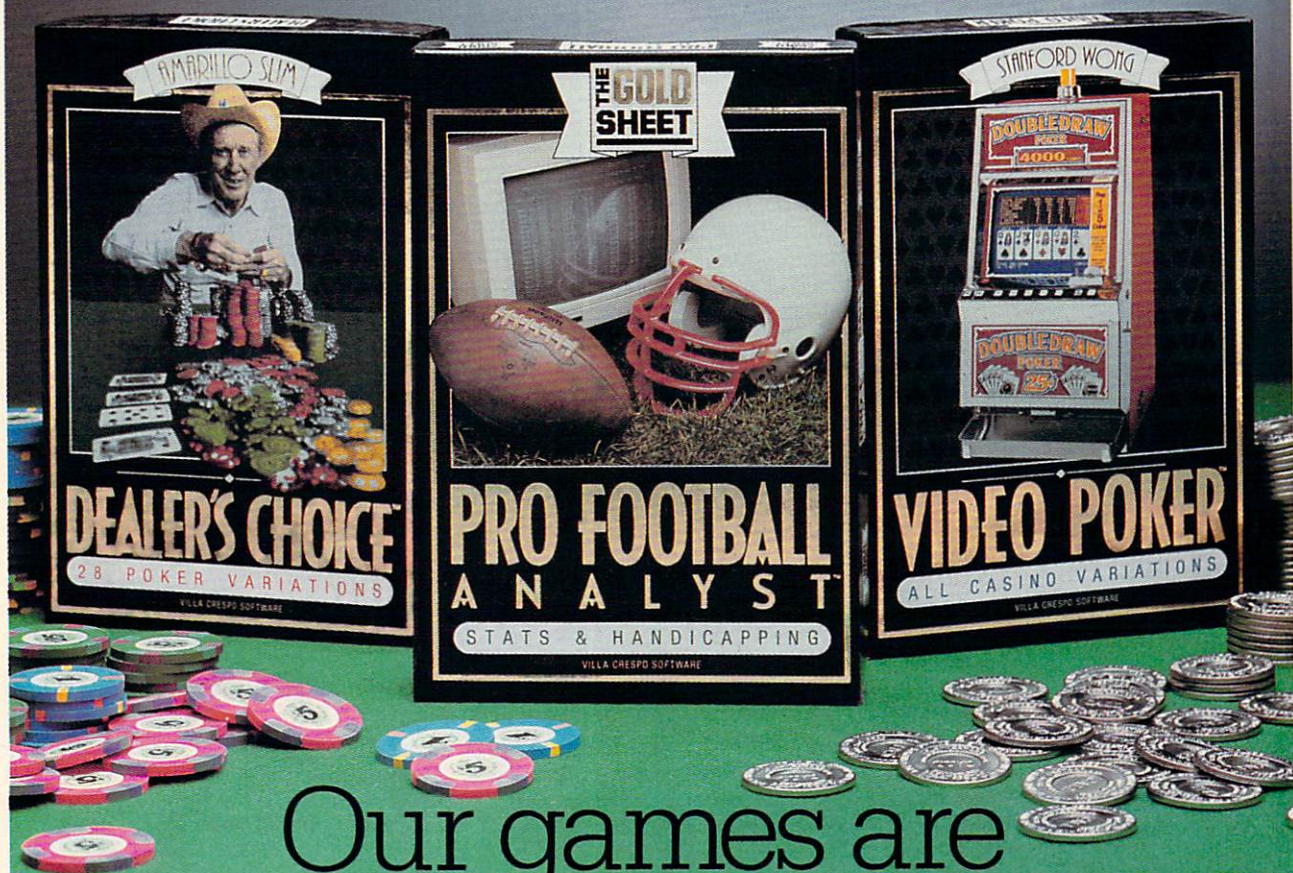
CHRIS HILL
INDIANAPOLIS, IN

Virtual Reality (VRI), publishers of Vista, should have introduced a PC version by the time this letter appears. VRI is located at 2341 Ganador Court, San Luis Obispo, California 93401; (805) 545-8515.

Not So Sweet 16

My friend and I are currently writing a drawing program in the Tandy version of GW-BASIC. We're using 16 colors at 320 x 200 resolution and are interested in converting it over into QuickBASIC version 4.0, but it doesn't seem to be able to support Tandy 16-color graphics. We were wondering if there was any way we could do this, and if so, how?

MARK MATINGLY
PRYOR, OK



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Microsoft doesn't support Tandy 16-color graphics in its current version of QuickBASIC and has no plans to support it in the future. True BASIC doesn't support it, and neither does PowerBASIC.

The programming staff here at COMPUTE believes that the 16-color BASIC support would be easy enough to create with machine language routines if you're interested in exploring that approach to the problem. Borland has said that its libraries can be edited to allow you to program for the Tandy video adapter in C and Pascal, but Borland no longer supports a BASIC. PowerBASIC used to be a Borland product (Turbo Basic), so you might investigate whether its graphics-adapter libraries can be rewritten in a similar way.

Ware to Share

I've written a couple of games on my Tandy computer, but when it comes to marketing, I'm lost. A friend suggested shareware, but I don't know how to go about distributing my programs as shareware. Can you help?

JAMES F. LONG
FARMVILLE, NC

The way to market a program as shareware is to place an opening screen on your program informing the user that it's shareware and that if the user likes the game, the registration fee is some amount of money (usually between \$10 and \$20).

It's a good strategy to offer a premium for registering, such as a version of the product in color, a special set of background screens, or an additional game. Make sure your name and address are clearly visible. Some authors put a routine in their programs that automatically prints out a registration form if

a certain key is pressed. You'll want to make your product as professional as you can, perhaps even providing a manual and a backup copy to people who register.

Finally, you'll need to upload the program to various online services, like CompuServe, GEnie, Delphi, PC Link, and any others you can think of. Get a list of bulletin boards in your area and upload it to them as well. You might be surprised at how quickly you start receiving registrations, depending on how useful or fun your program is.

PC Emulation

Is there an emulation program that allows an IBM PC to run programs written for other computers?

MICHAEL HORN
SWEENEY, TX

While they were once the game programmer's darlings, the Commodore 8-bit computers are starting to disappear from lists of equipment supported by software companies. Most new games are actually introduced for the PC and then translated for other machines. The PC is such a basic box that it would require a massive hardware investment even to make it emulate a Commodore 64. While you can find equipment and programs that enable the Amiga, Atari ST, and Macintosh to run PC software, it's unlikely that PC equipment will emerge to emulate these other machines. Enthusiasts for these machines will tell you that it's easier to make a race-car act like a tin lizzie than the other way around.

A coprocessor board is available to make a PC operate like an Apple IIe. It's sold with an Apple II-compatible disk drive, and it can access the PC's hard drive. It costs \$445. To find out the name of

a dealer in your area, call (408) 736-2000 or write to Diamond Computer Systems, 532 Mercury Drive, Sunnyvale, California 94086.

UniForm-PC (\$69.95) lets your PC read CP/M disks, copy CP/M files to MS-DOS, or copy MS-DOS files to CP/M. UniForm-PC can read and write over 300 CP/M formats. Since it doesn't cover all CP/M formats, you should call the company to make sure it can be of use to you.

MicroSolutions also offers UniDOS (\$69.95), which creates a Z80 CP/M version 2.2-compatible environment that can run CP/M programs on your PC. UniDOS is also available with a Z80 card (8 MHz, \$175 for both) that, according to the manufacturer, can make your CP/M programs run "twice as fast as they ever would on most CP/M computers." For more information, write to MicroSolutions at 132 West Lincoln Highway, DeKalb, Illinois 60115, or call (815) 756-3411.

The Amiga is your best choice for emulation, since programs and hardware are available that allow it to emulate a Macintosh, a PC, and a Commodore 64.

Blazing Pascals

I am a programmer in Turbo Pascal 5.0. The command KEEP (exitcode); will make the program terminate and stay resident (TSR). I would like to know how to make the program come back after this command when a certain hot key is pressed. Also, what is an interrupt vector?

ADAM BAUER
BROOKLYN, NY

According to our programming staff, the answer to your first question is dauntingly complex. Fortunately, many people have had to come up with it in the past, so there is



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FEEDBACK

prewritten code available to allow you to recall TSR programs and perform lots of other tricks. Where will you find this information? In the libraries of Code Runner from Microsystems Software or the shareware package Tesseract, which can be found on GENie and CompuServe. Moving on to your second question, an interrupt vector is an address to which the interrupt jumps to complete its work. These addresses are located in the first K of RAM, and they are very easily located. Since each interrupt requires a four-byte address, you simply multiply the interrupt number by 4 to locate the vector address. Interrupt 0's address is at location 0000h. Interrupt 21's address is at location \$0054 (decimal 84, which is 4*21).

Mea Gulpa

Whoops! On page 20 of the July issue of COMPUTE, you inadvertently used a screen shot of DINE Windows 3.0, a full-featured nutrient analysis, diet-improvement software product, to illustrate a review of another product. DINE Systems wishes to thank those readers who called us to point out the error. Although you graciously agreed to publish this letter in "Feedback," I believe that a more appropriate rectification would be to publish an insert with the screen shot and text describing our DINE Windows 3.0 product.

DARWIN DENNISON, PRESIDENT
DINE SYSTEMS
AMHERST, NY

COMPUTE regrets the error.

Oracular Access

DELPHI was inadvertently left off of a list of telecommunications services in the November COMPUTE, in the World of Electronic Games section. DELPHI offers two basic plans. The first charges \$6.00

per month for nonprime-time access, with a \$5.95 minimum, for which you receive one free hour of access. The other is called the 20/20 plan, which provides 20 hours of nonprime-time service for \$20 per month, and only \$1.25 per hour for each nonprime-time hour after the first 20. The 20/20 service is only available if you have access to Tymnet. The initial sign-up charge is \$39.00. DELPHI can be reached at (800) 544-4005 or by writing to DELPHI, General Videotex, 1030 Massachusetts Avenue, Cambridge, Massachusetts 02138. COMPUTE would like to apologize for this oversight.

Virus Guide

One powerful antivirus program was accidentally left out of our October "Buyer's Guide to Virus Protection Software." The Norton Antivirus program (\$129) is a heavy hitter. It offers constant memory-resident protection, automatic scanning that checks for viruses every time a file is opened, and instant updates on the latest viruses via Symantec's 24-hour Virus Newslines. We apologize for its omission. You may contact Symantec at 10201 Torre Avenue, Cupertino, California 95014-2132 or call (800) 441-7234.

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

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MERRY SHAREPAK

Christmas is fast approaching, and here's a great gift idea: COMPUTE's *SharePak* disk. December's *SharePak* is filled with three stocking stuffer programs sure to please every computer user on your Christmas list.

EZ-MENU puts a friendly menu system between you and the DOS prompt. It's the perfect answer for anyone who would rather not fool with com-

the online services for shareware so you don't have to.

Our connect time each month totals more than 100 hours, which would add up to a chunk of change if you searched yourself. By running and evaluating the programs, we also save you a lot of time. Considering *SharePak*'s low cost, you're getting real value.

EZ-MENU

You've read the manuals: "At the DOS prompt, type C:\THIS\THAT\AND THE OTHER." Forget your exasperation; now you have *EZ-MENU* to give DOS a facelift and run programs with one keypress.

EZ-MENU sets up in just a few minutes. It goes through your hard drive, making a list of all your applications and organizing them by type (for example, grouping all paint programs together), and then makes a menu for you. The result is a neatly organized, time-saving DOS menu.

EZ-MENU's documentation is short, but its online help is long; you can skip reading most of the manual and rely on the program for help.

To run *EZ-MENU*, you'll need a hard drive and 256K of available memory. The program works with any monitor.

PuzzleMaster 2.7

I love games like the ones in this brain-teasing collection. Instead of arcade shoot-'em-ups, *PuzzleMaster* gives you six mind-challenging diversions. One game is similar to *MasterMind*; one's a lot like *Simon*. There's also a word jumble game, a peg game, a slide puzzle game, and a jigsaw puzzle. Don't expect to get bored anytime soon.

Not only do you have a variety of games to choose from, but you can set difficulty levels and several game options. Your slide puzzle can be 3 x 3, 4 x 4, 5 x 5, or 6 x 6. I

still can't solve the 6 x 6 puzzle. The game called *CopyCat* that's similar to *Simon* will always get the best of you.

Computers are like elephants; they don't forget. So even if you have the best memory, you'll eventually miss one of the notes in the pattern as you try to replay what you've just heard in *CopyCat*. Luckily, for all the puzzles, you can save all the games and try them again later.

To play *PuzzleMaster* you need 256K of available memory. Although the program will run in monochrome, a color monitor is recommended.

PCBENCH

For all the techies and other interested parties on your list, *PCBENCH* will help separate the wheat from the chaff—the silicon computers from the Jell-O. Just install the program and tell it to start, and you'll get a complete report of your system's performance.

You'll find the resulting figures quite meaningful. You'll get average seek times for your hard drive and other similarly technical stats. If you're not up to the technical stats, though, you can see a comparison to several levels of industry-standard computers. IBM XTs, PS/2s, and ATs are among those that will be compared to your system. I loved seeing that my system performed 27 times better than the original IBM XT!

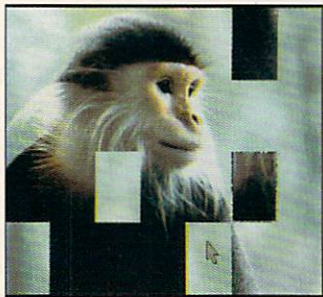
If you're looking for a used computer, this program really comes in handy. You can run it and get the *real* story on any computer you're interested in and plough through any bogus claims a seller might be tempted to make. If you're looking for a new system, just convince the salesperson to let you run *PCBENCH* on a showroom model.

PCBENCH runs on any system with 256K of memory. □

December's
SharePak: three
great stocking
stuffers sure to
please every
computer user on
your list.



EZ-MENU turns DOS into a whole different ball game.



Sharpen your mind skills with *PuzzleMaster*'s six games.

mands at the DOS prompt, and it's especially useful for those new to DOS. *PuzzleMaster* will keep the entire family entertained for hours on those snowy days. *PCBENCH* is for all the techies on your list who'd like to explore and compare different computer systems.

What is *SharePak*? It's an assortment of shareware we've methodically collected and carefully screened and put together on a single disk for your enjoyment. We search

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COMPUTE's SharePak disk contains the best of shareware—handpicked and tested by our staff—to complement this month's focus. You'll sample entertainment, learning, and home office software at a great savings. Each *SharePak* disk includes two to five programs plus complete documentation for one low price:

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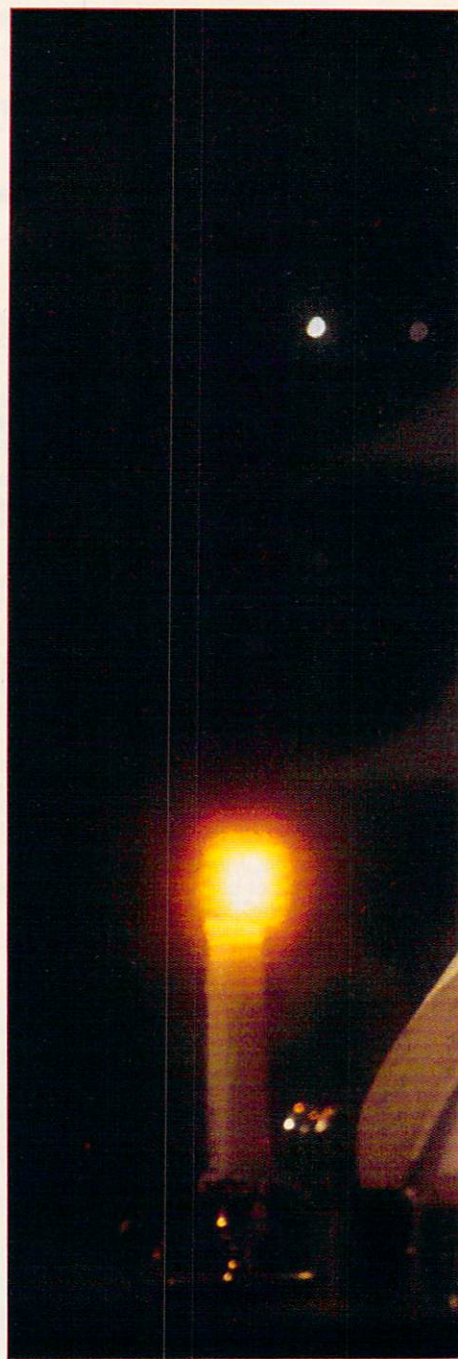
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Important Notice: COMPUTE's *SharePak* is not associated with COMPUTE's *PC Disk*. Please order *SharePak* separately.

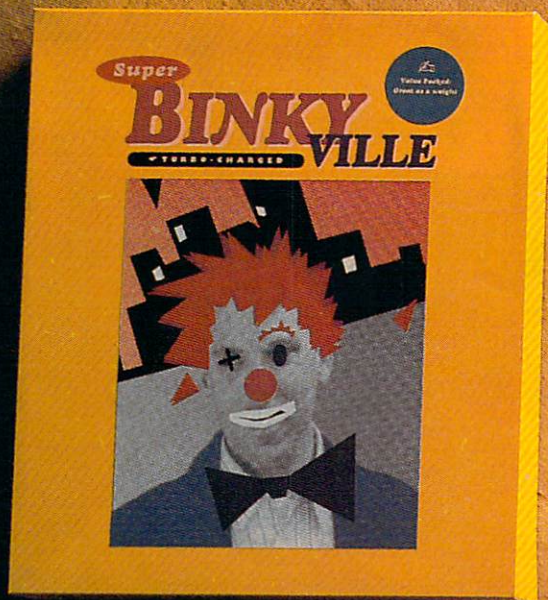
Christmas Wish Lists

'Twas the night before Christmas,
and all through *COMPUTE*,
The staff was a-scurrying to not get the boot.
The pages were sent to the printer
with care, In hopes that St. Silicon soon
would be there. The editors' thoughts
turned to spending with glee. With money no
object, what would they find
under the tree? Their wishes all vary,
but one thing's for sure,
The delusions they're having are full of grandeur.
Gather 'round close as the
editors themselves Tell what they dream of
having on their desks and their shelves.

BY ERIN RICHTER







Which Would You Rather Have? A Game That Challenges You For A Few Weeks.

Jill Champion Assistant Editor

Dear old St. Nick, I've been dreaming all year of a chance to get away from it all, and you're the only one who can make that happen. I'd like my own personal version of Sega's holographic videogame machine with all the bells and whistles that make it come alive—the 12-inch laser disc player and the 20-inch monitor with digital stereo sound and full digital graphics. I don't want a 3-D effect—I want 3-D for real.

Oh, and I'd like my own adventures for that holographic virtual world. *Hologram Time Traveler's* a little on the violent side for me, although I wouldn't mind catching a ripple or two. Just be sure to fill my holographic video machine with fantasy, thrills, and even a little mischief. Having my own game will allow me to jump in and play any old time without fighting all the teens at the local video arcade down at the mall. I know if you and your elves put your heads together, you'll find a way to leave that Sega machine under my Christmas tree. It's pricey; that's true. But please, Santa, it's the only thing I want.

Mike Hudnall Reviews Editor

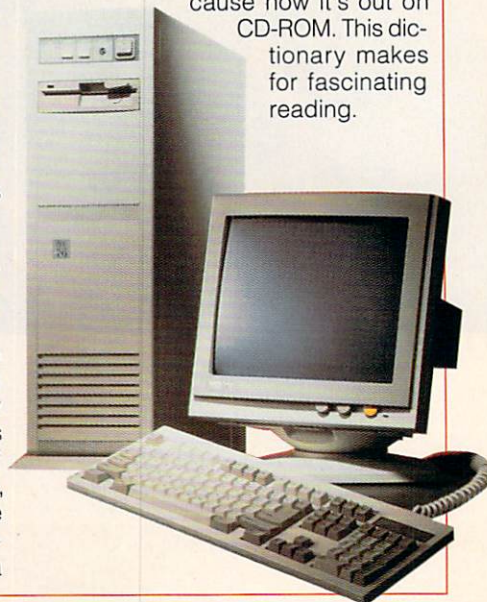
Pay attention, Santa. My old 8088 has served me well, but under my Christmas tree, I'd like to see a brand-new computer system with more speed, storage, and power—the ZEOS 386-33C, a 33-MHz vertical system with a 128K processor cache.

You've seen my crowded desktop, so you know how I need the vertical cabinet. I won't be greedy and ask for the 200MB drive; the 130MB drive will suffice (for the present), fast and spacious enough to handle any review software I might bring home. I'd like 8MB of memory rather than the standard 4MB, since this will have to last me for quite a while, and I'll be running some memory-intensive programs. The 1.2MB floppy drive and 1.44MB floppy drive should enable me to handle my extensive collection of old 360K floppies as well as any new software that comes along. With a 300-watt power supply and a total of eight expansion slots and eight bays, I'll have plenty of room for my modem, my fax board, my Sound Blaster, and any hardware goodies that may come my way for review. And Santa, give my eyes a

break, please, with a color VGA monitor, so that I can enjoy all those great games I'll be getting for Christmas to the maximum.

I'd also like *The Oxford English Dictionary* (better known as the *OED*) to use as a reference tool. I joined a book club for the sole purpose of getting the microprint *OED*, but I can throw away my magnifying glass because now it's out on

CD-ROM. This dictionary makes for fascinating reading.



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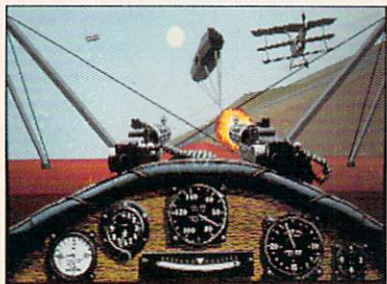
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David English Managing Editor

If money were no object—though it almost always is—I would have to select one of the new color LCD portable computers. The Toshiba T3200SXC features a 20-MHz 386SX processor, a sharp-as-a-tack VGA color LCD screen, a 120MB hard drive, and two slots for IBM-compatible expansion cards. It's only \$7,249.

If altruism truly has no bounds, I would like Dolch's lightning-fast color portable—the PAC 486-33E. It has a 33-MHz 486 processor, a Super VGA color LCD screen, a 420MB hard drive, and four EISA expansion slots. In the neighborhood of \$14,000. Nice neighborhood.

Most of my friends are mere mortals who have to watch every dollar, so I'll just ask for Central Point Soft-



ware's *PC Tools* 7.1 or Microsoft's MS-DOS 5.0. Every computer should have both, and if you know someone who has an earlier version of either, now would be a great time to buy the upgrade.

Who am I kidding? None of my cheapskate friends will spend that kind of money on me. I'll gladly settle for *Red Baron* from Dynamix. It lets you fly the unfriendly skies over Europe during World War I, dodging bullets and engaging famous foes in dog fights.

Denny Atkin Amiga Resource Editor

If money were no object, my first request to my cybernetic Santa Claus would be a custom-made RISC processor-based computer with a multitasking operating system that would run Amiga, Macintosh, and MS-DOS programs. Finally I wouldn't have to wait (or beg) for ports of my favorite games from machine to machine. In a more realistic vein, though, I'd settle for the new Amiga 3000T computer, with a 68040 processor board, an A2410 Lowell graphics board, a nice 19-inch multisync monitor, and a col-

Stephen Levy COMPUTE Books Editor in Chief

A notebook. A place to jot down my most profound thoughts, keep track of important appointments, catch up on the writing and editing I didn't get done during the day, and yes, of course, play my most current game in-fatuation. One like the 20-MHz Tandon NB/386SX.

The Tandon NB/386SX weighs in at just 6.5 pounds and measures the same as the notebooks you'll find in any stationery store, a mere 8.5 × 11 × 2.1 inches. But I'll need more than just the standard one parallel and two serial ports. Better include the optional 2400-baud modem so I can communicate with . . . well, I do enjoy playing games online.

The NB/386SX comes with a stan-



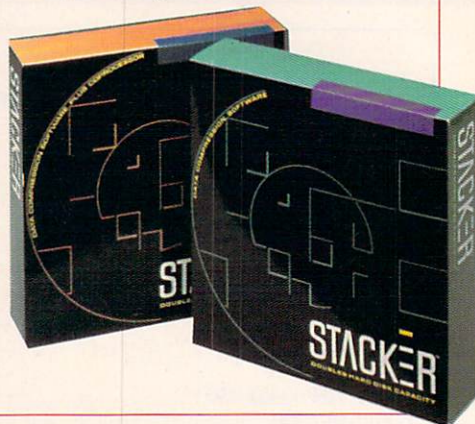
dard 40MB hard drive and 2MB of RAM, but Santa, you know I'll be running *Windows* and games that just love memory, so you'd better equip my notebook with the optional 60MB hard drive. And even though the Tandon can handle a full 16MB of RAM, I'll settle for just 4MB. Next year I'll be able to write my list at 30,000 feet.

Clifton Karnes Editor

I want just one thing for Christmas—Stacker. Stacker is a hardware and software combo from Stac Electronics that uses state-of-the-art compression technology to double the size of almost any hard disk. Amazingly, this magnetic magic doesn't cost you a bit in performance. A software-only version of Stacker is also available that operates only slightly slower. Stacker is a cinch to install. All you do is plug the coprocessor card into any free slot, run the installation program, and breathe an expansive sigh of relief. Your hard disk will be roughly twice its pre-Stacker size.

This may sound too good to be true, but it isn't. I know all about Stacker because I've installed a Stacker board in my PC at work, where it turned my 65MB hard disk into a 120MB jumbo. Now I'm dying to get

Stacker for my PC at home so I can transform my bulging, stuffed-to-the-gills 120MB hard disk into a whopping 240. Plus, there are new 16-bit versions available for MCA- and EISA-bus computers that promise to be even faster. So please, Santa, give me Stacker, and I'll never ask for anything else again. Promise.



or PostScript printer. This would be a fantastic productivity system. Perhaps a stocking stuffer to go with the Amiga would be a VGA 386, to play games not available on the Amiga, such as *Chuck Yeager's Air Combat*, *Falcon 3.0*, and *Strike Commander*.

It would be nice to have a collection of computers, each to run the one or two best games and applications for that particular machine. Maybe even some orphan machines to run the games that never made it to our 16- and 32-bit world of the future. However, my biggest Christmas wish would be to end the rash of sloppy,

careless ports of MS-DOS games to the Amiga platform. When companies release fantastic games like *Railroad Tycoon*, *F-15 Strike Eagle II*, and *Chuck Yeager's Advanced Flight Trainer 2.0* with operating system incompatibilities or prevent them from being installed on the hard disk, you wonder why they even bothered to port them. They would never release a PC game in such shoddy condition. Santa, please make these companies take the extra time to do their Amiga software products right, and make sure it pays off for them with better Christmas sales next year.

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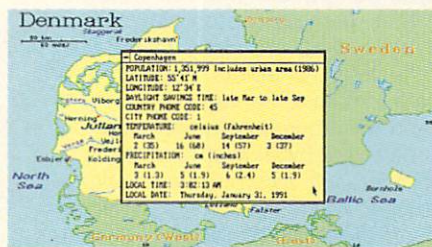
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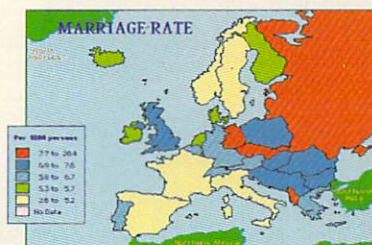
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DREAMING OF A SOFT CHRISTMAS TOP SOFTWARE PICKS FOR THE HOLIDAY SEASON 1991

Here's a list of some of the most desirable software available, both best sellers and neglected treasures.

The Ultimate Stocking Stuffer

David Sears: The one game I'd be willing to bet on this year is *Ultima VII*. Garriott's never failed me. The fact that the game is huge doesn't bother me. All the things I liked about the other Ultimas will live on in this version in spite of the 256-color factor. I've got to have that last Ultima.

A Word to the Wise

Denny Atkin: Interplay's *Lexi-Cross* is the most fun and addictive piece of computer entertainment since *M.U.L.E.* My wife and I have spent more time playing *Lexi-Cross* this year than all other games combined. It's an engaging word-puzzle game where you and another player take the roles of game-show contestants. The puzzles range from familiar to frustrating, and the graphics and sound are topnotch.

Jill Champion: *Transparent Language* forgoes the traditional tutorial method of teaching a language through repetition. *Transparent Language* is based on natural language development—learning skills by

reading. You read a literary work in its original language, displayed in the top part of your screen. As you highlight a portion of text, its English translation along with some very useful comments appear at the bottom of your screen. Eventually, you begin to understand words and phrases without consciously translating them.

Christmas Management

Pam Plaut: I'm putting *Quicken 5.0* on the top of my Christmas software wish list. *Quicken* would let me to balance my checkbook easily and keep tabs on my budget.

Robert Bixby: *GeoWorks Ensemble* can't do everything, but it is a remarkably flexible tool for desktop publishing, correspondence, telecommunications, organizing time, and keeping track of lists. If it had nothing else to recommend it, the way it makes fonts look, even when printed on a low-end dot-matrix printer, would be enough. I know this isn't the place to talk about hardware, but I've fallen in love with the RISC-driven NEC 990 Silentwriter2—the fast, silent type—a laser printer that churns out pages fast enough to match my productivity, which is rare in a model designed to sit on a desktop. It's a desktop

publisher's dream. Let me sneak in one more item of hardware: The Sony Laser Library CD-ROM System, a CD-ROM bundled with enough CDs to make the relatively heavy investment in the multimedia-ready hardware worth every dollar.

Yuletide Utilities

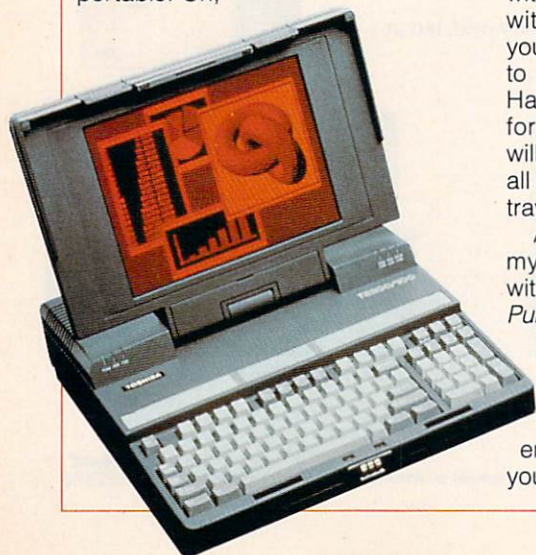
David English: Every once in a while, a program comes along that I absolutely must have. That's how I feel about *Magic Cursor!*. You can chose from among 47 oversize cursors to use in *Windows*, including arrows, pens, pointing hands (my favorite), airplanes, and lots of others. It's a terrific convenience for any *Windows* user but an absolute must for laptops.

Clifton Karnes: *Micrografx Designer* is the tops in precision illustration software. It's so versatile that in addition to taking advantage of its drawing prowess, you can use it as a typography tool, for desktop presentation, or as a CAD program. It will do just about everything, including importing and exporting almost every vector-based file format known to man—even the tough ones. And bundled with *Designer* is the *Micrografx PostScript Driver*, an underground classic (the driver is available separately for \$199).

Pam Plaut COMPUTE Books Editor

Santa, times are tough, I know. But I've been dreaming of having my own laptop computer this Christmas. I would like a Toshiba T5200 laptop with its 100MB hard drive and plenty of memory. It has a 20-MHz 386 processor, VGA gas plasma screen, and a 3½-inch floppy drive, too. It would be just what I need.

As for a printer, I'd like a portable ink jet—perhaps a Canon BJ-10ex portable. Oh,



yeah—could you throw in a mouse with all of this? I think I'd like the Microsoft BallPoint that I can clamp to the edge of my keyboard.

And to accompany my portable set, could you throw in a few round-trip tickets to some exotic places like Casablanca, Hong Kong, and New Delhi? I'd love to get started on that novel about my adventures in far-away destinations. And make those tickets on the Concorde, please.

My system wouldn't be complete without a modem to communicate with the rest of the world. While you're at Toshiba, Santa, I'd like you to pick up the optional 2400-baud Hayes-compatible internal modem for that Toshiba laptop. My editor will be waiting anxiously to receive all the latest chapters detailing my travels. Thanks, Santa.

And then there's software to run on my new machine. Well, supply me with *Microsoft Windows* and *Ventura Publisher*, *Windows Edition*, and *Microsoft Word for Windows*. I think I can take care of the rest. Santa, you're a busy man, and I know you've received a lot of computer wish lists this Christmas. Do what you can. I'll be nice all year long.

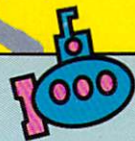
Tom Netsel Gazette Editor

The Commodore 64 tree is a little bare this year, but that didn't stop me from bending Santa's ear with a few modest gift proposals.

Since my 64 and 1541 are starting to show a little wear and tear around their chips and sockets, I might as well put the bite on Santa for new ones. I hope he picks the Test Pilot combo, which includes the Commodore 64, 1541, joystick, and some games for about \$300. That shiny new system just screams for a speedy hard drive from Creative Micro Design. Since the guy in the red suit is footing the bill, I'll opt for the HD-200 with its 200MB capacity. More modest models include the HD-20.

While the old boy is at CMD, he might as well pick up a RAMDrive or two for stocking stuffers. These battery-backed RAM disk cartridges come in 512K, 1MB, and 2MB models. Some of us 64 users were disappointed that RAMLink was a little slow out of the shipping dock, but Santa assures me that his elves at CMD are cranking out plenty of these REUs for Christmas orders.

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(800) 892-0020

PC Tools 7.1 \$179.00
Central Point Software
15220 NW Greenbrier Pkwy.
Beaverton, OR 97006
(503) 690-8090

Amiga 3000T \$4,998.00
A2410 Lowell Graphics Board \$998
Commodore
1200 Wilson Dr.
West Chester, PA 19380
(800) 662-6442

HD-200 \$1,299.95
(200MB capacity)
HD-20 \$499.95
(20MB)
Creative Micro Design
15 Benton Dr.
E. Longmeadow, MA 01028
(413) 525-0023

Red Baron \$59.95
Dynamix/Sierra On-Line
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Oakhurst, CA 93644
(800) 326-6654

Magic Cursor! \$49.95
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Northridge, CA 91324
(818) 886-8787

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Berkeley, CA 94704
(800) 772-0001

Lexi-Cross \$39.95
Interplay Productions
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Santa Ana, CA 92704
(714) 549-2411

Quicken 5.0 \$69.95
Intuit
P.O. Box 3014
Menlo Park, CA 94026
(415) 322-0573

Micrografx Designer \$695.00
Micrografx
1303 Arapaho
Richardson, TX 75081
(800) 733-3729

BallPoint Mouse \$175.00
MS-DOS 5.0 \$99.95
Windows 3.0 \$149.00
Microsoft
One Microsoft Way
Redmond, WA 98052-6399
(800) 426-9400

NEC Silentwriter2 Model 990
\$4,495.00
NEC Technologies
1414 Massachusetts Ave.
Boxborough, MA 01719
(508) 264-8000

Ultima VII \$79.95
Origin Systems
P.O. Box 161750
Austin, TX 78716
(800) 999-4939

The Oxford English Dictionary
\$950.00
Oxford Electronic Publishing
200 Madison Ave.
New York, NY 10016
(212) 679-7300

Sony Laser Library CD-ROM System
\$699.00
Sony Corporation
of America
Computer Peripheral
Products
655 River Oaks Pkwy.
San Jose, CA 95134
(800) 222-0878
(408) 432-0190

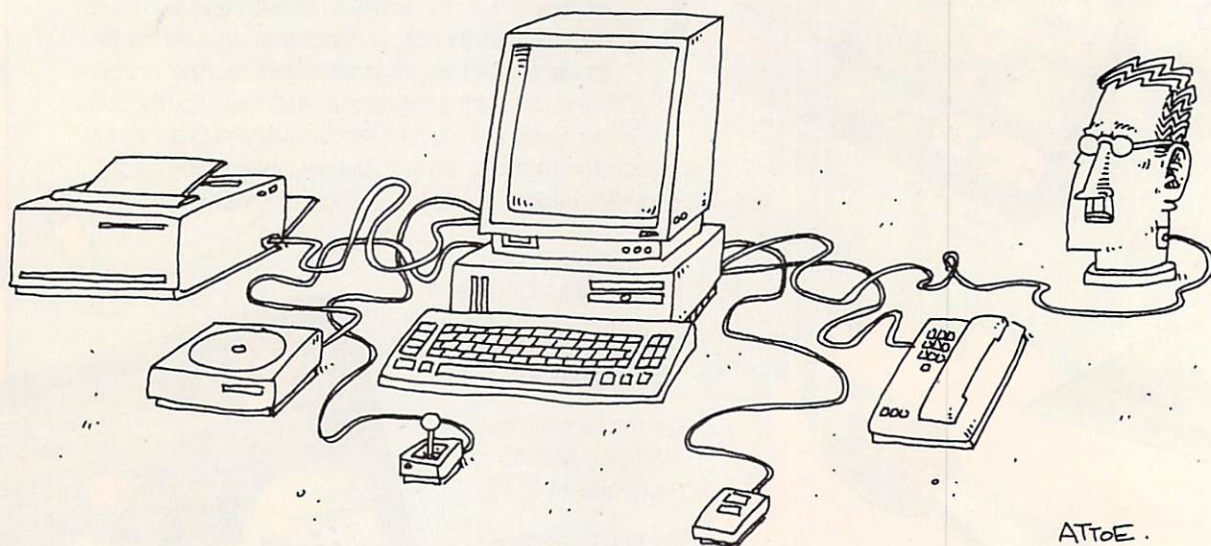
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(for MCA bus computers)
Stacker AT/16 \$249.00
(for 16-bit ISA bus computers)
Stacker XT/8 \$199.00
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Stacker \$149.00
(software only)
Stac Electronics
5993 Avenida Encinas
Carlsbad, CA 92008
(800) 522-7822

Tandon NB/386SX/20 \$4,449.00
Tandon
405 Science Dr.
Moorpark, CA 93021
(800) 800-8850

Toshiba T3200SXC \$7,249.00
Toshiba America Information Systems
9740 Irvine Blvd.
Irvine, CA 92718
(800) 334-3445

Transparent Language \$95.00
Transparent Language
9 Ash St.
P.O. Box 575
Hollis, NH 03049
(800) 752-1767

ZEOS 386-33C \$3,295.00
ZEOS International
530 Fifth Ave., NW
St. Paul, MN 55112
(800) 423-5891

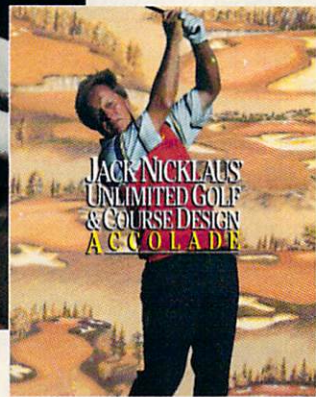
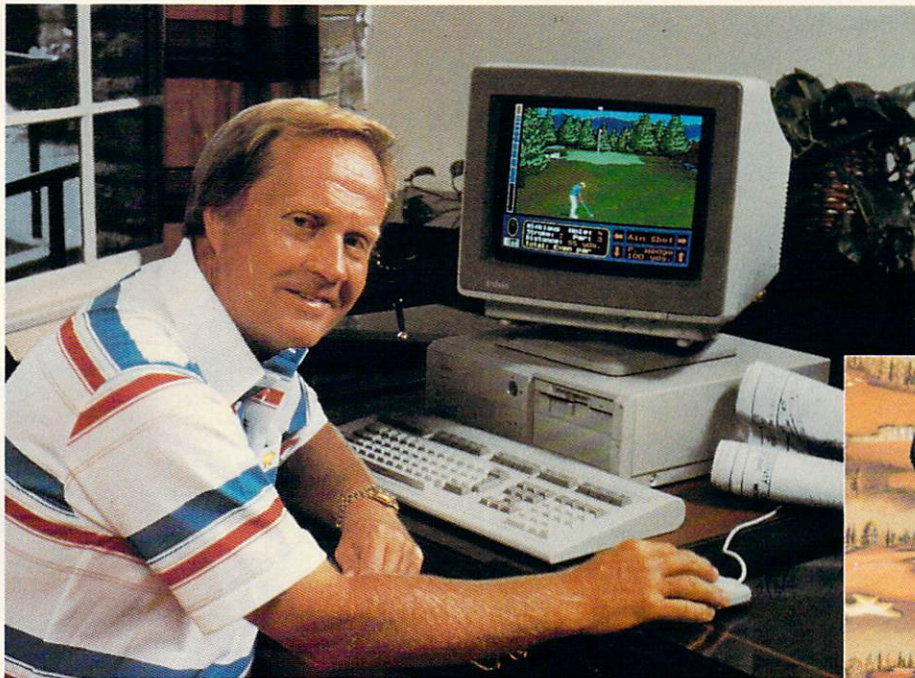


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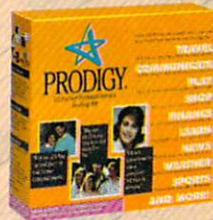
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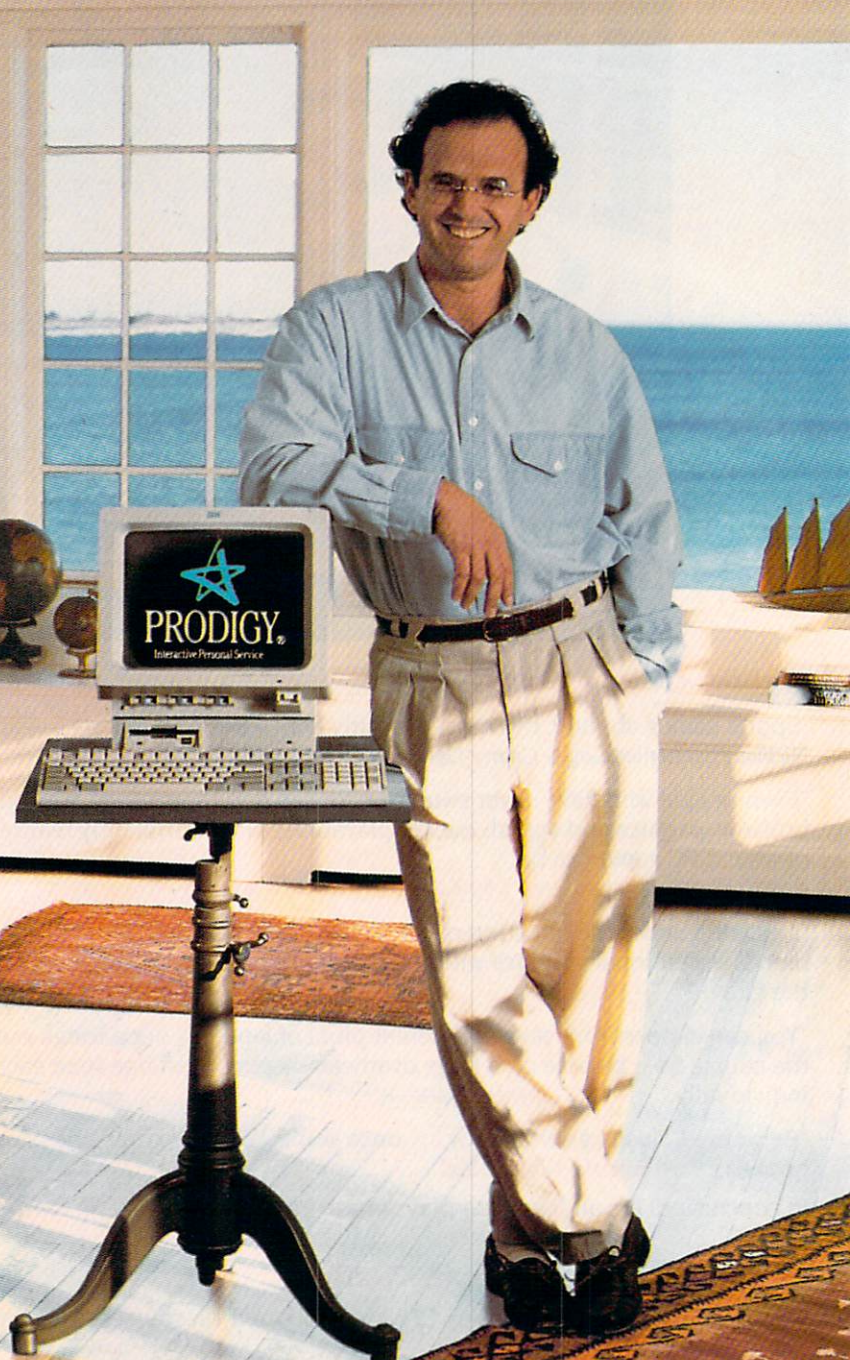
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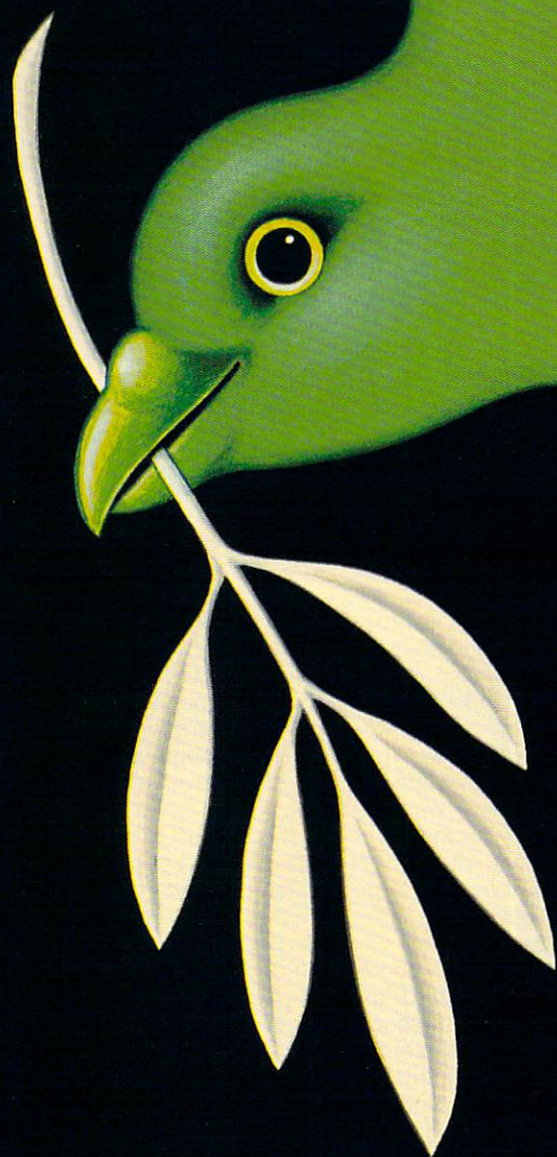


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PEACE ON EARTH

BY SHERRY ROBERTS

So far, no one has written a classic Christmas carol about computers. Few people deck the halls with computer cables, and even fewer jingle computer chips while sleighing through the snow.

But the fact is that in today's high-tech world, computers play an increasingly important role in maintaining stability and peace on earth.

In organizations such as the American Red Cross and the National Weather Service, computers help protect us, warn us of danger, and rescue us from catastrophe. Computers are also helping farmers and aid workers in famine-prone areas to reduce world hunger.

High-Tech Volunteerism

VITA (Volunteers In Technical Assistance), a nonprofit organization founded in 1959 to facilitate economic growth in developing countries through technical information, uses computers to make possible dairy farms, training schools, and printing companies in countries such as Chad.

VITA has designed a communications program using packet radios, computers, and a low-earth orbiting satellite called VITASAT that enables farmers in remote Sudan to plug into highly technical resources. VITA president Henry Norman says requests for technical information are answered by 5000 skilled volunteers.

Since 1988, VITA's Disaster Information Center has operated an electronic bulletin board called VITANet to track offers of relief assistance, time, money, and commodities. When a disaster is declared, volunteers enter offers of help into a database that can be accessed and downloaded by subscribers.

Disasters such as the Armenian earthquake may generate 500-1000 calls. More than 100 agencies access the information by computer for use in their relief and rehabilitation efforts.

Overcoming Famine

Computers have made possible new inroads into famine relief in seven drought countries in Africa—Ethiopia, Sudan, Chad, Burkina Faso, Niger, Mali, and Mauritania. Agricultural, economic, and meteorological conditions are monitored in those countries by the Famine Early Warning System.

Tulane University started developing the Famine Early Warning System for the U.S. Agency for International Development in 1985. Software packages created by the project's researchers analyze information gathered by satellite imagery and field workers—such as reports on the progress of the rainy season, the development of vegetation, and harvests—and issues bulletins used by relief agencies to predict food shortages and to plan shipments.

Marian Mitchell, operations specialist, runs the Early Warning software on 386-class computers. Fieldworkers use NEC Pro Speed laptops.

"It used to be that people on the ground knew what was going on but the information did not get back to the States until there was a crying need for food," Mitchell says. Now, thanks to computers and the Famine Early Warning System, relief officials can have as much as a three-month lead on famine.

A Change in the Weather

Catching the lead on disaster is also the job of National Weather Service

computers, which generate global and regional forecasts.

Increasingly powerful computers have improved the weather service's forecasting edge, which in turn saves property and lives.

According to Wayman Baker, deputy chief of development at the National Meteorological Center in Camp Springs, Maryland, in 1955 (precomputer), the weather service was capable of producing a reasonably accurate 1½-day forecast. Today the weather service can provide a 4½-day forecast with the same accuracy.

Using a Cray—the world's fastest computer—the weather service issues a ten-day global forecast and a 48-hour regional forecast every day.

When Disaster Strikes

Many lives are saved by the advanced weather warnings made possible by the computers at the National Weather Service, but when disaster is unavoidable and lives and property are in harm's way, people look to the American Red Cross—and its computers—for help.

Computers used in national disaster operations are warehoused in three locations—Cleveland, Dallas, and Burlingame, California. From those sites they can be shipped anywhere in the mainland United States, Puerto Rico, the Virgin Islands, and U.S. Pacific possessions within 24 hours.

This inventory consists of about 100 pieces of hardware: IBM PS/2 standalones, printers, Novell local area networks, and IBM 80 file servers.

The Red Cross has sent computers into the field for only three years, according to Armond Mascelli, manager of operations and technical support for disaster services. The organization tried using computers on relief operations in 1976-77. However, the process, which involved field workers traveling to a mainframe computer at night to process data, was tremendously cumbersome and was discontinued.

"Automation for disaster was put aside," Mascelli says. "Then when the PC explosion happened, it was the right piece of technology for the problem. Portable computers with a lot of memory and capable of running large databases and applications became useful for disaster-type activities.

"On the planning side, we use computers to try to anticipate where disasters are going to happen," Mascelli says. Using *Conquest*, a commercial demographics analysis program, the Red Cross pinpoints disaster-prone areas, such as hurricane-plagued coastal areas, and assesses what types of services will be needed in the event of

a disaster. Analyzing demographics— income levels, degree of home ownership, age of homes (were they built before earthquake building codes?)—provides good indicators to gauge probable relief needs.

Although the computers are popular in the field, they cannot be used in relief operations where the environment is too hostile for computers, such as when Hurricane Hugo knocked out power on whole islands.

While the American Red Cross is the first to use computers extensively in disaster services, Red Cross societies around the world are watching this high-tech experiment closely.

Computers also help run Red Cross blood services. In the Washington, D.C., headquarters and 52 local centers they perform functions from day-to-day donor operations to donor deferral (an updated list of disqualified donors) and rare-donor registry.

The rare-donor registry tracks more than 11,000 donors with rare blood types. When a pregnant woman with a very rare blood type in England required a blood transfusion at delivery, a computer search found a matching donor in Michigan in just hours.

In day-to-day operations, computers are used to record medical history of donors as well as the test results of every unit of blood, information on which hospital received the unit, and what components were made from it.

Elizabeth Hall, a spokesperson for blood services at the Red Cross, says this is not a simple chore. In the United States the Red Cross collects 20,000 donations of blood per day—that's six million units of blood a year. From these, fifteen million blood components are transfused into as many as four million patients.

"We have gone from manual entry at every level to completely automated systems where testing equipment sends messages to the central computer in the blood bank so they can never be recorded wrong," Hall says.

The accomplishments of the Red Cross are even more impressive when you realize that it struggles along with a mishmash of computer systems. Hall notes that each donor center has different software and hardware. And so the Red Cross has set a lofty goal: By December 1993, every donor center and Red Cross facility in the country will be online with one national computer system. The budget for the entire program is estimated at \$120 million.

Critics aren't sure the American Red Cross can pull off this daring computer project. But if it does, it will be a giant technological step for mankind and certainly worthy of a Christmas carol. □

TEST LAB

Mail-order companies offer a relatively inexpensive way to add mountains of mass-storage capability to your computer. To help you decide whether mail-order hard drives are for you, this month's Test Lab focuses on ten hard drives and the six mail-order companies that provided them for testing and review. Along with test data and reviews discussing the performance of these drives and companies, Test Lab explains the hard drive technologies and offers several tips on purchasing hard drives. One of our drive testers commented, "Purchasing a hard disk via mail order can be a double-edged sword: It can save you lots of money, or it can also be a nightmare. How it turns out depends on the information you have about your computer system and the questions you ask the sales representative when you call to order the drive." This month's Test Lab will help you make sure that the sword cuts your way.

CONNER CP3184

With Conner's CP3184, you get more than 80MB of exceptionally quiet hard drive storage.

This drive is so quiet, in fact, that I often found myself touching the drive in search of some vibrational tingle to confirm it was operational, since there is no hard drive access indicator light (nor the pins to attach an external LED indicator). While having a quiet drive is great, most folks like a reassuring LED to provide visual notification when the drive is being accessed for reading or writing.

Installing the drive taught me a great deal about the importance of understanding the drive technology before ordering. This Conner IDE drive wouldn't hook up as a secondary drive to my current RLL controller driving a Seagate ST-251-1, so I disconnected the existing drive and controller in an attempt to install the

CONNER CP3184

Supplier: Hard Drives International

Price: \$379 Capacity: 84MB

Controller/Interface: 16-bit IDE

Condition as Received:

unformatted, no DOS,

16-bit IDE hard/floppy

controller card, 40-pin

dual cable, DM (Disk

Manager) software,

mounting rails with

screws, Hard Drives

installation/reference manual

Conner alone using the supplied IDE card. Accent should go on the word *attempt*.

The drive came with no cylinder, head, or sector/track specs, so I placed a call to Hard Drives International's technical support for the information required by the BIOS setup screen on the 386SX test system. The tech support folks provided the drive specs in a matter of minutes, but I found no listing of a drive type fitting these specifications in the setup menu.

Although no one at tech support could help me right away, when I called a second time, a technician did call back. He left a message on the lab's answering machine with a reference number for me to use when calling him back. I called HDI the next morning using the reference number, and a technician talked me through the procedures to install the drive with the supplied *Disk Manager* program using a drive type that was close to the Conner in specifications. He warned me to bear in mind that this might not work with my current BIOS. (My Everex has a December 1987 BIOS date.)

I followed the prescribed procedures to format the drive, and, sure enough, it didn't work. Then I decided to install the drive on a computer that had a newer BIOS version which permitted user-configurable hard drive types. Installation proceeded on this machine without any problems.

While the original Everex BIOS date doesn't seem overly ancient



to me, it couldn't accommodate the Conner drive. The HDI representative said that I could always order a newer BIOS chip set from Everex as a solution to the problem. The documentation that came with the drive makes no mention of possible incompatibility problems such as these.

Hard Drives International supplies its generic installation/reference manual along with an IDE installation data sheet—a nice touch, as sometimes original manufacturer documentation is difficult to wade through. Lots of general information is provided along with specifics on how to configure jumpers, attach cables, and the like, although I found no mention of mixing an RLL drive and an IDE (or SCSI) drive on the same system. The lesson in all this, of course, is that it pays to talk to a vendor *before* you buy to find out how your system might or might not work with a hard drive or controller.

Once the installation was completed on a new 386DX machine with a later model BIOS, the half-height Conner drive performed as expected. I installed MS-DOS 5.0 and treated the entire 82MB (formatted capacity) as one large partition. Speed, access time, and overall operation were average—this quiet, reliable Conner drive makes a good choice as a primary or secondary drive when connected to an IDE controller.

PETE CLARK

Circle Reader Service Number 301

TEST LAB

KALOK KL3100

The compact Kalok KL3100 100MB drive from Professional Hard Drives fits nicely into one half-height bay and includes all the mounting hardware you'll need. Just make sure your computer can handle the IDE interface.

Initially I didn't know about the IDE incompatibility with my system, so when I installed the Kalok with its IDE controller, my 386SX locked up, and I couldn't boot from any drive. After searching through the poor documentation for a clue as to what the problem might be, I made a toll call to Professional Hard Drives in Houston. The only person who could help me wasn't there, and I was asked to call back in half an hour. When I did call back, the technician said that it would be impossible to install the Kalok in my computer as a second hard drive because of its IDE controller. A definite point to remember if you're considering this as a choice for your second hard drive.

Disabling my primary drive wasn't enough, as I learned in another call to tech support; I had to remove the existing controller card completely and use only the IDE controller in this system.

Removing the old controller card enabled me to boot from the floppy, but I received an error message telling me that I had an invalid media track when I tried to access the hard disk. Since I couldn't find a solution in the manual and the drive did not match up with any drive type in my CMOS setup, I made yet another call to tech support. This time the folks at Professional Hard Drives felt they couldn't remedy my problem and suggested I call Kalok tech support in California.

Kalok was, thankfully, right on the ball. Its tech support rep patiently stepped me through the process from the start and provided a CMOS drive type designation that was similar to (and compatible with) my configuration. He stayed on the line to make sure eve-

KALOK KL3100
Supplier: Professional Hard Drives
Price: \$319 Capacity: 100MB
Controller/Interface: 16-bit IDE AB-8388 AT Bus Card
Condition as Received: unformatted, no DOS, 16-bit IDE hard/floppy controller card, 40-pin dual cable, mounting rails with screws, installation manual

rything was completely operational before disconnecting.

Physically, the drive looks like any other half-height. Performance, however, is another matter. Once installed and formatted, the Kalok proved to be truly speedy, delivering random seek performance even better than the figures in the Kalok manual.

I can't really fault this drive for the problems I encountered; I wish the documentation and support from Professional Hard Drives had been stronger, however. If you're running a computer with a late model BIOS and looking for a fast drive, this Kalok KL3100 is a good choice.

BOB LEVY

Circle Reader Service Number 302

MAXTOR 4170S

Corporate Systems Center's Maxtor 4170S provides over 150MB of storage—plenty to handle today's mega-applications—and with the FastCache 32 SCSI



controller CSC sent along, its performance is plenty fast.

If you're like most hard drive users, you find yourself accessing the same portions of your hard drive time and time again because you tend to use the same applications over and over again. The result is 100-percent wear on a hard disk that you may use only 10 percent of on any given day. This mechanical stress can eventually result in hard disk failure and loss of important data.

To the rescue come RAM-rich disk controllers, which can prolong the life of the average hard drive. Simply put, information repeatedly used by your hard disk, such as a word processor or a spreadsheet, can now be loaded simultaneously into both your system's memory and an optional RAM cache on a hard drive's interface board. The RAM cache, which has no moving parts to wear down, will then be accessed as the primary memory source if you should need the

TIP 1: KNOW WHY YOU'RE BUYING

Analyzing your need will go a long way in determining what type of hard drive you should purchase. The main reasons are usually to replace a dead or ailing existing hard disk, to gain additional storage space, or to move large amounts of data from one computer to another conveniently. If you merely want to replace an existing drive that has seen better days, the least expensive and least complicated route will be to order the same make and model of your exist-

ing drive or one of the same type but perhaps a higher capacity. To gain additional storage, the safest bet would probably be to order the same model or a similar model that will work with your existing controller as a second drive. For portable media, you should consider a removable hard drive or a hard card. Knowing your needs will help you make the best choice for your budget.

—TOM BENFORD, PRESIDENT
COMPUTER PRODUCT TESTING SERVICES



Smartcom Exec™, the newest communications software from Hayes, is remarkably easy to operate. In fact, Computer Shopper said "Many people...will be able to install and use the program without touching a book, because the interface is quite self-explanatory and help is just a function key away."

And yet, Smartcom Exec is also highly advanced. It features everything from the most popular terminal emulations and file transfer protocols to a peruse buffer and a powerful on-line text editor with many word processing capabilities.

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operation and automatic log-ons.

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All of which is why Smartcom Exec received PC Magazine's prestigious Editors' Choice Award, Micro Decision's Gold Award, and was named a Buyer's Choice by Computer Reseller News.

At \$129, Smartcom Exec costs much less than you'd expect. And it's even more affordable when purchased in Hayes' unique Multi-Copy software packs.

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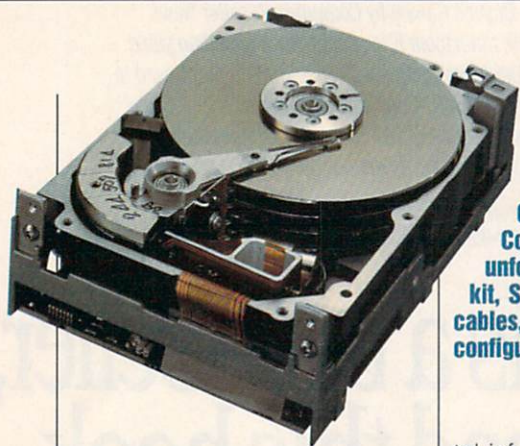
While our software is a best-seller, not many have to read this book.



Smartcom Exec users: Enter the SCOPE contest. \$12,000 in prizes. For details call 1-800-635-1225.

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Circle Reader Service Number 135

TEST LAB



MAXTOR 4170S
Supplier: Corporate Systems Center
Price: \$499 Capacity: 154MB
Controller/Interface: SCSI
Condition as Received: unformatted, no DOS, mounting kit, SCSI Fast Cache Card and cables, 7MB RAM (SIMM configuration) for Cache Card

same information again. This way, the hard disk and its mechanical drive heads are spared the effort of repeatedly seeking and sending the same data.

The FastCache 32 from Corporate Systems Center, a SCSI controller board with expandable RAM capacity, has been offered with Maxtor hard disks to enhance the performance and prolong the life of the drives. The full-height internal hard drive requires either a full bay or two half-height bays. Either way, you can say bye-bye to a couple of half-height drives or get yourself a bigger system cabinet.

The installation of this drive and controller turned out to be more difficult than I expected. The drive itself comes with nothing but foam packing and a technical specifications manual, which didn't provide all the answers I needed. If you don't purchase the FastCache 32 card with the drive, you'll need to buy a SCSI interface, mounting rails, and ribbon cable to complete the installation. Before you buy any drive, be sure to find out what you're getting and what you'll need.

The FastCache 32 card comes with a manual and a setup disk; I found the documentation to be abysmal. The only photos to guide the inexperienced installer were located in the rear of the manual and dealt with installing additional SIMM chips on the board. The manual assumes that everyone's an expert at installing a SCSI hard drive with a cache board. Because I couldn't find vi-

tal information in the manuals, I had to place four separate toll telephone calls to CSC technical support in California to walk me through what should have been a simple installation. These phone calls dealt with issues like DIP switch settings to reflect RAM configurations, controller access preferences, and other topics that should have been covered in the documentation.

Once up, the drive performed without a hitch. The RAM cache made the Maxtor's performance speed go off the charts. *SpinRite* reported processing speeds of 3 ms—far faster than the drive itself was capable of. Without the cache, the drive performed as would be expected, with a respectable 15-ms seek time and fairly quiet operation.

If you don't mind the size of the drive and the lack of documentation, CSC's Maxtor drive and Fast-

Cache 32 make an impressive team. But be sure you are receiving all that you need if you plan to purchase the drive without the FastCache 32. Overall, the drive/card combination impressed me almost enough to forgive the lack of adequate documentation—almost.

BOB LEVY

Circle Reader Service Number 303

PLUS HARDCARD II XL50

The thin size and "unibody" construction of the Plus Hardcard II XL50 don't really give you an indication of the truly awesome performance this unit delivers. Admittedly, I was skeptical about whether this hard-drive-on-a-card supplied by Bulldog Computer Products would install as painlessly as advertised and also perform at the 9-millisecond access time advertised.

As well as the Hardcard was designed, though, during the installation process a few problems did arise. The one-piece drive and card unit, filling a full-length expansion slot, wouldn't work on an old IBM AT (6 MHz) running MS-DOS 3.3. However, a quick five-dollar flat-fee phone call to Plus technical support revealed that the problem stems from a quirk in the IBM processor itself. This peculiarity

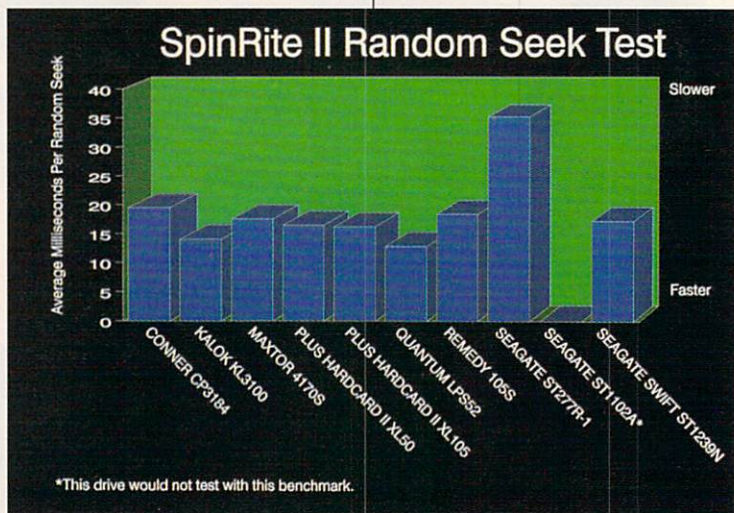




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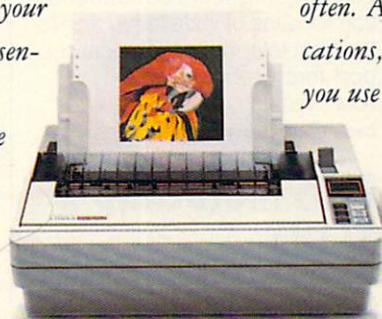
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Circle Reader Service Number 166

TEST LAB

makes MS-DOS unusable with the Hardcard on my machine. (PC-DOS, however, functions just fine with the software patch program provided with the drive.) The quirk has something to do with one high bit that IBM changed in the old AT BIOS since my machine was released (January 10, 1984). Tech support suggested that I switch over to PC-DOS and run the patch program to alleviate this incompatibility problem. Since I didn't have a copy of PC-DOS available, I decided to do the installation and review on another machine.

I then installed the Hardcard on a 386SX under MS-DOS 3.3 and found the rapid automatic installation a remarkably painless procedure that could be followed to a T with one small exception. The installation was complete in a couple of minutes. However, I then realized that my existing C and D drives had become C and E, and the Hardcard had interjected itself as a 32MB D drive. What had happened to the other 18MB of Hardcard space? It was, after all, supposed to have a 50MB formatted capacity.

Since MS-DOS 3.3 can recognize partitions only up to 32MB, the solution was simply a matter of returning to Plus's installation software, selecting manual partitioning, and creating an 18MB F drive. The excellent Plus user's manual provides lucid, detailed in-

TIP 2: KNOW YOUR PRESENT CONFIGURATION

Know your present computer system configuration. You should write down essential information about your computer system including the BIOS date and type; what version of DOS you're running; what kind of hard drive controller you presently have in your system; and the capacity, make, and model of your existing hard drive. You'll be able to gather most of this information from the user's manual that came with your computer or from diagnostic software like *The Norton Utilities* or *Check-It*.

—TOM BENFORD

PLUS HARDCARD II XL50

Supplier: Bulldog Computer Products
Price: \$389
Capacity: 52MB
Controller/Interface: ERL
Condition as Received: low-level formatted, no DOS

structions on how to do this.

The drive is a superquick star performer, exceeding even its published specs. And it's quiet, too—completely inaudible over the hum of the system's cooling fan. Only during intense data-write testing could I hear any sound at all.

Since the Hardcard mounts internally in an expansion slot, you don't have the benefit of a drive access light commonly found on standard hard drives. The Plus engineers have thoughtfully provided a utility that generates a flickering plus sign in the upper corner of the video display whenever the Hardcard is accessed. (You can optionally disable this feature if you so desire.)

The Plus Hardcard II XL50 proved to be a well-engineered piece of equipment. It's an excellent choice for the novice user who wishes to install a mass storage device that's also easily removable. I give the Plus Hardcard my highest recommendation for ease of installation and for the best telephone technical support that I received.

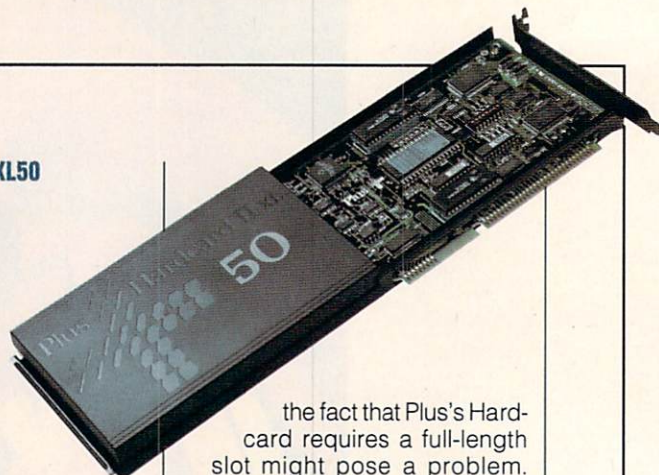
SCOTT MEGILL

Circle Reader Service Number 304

PLUS HARDCARD II XL105

This hard-drive-on-a-card is a screamer! Not only does it provide excellent capacity, but it's lightning fast and a breeze to install. But I'm getting ahead of myself; let's start at the beginning.

If available expansion slots are at a premium in your computer,



the fact that Plus's Hardcard requires a full-length slot might pose a problem. However, if all of the available bays on your system are already occupied with a couple of floppy drives and a hard disk and you still need more storage, then you should definitely take a look at the Plus Hardcard II XL105. This drive could be your ticket.

After successfully installing the Hardcard II in just a few minutes without incident, I could tell that Plus Development had spent lots of time designing the hardware, installation software, and user's manual. Inserting and using this device is extraordinarily easy, even if you've never installed any hardware before. To aid the installation process, there's a totally automatic mode that makes all of the decisions about partitioning and other pertinent aspects of the technology for you. In most cases, the automatic selections work just fine, but there's also a manual mode should you decide to override these computer-chosen defaults.

After completing the installation in less than 15 minutes, I had three 32MB partitions and one 7MB partition (a total of 103MB formatted capacity) running under MS-DOS 3.3. The trim unit is less than an inch wide, allowing it to fit comfortably in a single card slot.

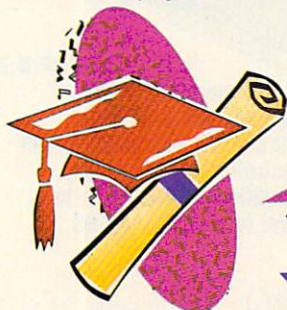
While the Plus Hardcard doesn't have a drive access LED like those on conventional hard drives, a light utility is provided in the setup software which provides a plus symbol in the upper right-hand corner of the monitor whenever the drive is being read from or written to. This is a nifty feature which, like everything else about the Hardcard, is well

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3. At the U#-prompt, enter XTX99423, COMPUTE then press <RETURN>.

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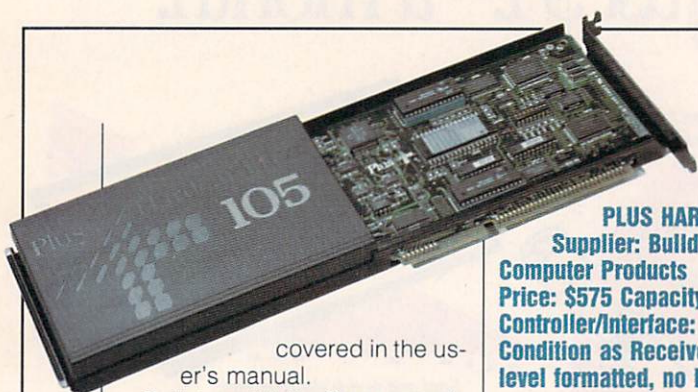
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TEST LAB



covered in the user's manual.

Bulldog didn't offer me tech support on this drive but did refer me to the manufacturer's tech support service. While no telephone tech support was really required during this installation, I know from experience that the tech support department at Plus Development is thorough, helpful, patient, and conscientious. At a flat \$5 fee for a tech support call, it may well be one of computerdom's great bargains. If you have an open card slot and would like your computer to have additional hard drive space, the Plus Hardcard II XL105 is definitely worth looking into.

PETE CLARK

Circle Reader Service Number 305

QUANTUM LPS52

The miniaturization of electronic devices and components, a byproduct of technological advances, has made a clearly positive impact on the world of personal computers. The compact laptop computers of only a year or two ago are quickly giving way to even more diminutive notebook models. Hard drives, too, have steadily decreased in physical size while their capacities have grown by leaps and bounds. The original IBM XTs came outfitted with a full-height 10MB hard drive that could do double duty as a boat anchor. Then half-height drives appeared on the scene. Now Quantum's LPS52 drive takes size reduction to the next logical step with a design that's only one inch thick.

A sleek piece of equipment, this inch-high Quantum drive has a formatted capacity of 50MB and uses VLSI (Very Large Scale Inte-

PLUS HARDCARD II XL105

Supplier: Bulldog

Computer Products

Price: \$575 Capacity: 105MB

Controller/Interface: ERLI

Condition as Received: low-level formatted, no DOS

gration) technology to pack a great deal into a remarkably small package. The drive sports a built-in access indicator light, and you get an additional two-pin jack to rig an extension LED indicator for hidden mounting situations—a nice touch. I like to be able to see some indication of hard drive activity and know that the file I meant to save is actually being saved.

The drive came supplied with a mounting kit and an IDE floppy/hard controller card, but I opted to plug it into my existing IDE controller. Even though it's about half the thickness of an ordinary half-height drive (you can fit two of these into the same mounting bay), the supplied mounting kit documentation assures you that it will nestle comfortably into any half-height opening.

I partitioned the drive with FDISK in a matter of minutes, loaded MS-DOS 5.0, and was up and running in under ten minutes—from start to finish. This was truly a painless installation, and on the basis of this pleasant experience, I would recommend this particular drive/controller combination as a good choice for someone in-

QUANTUM LPS52

Supplier: Hard Drives International

Price: \$239 Capacity: 52MB

Controller/Interface: 16-bit IDE

Condition as Received: unformatted, no DOS, 16-bit IDE hard/floppy controller card, 40-pin dual cable,

DM (Disk Manager) software, mounting rails with screws, Hard Drives installation/reference manual

stalling a drive for the first time.

I found the supplied installation instruction sheet easy to follow, something a user of any experience level can and will appreciate. If you follow the step-by-step directions precisely, calls to tech support shouldn't be necessary.

The drive noise was about average for an IDE drive—much quieter than the older, larger drives I've used. As far as performance goes, the drive is quick—much faster than the old trusty Seagate ST-251-1 that usually resides in my test system. Easy installation, good documentation, and good performance earn this drive my high recommendation.

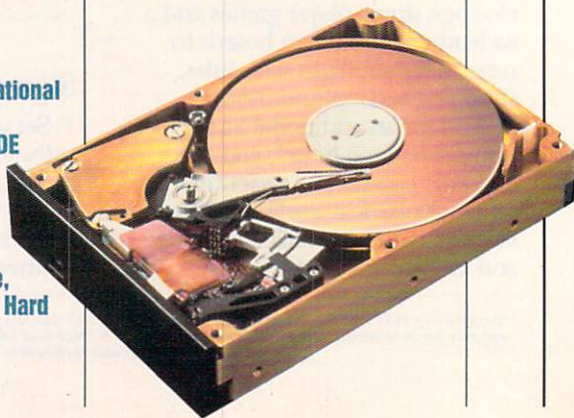
STEVE MAREK

Circle Reader Service Number 306

REMEDY 105S

The idea of a removable high-capacity hard drive appeals to many users, and the design of SPC's Remedy models makes this scheme a practical reality.

Essentially, the Remedy 105S drive is a streamlined 3½-inch unit that docks inside a 5¼-inch frame—physically the same size as a standard 5¼-inch half-height drive. The frame installs inside the PC with four screws and is the permanent (nonremovable) part of the installation. The drive itself slides into this frame and clicks into place, making contact with an edge connector at the rear. Removal of the drive is simply a matter of pulling it out of the frame—in effect, the drive itself is a cartridge which snaps into



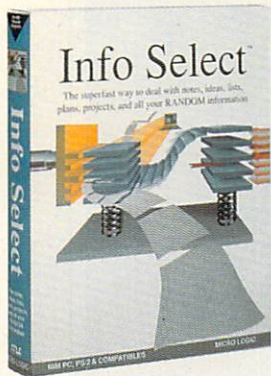
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Decisions



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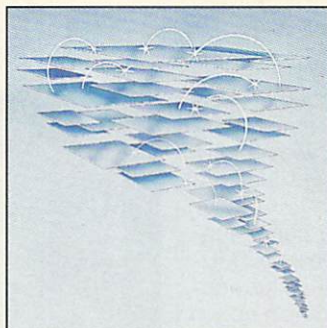
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Jeffrey Parker,
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"As easy as remembering your own name."
Patrick Marshall,
Info World

PC



Editor's Choice
"First rate"
PC Magazine

TEST LAB

place in the bay. Of course, in order to be able to remove the drive from the frame, you need to mount it in a bay accessible from the front of the PC.

The Remedy 105S came supplied with a Future Domain TMC-860 SCSI interface card for controlling the unit and a 50-pin ribbon cable for connecting the card to the drive. A good user's guide, supplied with the Future Domain SCSI card, made the physical hardware installation simple and straightforward with no special skills or technical knowledge required; all required screws, cabling, and other hardware were supplied.

I installed the Remedy 105S in a 386SX PC which already contained a 40MB Seagate ST-251-1 with an RLL controller card. According to the documentation, installing the Remedy as a second drive shouldn't have posed a problem, since the new drive was SCSI-interfaced. Actually, installation turned out not to be quite as straightforward as expected.

When the PC was powered up, it would boot normally. But since

STORAGE MEDIA TESTS

Regardless of the speed and computing power of a computer, the storage devices are often a bottleneck. COMPUTE's *BenchMark* program performs four different tests that can help rate the speed of a drive.

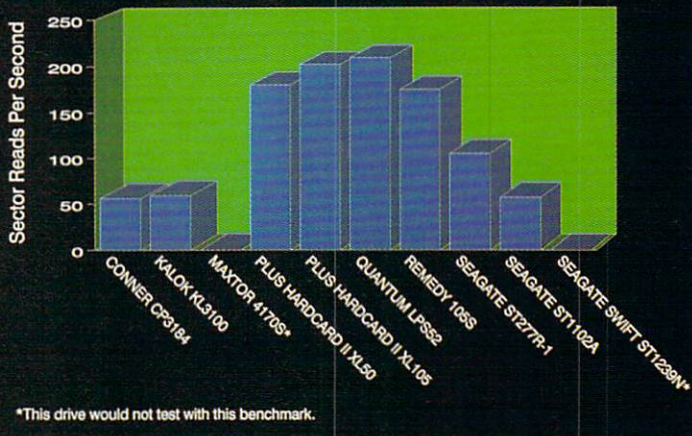
Our tests read sectors from the drive and write sectors to the drive with a timer running. That way we know how many sectors have been accessed in a second. The more sectors read or written, the better the performance and the faster your application will run.

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—RICHARD C. LEINECKER

Fragmented Sector Read Test



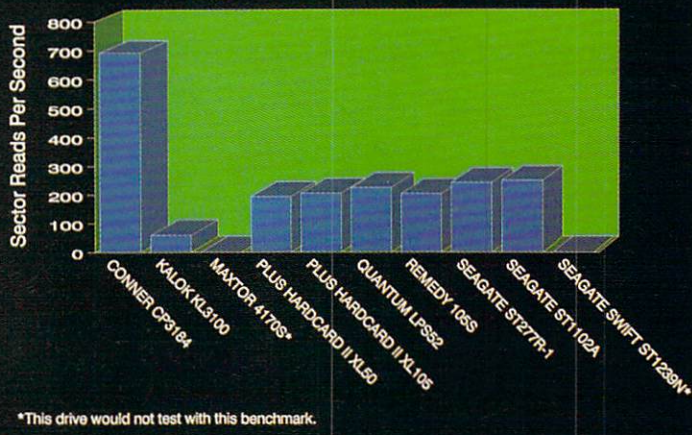
the existing drive was already partitioned as C: and D:, a conflict existed with the new Remedy drive, which was also partitioned as C: and D: as shipped. The PC recognized the C: section of the Seagate drive but looked at the Remedy for Drive D:. The location of the D: partition of the Seagate and the C:, E:, and F: partitions of the Remedy drive remained a mystery.

To try to rectify the problem, I made a call to SPC tech support. After several unsuccessful attempts at finding a cure to this incompatibility, SPC suggested that repartitioning the existing Seagate drive might be the best

solution. Since my data on that drive isn't expendable, I opted to disconnect it totally and run the Remedy as the sole hard drive on the system. I didn't really need the Seagate drive operational to proceed with the review, so this was my work-around. Without the Seagate running interference or competition, the Remedy booted and performed flawlessly from that point on.

The drive came with DOS 3.3 already installed, but I wanted to upgrade the drive to DOS 5.0 and eliminate the partitions in order to have one nice, large 105MB drive to work with; the upgrade went off without a hitch. I

Contiguous Sector Read Test



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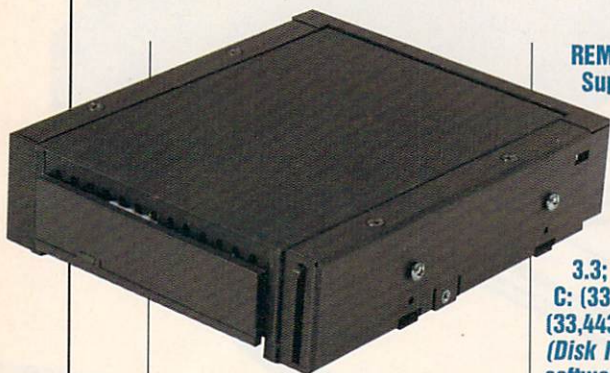
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was very impressed with the Remedy's speed—especially knowing how slowly by comparison my 28-ms Seagate ST-251-1 usually performed in this same machine.

If you're interested in a removable mass storage medium and particularly if you have data you'd like to be able to transport conveniently between two or more computers, the Remedy 105S is a convenient and efficient (albeit expensive) solution.

TOM BENFORD

Circle Reader Service Number 307

SEAGATE ST277R-1

I've had some bad experiences installing and reviewing mass storage devices in the past, so when I pulled this drive out of the box, I breathed a sigh of relief. The general consensus here at the lab was "It's a Seagate. We'll have this drive up and running in a matter of minutes." Little did I know that the projected half-hour installation was to turn into a nightmare of the first order.

The physical installation of the Seagate ST277R-1 drive and the RLL controller card into the test system went without a hitch, but

All Benchmark/Performance Testing is conducted by Computer Product Testing Services (CPTS), an independent testing and evaluation laboratory based in Manasquan, New Jersey. Every effort has been made to ensure the accuracy and completeness of this data as of the date of testing. Performance may vary among samples.

REMEDY 105S
Supplier: Systems Peripherals Consultants
Price: \$945
Capacity: 105MB
Controller/Interface: SCSI
Condition as Received: preformatted with DOS 3.3; partitioned as drives C: (33,148,928), D: (33,443,840), E: (33,443,840), and F: (4,571,136); *DM (Disk Manager)* partitioning software and device driver *DMDRVR.BIN* preinstalled on the drive along with a *CONFIG.SYS* file reflecting the presence of the partitioning driver

severe error messages during the disk partitioning segment of the setup (using the included *Disk Manager* software) indicated that I had a DOA (Dead On Arrival) on my hands. A call was placed to Hard Drives International's tech support department, and I described the problems. The technician agreed that it sounded like the drive was inoperable and provided me with an RMA (Return Merchandise Authorization) number. I also mentioned my really tight schedule and asked if the replacement unit could be shipped using my Federal Express account number.

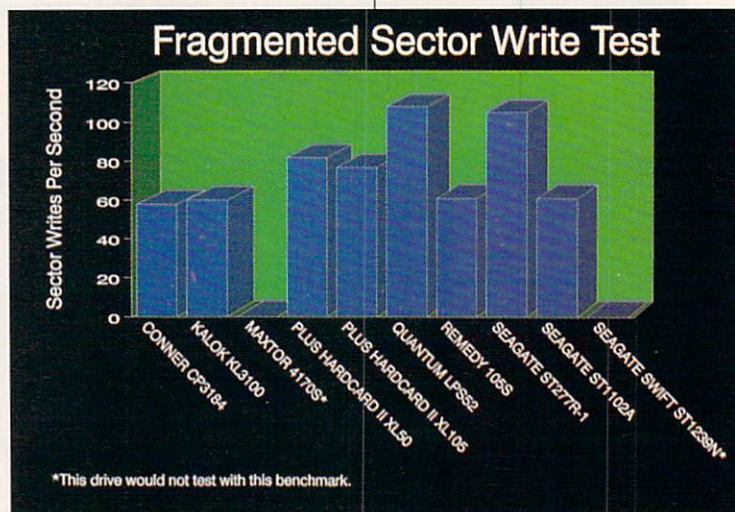
The Hard Drives International representative responsible for

helping me work out my problem was most accommodating and assured me that a replacement unit would ship as soon as the defective unit was returned. I didn't mention that I was reviewing this unit for *COMPUTE* because I wanted to see the kind of treatment an average customer would receive. HDI usually ships via ground delivery service, which takes longer than the overnight air service I requested at my expense.

Upon receipt of the replacement unit (within 48 hours after my call), I proceeded to install the drive and controller card in my computer. My Everex CMOS setup screen didn't show a drive type with the same number of cylinders, sectors, and capacity as the Seagate drive's, so I opted to let the *Disk Manager* software select the correct type and write the ID info to the CMOS registers.

When I loaded *FDISK* to repartition the drive, it indicated that the drive capacity was only 31 megabytes; *Disk Manager* had obviously chosen the incorrect drive type. I made another call to tech support at Hard Drives International and was advised to "pick something close to that configuration from the CMOS menu—it should work." It didn't.

Another call to tech support elicited the advice that I purchase "upgraded ROMs for [my] computer



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VGA Wonder XL 512K w/mouse \$239

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BOCA Research

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TEST LAB



SEAGATE ST277R-1
Supplier: Hard Drives International
Price: \$319
Capacity: 65MB
Controller/Interface: RLL
Condition as Received: unformatted, no DOS, 16-bit RLL hard/floppy controller card, DM (Disk Manager) software, mounting rails with screws, Hard Drives installation/reference manual

that will allow user-definable drive configurations." This option was not viable (or desirable) at the time, so I moved the drive and controller card over to another 386 with a newer AMI BIOS that does permit user-definable drive configurations.

With drive and controller installed in the 386DX chassis, I selected type 47 (user-definable) from the setup menu, keyed in the specs, and proceeded to format it from the command line. The drive formatted to 62MB without further incident.

After they work with IDE and SCSI drives, it's easy for today's computer enthusiasts to become jaded and spoiled by their quick speed. The Seagate ST277R-1 is not a contender for the *Guinness*

Book of Fast Drives. I could tell a difference in performance. Though the drive is rated at 28 ms, it consistently clocked slower seek, contiguous/fragmented sector read, and write times than this rating. Waiting for the drive to access and load files frequently became tedious, and writing data to the disk seemed to take an inordinately long time.

As with other drives supplied by HDI, this one came with fairly detailed documentation. However, it gave no advice on how to proceed with an installation on a machine like my Everex.

If you're running an older drive under RLL controller technology, this might be a good choice to replace it. Be prepared to settle for older technology and slower access speeds, however.

STEVE MAREK

Circle Reader Service Number 308

TIP 3: DETERMINE WHERE THE NEW DRIVE WILL RESIDE

Examine your computer system to select a "home" for the new drive. If you have only a single half-height bay available, don't consider purchasing a full-height drive, since it won't fit. If you have only half-height 5¼-inch wide bays available and you're going to purchase a 3½-inch wide hard drive, you'll also need a mounting kit to secure it in the wider bay. If you're considering a hard card, you'll need at least one full-length expansion slot available to accommodate it. Knowing what your present configuration is and what resources are available in your system will aid you in making an intelligent hard drive purchase decision.

—TOM BENFORD

SEAGATE ST1102A

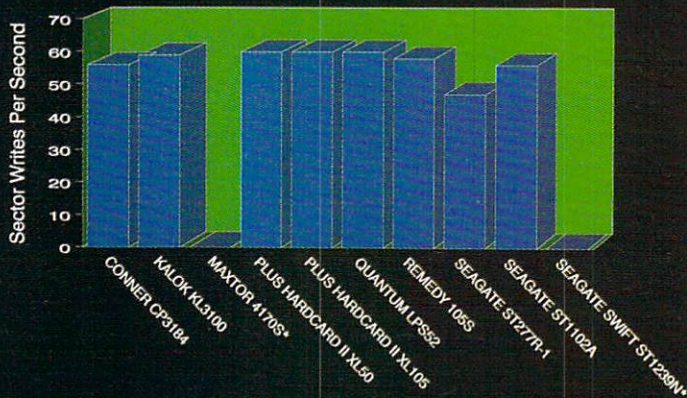
This half-height Seagate drive arrived completely formatted with the MS-DOS 5.0 operating system and a CONFIG.SYS file already installed—a pleasant surprise, indeed.

Along with the drive, Harmony Computers supplied the appropriate IDE ribbon cables and a half-slot IDE hard/floppy controller card. All I needed to come up with was a mounting kit to secure the 3½-inch unit into an available 5¼-inch bay in my test system.

The physical installation of the drive went along without a hitch, requiring less than 15 minutes to secure the drive in a bay and attach the cables to the controller card. Next on the to-do list was selecting the appropriate drive type from the PC's CMOS setup list, and here's where things got a bit interesting.

In addition to the Seagate installation guide booklet supplied with the drive, Harmony provided a "drive geometry" printout, which gave specific data about this particular drive. Included were its serial number, ROM/RAM versions, date and time stamp, and the physical configuration, which was listed as "Cyls: 1021 - Heads: 5 - Sectors/Track: 44, 36, 30 - Bytes/Sector: 512." On the surface this appears to be

Contiguous Sector Write Test



*This drive would not test with this benchmark.

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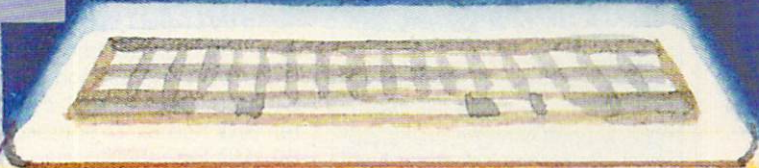
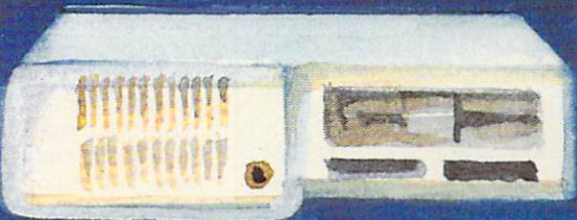
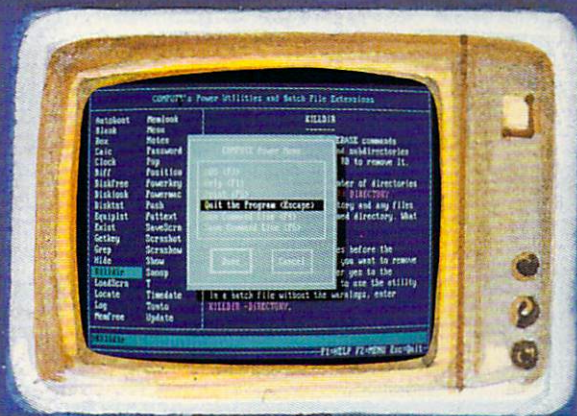
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TEST LAB

TIP 4: CHECK COMPATIBILITY

When ordering a new drive, be sure to tell the salesperson what kind of hard drive and controller you have in your system currently and ask if the new drive will be compatible with these components. If the salesperson doesn't know, ask to speak with someone in tech support to get the answer. If you're told that you'll need a new controller card, ask if your old drive will work with the new controller card. Most importantly, ask what the return policy is if the new drive or controller doesn't work with your current setup.

TIP 5: ASK WHAT'S INCLUDED

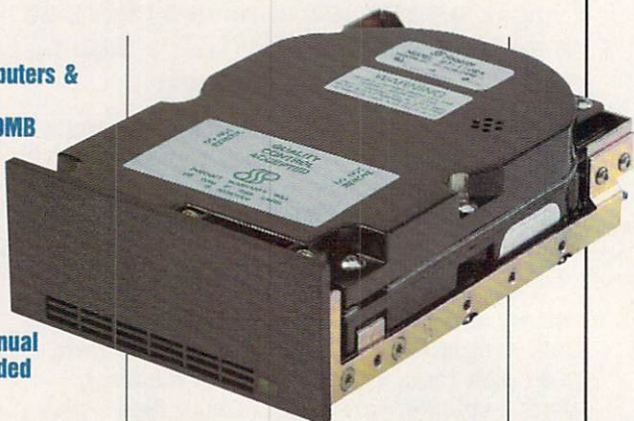
In addition to the drive itself, you'll also need a connecting cable or cables, a mounting kit, and, depending on which version of DOS you're running, partitioning software. You may also require a new controller card and appropriate cables to connect your old drive to the new card. Be sure to inquire what is included with the drive and what will have to be purchased at additional cost. Knowing your system configuration will help in determining what mounting hardware, cables, and software you'll need.

TIP 6: CHECK ON AVAILABLE ASSISTANCE

Be sure help will be available if needed. Depending on your current system components, the drive type and model you purchase, and your own technical acumen, installing a hard disk may be more than you can handle by yourself, and it's good to know that competent technical support is only a phone call away. Be sure to ask about tech support from the vendor you call to establish whether a technician will be available to answer your installation questions or you'll have to call the drive/interface manufacturer. If you think you'll be in over your head, you might be better off purchasing the hard drive from a local computer store/dealer and having the installation done there. Don't expect to get tech support from a local dealer for a drive you purchased via mail order!

—TOM BENFORD

SEAGATE ST1102A
Supplier: Harmony Computers & Electronics
Price: \$309 Capacity: 80MB
Controller/Interface: 16-bit IDE hard/floppy controller card
Condition as Received: preformatted, DOS 5.0 and CONFIG.SYS file preinstalled on drive, Seagate installation manual and ribbon cables included



helpful information that is essential in selecting an appropriate drive type from the CMOS menu. However, in the Seagate installation guide I found other specs conflicting with this shipment document.

On page 10 of the manual, a table advises that Drive Type 35 should be selected for machines running an AMI BIOS dated April 9, 1990, or later (as on our test system); the setup for Type 35 automatically comes up with 1024 cylinders, nine heads, 17 sectors, and 77MB capacity—all quite different from the enclosed geometry document. But that's not all. The upper half of page 11 in the Seagate manual states that Drive Type 35 should come up with 80.2MB capacity. It gets even more interesting on the bottom half of page 11, which advises, "If you have a system BIOS which offers a user-defined drive type [as mine does], select from the following drive configurations: For an ST1102A drive—1024 cylinders, ten R/W heads, 17 sectors/track, 89.1MB formatted capacity."

It all sounded pretty confusing to me. Which specs should I use for the CMOS setup? Fortunately, I have another PC in the lab which also runs a late-model AMI BIOS, and it's also equipped with a Seagate ST1102A drive. I took a look at the CMOS setup on that machine and saw that it was User-Defined Type 47 (1024, 10, 1025, 17, 85MB), so that's the one I used for our review unit as well.

All of this conflicting information was confusing, indeed! Just to be

on the safe side, I placed a tech support call to Harmony Computers, and the technician immediately told me to select User-Defined Type 47 and set it up for 1024 cylinders, ten heads, 17 sectors, and a 1025 compression setting (an exact match of our choices). He even provided Seagate's 800 number in case I needed any additional help. Hats off to Harmony's tech support staff!

After I exited the CMOS setup, my test PC rebooted directly from the Seagate drive, and I proceeded to run some tests. One thing that really perplexed me was *SpinRite II*'s inability to determine the seek time of this disk. A message displayed said, "This computer's hard disk subsystem is ignoring cylinder seek commands." I changed the operating system to MS-DOS 4.01 in an effort to get a seek reading but to no avail. I then tried to reconfigure the drive in CMOS to a different drive type as suggested in the Seagate Hard Drive installation manual, but this didn't alleviate the problem either. As a last resort, I tried running the *SpinRite II* test on our other similarly configured PC, but the same message appeared on this machine as well. Apparently some sort of incompatibility exists between *SpinRite II* and the ST1102A drive, at least when it comes to taking seek-timing measurements.

I didn't have any problems getting performance measurements with COMPUTE's proprietary benchmark software or with *Nor-*

ton Utilities 5.0, so I went with these figures and proceeded to load files on the drive and put some miles on it. The drive is a quick and reliable performer that packs 80MB of storage into a small, fast package.

TOM BENFORD

Circle Reader Service Number 309

SEAGATE SWIFT ST1239N

The 203MB Swift ST1239N drive is a testament to Seagate's commitment to performance and quality, as evidenced by the unit's quiet operation and 15-ms average seek time.

The installation of the drive couldn't be simpler. You'll need a SCSI interface card and a 50-pin ribbon cable, which were not supplied with the drive. The interface card plugged into an expansion slot, and I installed the tiny drive in an open 5¼-inch half-height bay using mounting brackets. Once I'd connected the power cable to the rear of the drive, the majority of the work was done. The drive comes low-level formatted to 203MB, so all you need to do is partition the disk and create logical drives with MS-DOS's FDISK utility (not supplied with the drive).

After completing the installation, I had a 160MB partition and a 43MB partition, designated as drives E: and F: (the resident 40MB drive on my computer system already had C: and D: designations). After some of the installation enigmas I have experienced with other drives, you can't imagine my relief at the ease with which this drive installed, especially since it had no problems getting along with the resident 40MB drive in the system. The Seagate manual is packed to the brim with all the information needed for a successful installation and includes illustrations of the process to supplement the descriptive text.

Once running, the drive per-

SEAGATE SWIFT ST1239N

Supplier: Corporate Systems Center

Price: \$595

Capacity: 207MB

Controller/Interface: SCSI

Condition as Received: low-level formatted, no DOS



formed exactly as expected: quietly, with speed and reliability. Its diminutive size certainly posed no problems in any performance-related areas. Supported by both Computer Systems Center and Seagate itself, technical assistance is not lacking for this drive, although I didn't require any tech support. Far too often you can find yourself on the short end of the stick when dealing with mail-order and discount companies offering amazing deals. The

Seagate Swift ST1239N is an excellent choice, and dealing with CSC is a pleasant experience.

SCOTT MEGILL

Circle Reader Service Number 310

For further information about this month's Test Lab, see the COMPUTE area on GENIE and America Online. In addition to regular Test Lab information, you'll find our HDBENCH.EXE, proprietary benchmark software developed especially for the Test Lab.

HARD DRIVE INTERFACE TYPES

MFM: Modified Frequency Modulation is the oldest of the six interface types. It's typically the slowest and least expensive of the bunch, operating at a transfer rate of about five megabits per second (Mbps). It transfers data more slowly than other technologies principally because it allows only 17 sectors of data per track.

RLL: Run Length Limited permits a higher number of sectors per track (26), increasing transfer rates to 7.5 Mbps. The main drawback to RLL is the increase in price. The storage medium (hard drive disk) must be a stronger type to handle the increased demands on the magnetic surfaces.

ARLL: Advanced Run Length Limited, sometimes also known as ERLL (Enhanced RLL), compresses data even more tightly on the surface of the hard disk to gain about 75 percent more capacity and speed than that of a standard MFM controller and about 25 percent more than that of an RLL card—approximately 9.3 Mbps. As is usually the case, these enhancements mean higher prices.

ESDI: Enhanced Small Device Interface requires that its hard

disks are specifically manufactured to run ESDI, which tends to drive up prices. However, the interface runs at 10 Mbps and supports 34 sectors per track, which makes large capacity drives run at speeds often exceeding the speeds of smaller units using other interface types.

SCSI: Small Computer System Interface has been around awhile but has only recently become popular as a hard drive interface. SCSI's real claim to fame is its ability to control up to seven devices on the same controller board. Coupled with a 32-Mbps transfer rate, SCSI controllers have found quite a large following and are assured a steady future.

IDE: Integrated Drive Electronics, the newest interface type to appear, sports extremely rapid transfer rates and is typically capable of sending 16 bits of data at a time. IDE has a theoretical speed of about 12 times faster than a standard MFM interface, but its price is also elevated. IDE may pose compatibility problems when installed in systems with existing non-IDE controllers.

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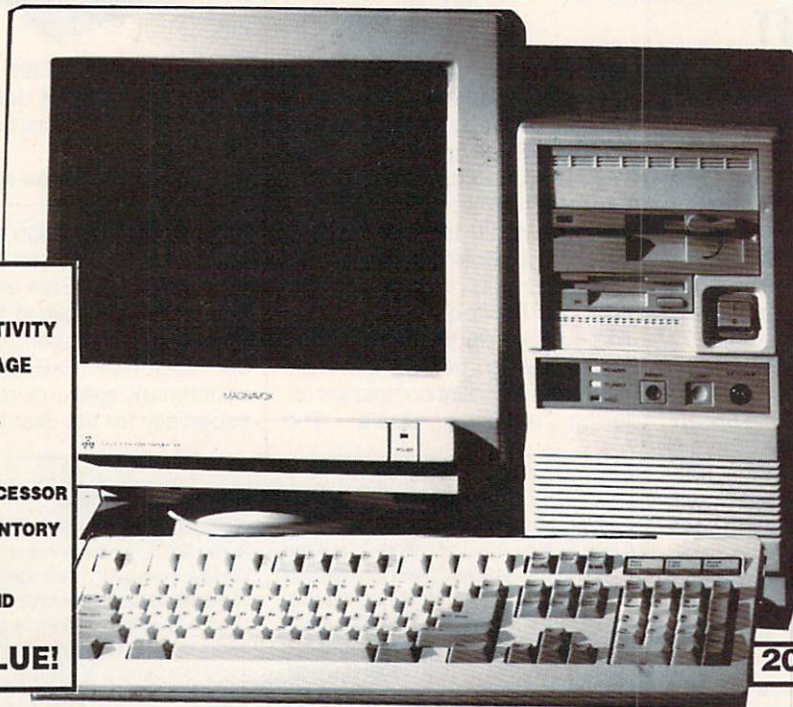
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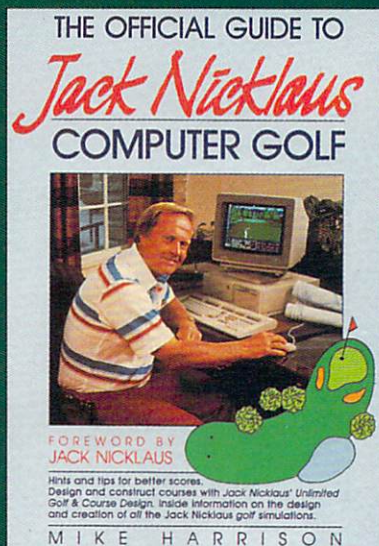
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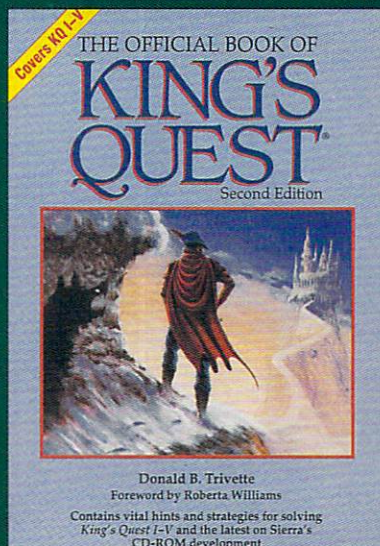


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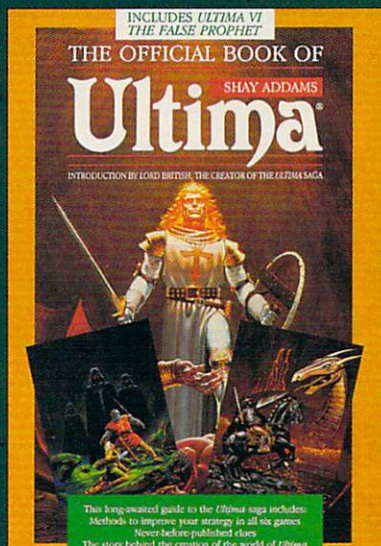
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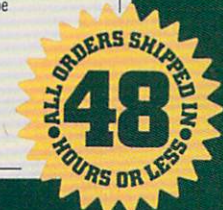
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TELECOMMUNICATIONS POWER

TONY ROBERTS

Wake up, telecommunicators! You're working too hard. The rest of the world has moved up to automated telecommunications while you're still waiting for prompts and typing account numbers and passwords.

If you telecommunicate, it's time you looked into ways to automate the process, and there are several reasons why:

- You can save time.
- You can save money.
- You can have fun programming your PC.

If telecommunications is part of your business, you know that saving time is essential. The sluggish economy, business downsizing, and increasing competition force every worker to find ways to be more productive. If you can find ways to increase what you can do in a day, you'll protect your job and build skills for your career.

Whether you're a business or home telecommunicator, saving money is always an issue. Automated telecommunications allows you to accomplish more in less online time, keeping both online charges and telephone line charges down.

Ten years ago, computer programming—mostly in BASIC—was a part of every computer user's day. You needed a little programming here and there just to keep your system going. Programming became a challenging hobby enjoyed by thousands of computer owners who were able to use their newly learned skills to create useful software for their families and businesses.

The evolution of computing, however, has left would-be recreational programmers twiddling their thumbs. Systems have become so complex and software has become so advanced that it's almost impossible for the average person to write application software that's really useful or

that can compete with today's off-the-shelf programs.

Unless you're going to throw your life into it, it's difficult to justify the expense of a software development package and all the tools and research materials that go with it.

If you own a telecommunications program, however, you probably have the tools at hand to embark on some small programming projects that have a purpose. You can use your program's script language to create custom software that's useful for you, and in so doing, you can save time and money and complete a challenge.

If you're not up to programming, don't desert me. It's possible to automate telecommunications sessions in other ways, including the use of keyboard macros and dedicated front-end software programs. In fact, serious telecommunicators will probably adopt a combination of these methods. See "No Programming Required" for more information on these nonprogramming alternatives.

An Elementary Guide to Script Writing

Every telecommunications program has its own script language, but most telecommunicators take one look at the script language manual and stop cold.

Even some *programmers* are put off by 200 pages of cryptic commands. Don't lose your cool. Getting started is easier than it looks.

Although these script languages have the raw power to produce huge and complex programs, most home-hacker telecommunications chores can be accomplished with a handful of commands.

If you can figure out how to do the following four things, you can write telecommunications scripts.

- Dial a telephone number.
- Watch for specific information coming in over the modem.
- Send and receive characters.
- Send and receive files.

This article will show you how to accomplish these tasks using the script languages provided with *Procomm Plus* and *Telix*, two popular telecommunications programs. Even if you have a different package, follow along, because chances are that the commands your program offers are similar.

Both *Procomm Plus* and *Telix* include sample script files on their distribution disks. If you have *Procomm Plus*, look for files with ASP extensions; if you have *Telix*, look for files with SLT extensions. The rationale for these ex-

tensions crystallizes when you realize that *Procomm Plus* scripts are created with the *Aspect* language, and *Telix* scripts are created with a language called *SALT*.

These sample files are excellent references for command usage. In fact, some of these programs can be put right to work. Both programs offer a script that logs on to CompuServe once you fill in your account number and password. That script can then be modified to work with other services you call.

Programming Prologue

- Both *Aspect* and *SALT* are C-like languages. If you don't know C, don't worry, the scripts you write as a beginner will consist of a start and a finish with a few program lines in between.
- Both script languages allow you to use variables and require that they be defined before they are used. However, many simple scripts, including the ones used here as examples, can be written without variables.
- Finally, most of the commands available in script languages have far more options than the beginning programmer can use. Many commands also provide a return value. This is a code that your program can use to verify that the previous command was successful. Return values are crucial in complex programs that run unattended, but simple programs that are built to save you tedious repetitive keystrokes usually can do without them.

Dialing

Both *Procomm* and *Telix* can associate scripts with dialing directory entries. That is, you select an entry from the dialing directory; the program dials and establishes a connection. Once the handshake occurs, the script kicks in.

However, sometimes it's convenient to include dialing commands in your script. This might allow you to execute your scripts from DOS or from another program such as *dBASE*.

Basic Script Commands

Command	Telix	Procomm
Dial a number	DIAL	DIAL or MDIAL
Wait for text	WAITFOR	WAITFOR
Send characters	CPUTS	TRANSMIT
Manipulate buffer	CAPTURE	LOG
Download file	RECEIVE	GETFILE
Upload file	SEND	SENDFILE

NOTE: In the syntax examples for the Procomm Plus telecommunications commands, some parameters are separated by the vertical bar symbol, represented by the character |. This symbol should be interpreted as "or," and only one parameter should be used at a time.

In the *Telix* examples, command parameters are placed in parentheses and are separated by commas. The examples also indicate what kind of parameter is required—*str* indicates a character string parameter, and *int* indicates an integer. All *Telix* statements must conclude with a semicolon.

Dial a Number

Procomm:

```
DIAL "[Idcode]entry[Idcode]..."
      strvar[stringvar]
```

or

```
MDIAL "[Idcode]number[Idcode]"
      strvar[message]
```

Telix:

```
DIAL (str<dialstr>, int<maxtries>,
      int<no_link>);
```

Procomm Plus uses separate commands to handle numbers selected from the dialing directory and manually entered numbers. *DIAL* plucks a number from the dialing directory and initiates the call. If you want to call the service that's listed fifth in your dialing directory, *DIAL 5* will do the trick. If special long distance codes need to be added to the number, they can be appended before or after the dialing directory number as appropriate.

Manually dialed numbers are simply entered with the *MDIAL* command as in *MDIAL 555-1212*.

Although it may seem easier to select manual dialing for many simple scripts, there's an advantage to using the dialing directory. The dialing directory entries contain the settings for each service you call. By using the dialing directory, you ensure that your telecommunications parameters will be correct. Under manual dialing, however, the program establishes a connection using whatever settings and parameters are currently in effect.

In *Telix*, one command does all the work. In its simplest form, you enter the dialing directory entry number for the service you want to call, such as *DIAL("5")*. Other parameters you can add indicate the number of times *Telix* should attempt to establish a connection and a code to deactivate a script that's associated with the dialing directory entry.

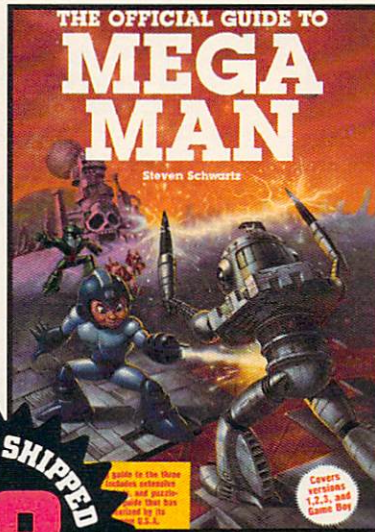
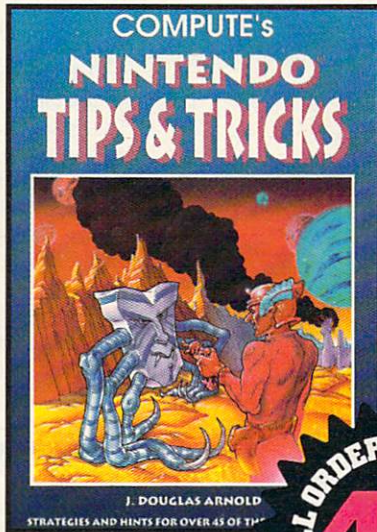
The command *DIAL("4", 10, 1)*; would dial entry number 4, try ten times to make a connection, and not run the script file associated with the dialing directory entry. If the second parameter, *maxtries*, is 0, *DIAL* will attempt to make a connection until it is either successful or halted by the user. If the no-link parameter is either not included or set to 0, the script associated with the dialing directory entry will

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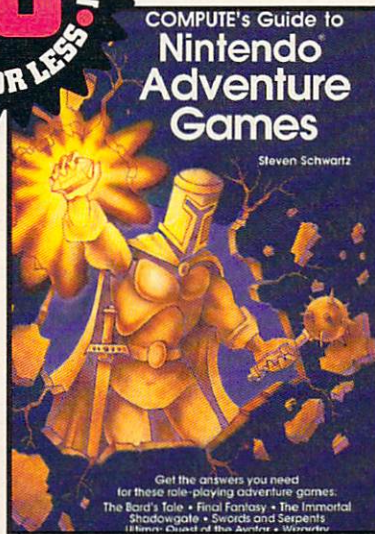
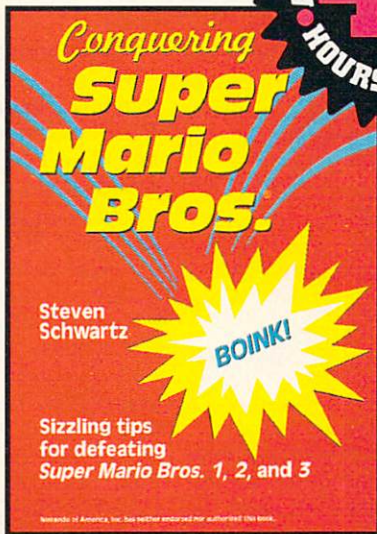
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SAMPLE SCRIPTS

```

PROGRAM 1: Procomm Plus Aspect
Script
;* Procomm Plus script to log on to local BBS
;* and capture all mail into default log file.
;*
PROC MAIN
;* Call entry number 1 in dialing directory and log on at prompts
DIAL "1"
WAITFOR "First Name:" 15
TRANSMIT "Tony"
TRANSMIT "^M"
WAITFOR "Last Name:" 15
TRANSMIT "Roberts"
TRANSMIT "^M"
WAITFOR "(Y/N)?" 15
TRANSMIT "Y"
TRANSMIT "^M"
WAITFOR "Password:" 15
TRANSMIT "password"
TRANSMIT "^M"
;* open log file to capture mail
LOG OPEN
;* wait for prompt from menu and issue series of commands to read mail
WAITFOR "Choice?" 15
TRANSMIT "R"
WAITFOR "?" 15
TRANSMIT "F"
WAITFOR "first"
TRANSMIT "^M"
WAITFOR " ?" 15
TRANSMIT "C"
;* wait for return to main menu, close log file, and log off BBS
WAITFOR "Choice?" FOREVER
LOG CLOSE
TRANSMIT "G"
ENDPROC

PROGRAM 2: Telix SALT Script
// Telix script to log on to BBS at typesetting service.
// This script logs me on to the BBS, then goes through
// the steps necessary to upload a file called ROBERTS.ZIP.
MAIN()
{
// dial a number manually rather than use dialing directory
DIAL ("m274-8131");
WAITFOR ("First Name:",15);
CPUTS ("Tony");
CPUTS ("^M");
WAITFOR ("Last Name:",15);
CPUTS ("Roberts");
CPUTS ("^M");
WAITFOR ("(Y/N)?",15);
CPUTS ("Y");
CPUTS ("^M");
WAITFOR ("Password:",15);
CPUTS ("password");
CPUTS ("^M");
WAITFOR ("Choice?",15);
// select menu option to upload file
CPUTS ("U");
WAITFOR ("Your choice?",15);
// specify ZMODEM protocol
CPUTS ("Z");
WAITFOR ("Filename?",15);
CPUTS ("ROBERTS.ZIP^M");
WAITFOR ("Description:",15);
CPUTS ("File for Typesetting from T. Roberts^M");
WAITFOR ("CTRL-X aborts",15);
send ("Z","ROBERTS.ZIP");
WAITFOR ("Choice?",15);
// choose Good-bye from menu
CPUTS ("G");
CPUTS ("^M");
}

```

be activated once the connection is established.

If you don't want to use the dialing directory in *Telix*, precede the phone number with the letter *m* to indicate manual dialing: `DIAL("m555-1234");`

Wait for Text

Procomm:

```
WAITFOR string [integerFOREVER]
```

Telix:

```
WAITFOR(str<waitstr>,int<timeout>);
```

The `WAITFOR` command is central to any telecommunications script. Its function is to keep watch for a specific string of characters that the program needs in order to take its next steps. For example, `WAITFOR "Password:" 60` in *Procomm Plus* or `WAITFOR("Password:",60);` in *Telix*

causes the program to monitor the communications port for 60 seconds, looking for the password prompt. As soon as the string "Password:" comes in or as soon as 60 seconds go by, the program will move on to the next command.

Setting the timeout parameter to 0 in *Telix* or to `FOREVER` in *Procomm Plus* prohibits the script from advancing unless the proper string is received.

Send Characters

Procomm:

```
TRANSMIT string
```

Telix:

```
CPUTS(str<outstr>);
```

You'll use these commands to send data, such as your account number, password, and menu selections to the communications port. These commands

will usually follow a `WAITFOR` command.

Assuming your password is "secret*word", you can transmit it in *Procomm* using the command `TRANSMIT "secret*word"`. In *Telix*, the command would be `CPUTS("secret*word");`

Note that neither language automatically adds a carriage return, so you'll have to do it yourself, either by appending the carriage return code (^M) to the password string or by sending a second command as in `TRANSMIT "^M" or CPUTS("^M")`.

This carriage return code is entered by typing the carat (Shift-6 on most keyboards) and then an uppercase *M*. This combination is interpreted by the program as Control-M, which is equivalent to ASCII 13, the carriage return character.

This same process can be used to send other control codes such as ^G, the bell character, or ^J, the linefeed character.

Manipulate Buffer

Procomm:

```
LOG {OPEN [filespec]
CLOSESUSPENDRESUME}
```

Telix:

```
CAPTURE(str<filename>;
```

In many instances, you'll want to capture some information while you're online. The `LOG` and `CAPTURE` commands can be used to grab an image of the telecommunications session, or parts of it, and save it to disk as an ASCII file that can be examined later.

Both *Procomm Plus* and *Telix* allow you to specify default filenames for this process in their setup utilities. Unless you override those filenames in your script, the captured data will be appended to those files.

In *Procomm Plus*, use commands such as `LOG OPEN`, `LOG CLOSE`, `LOG SUSPEND`, and `LOG RESUME` to control the current log file. The command `LOG OPEN "data.txt"` would open a new log file, `DATA.TXT`.

The *Telix* syntax for this function is similar: `CAPTURE("data.txt")` opens the file `DATA.TXT` and saves the current telecommunications activity in it. Further buffer manipulation is accomplished with the following commands:

```
CAPTURE("**CLOSE**");
CAPTURE("**PAUSE**");
CAPTURE("**UNPAUSE**");
```

If you use a null string ("") in your capture command, as in `CAPTURE("")`, *Telix* opens a dialog box allowing you either to select a file to open or to close or pause a currently open file.

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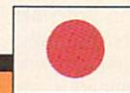
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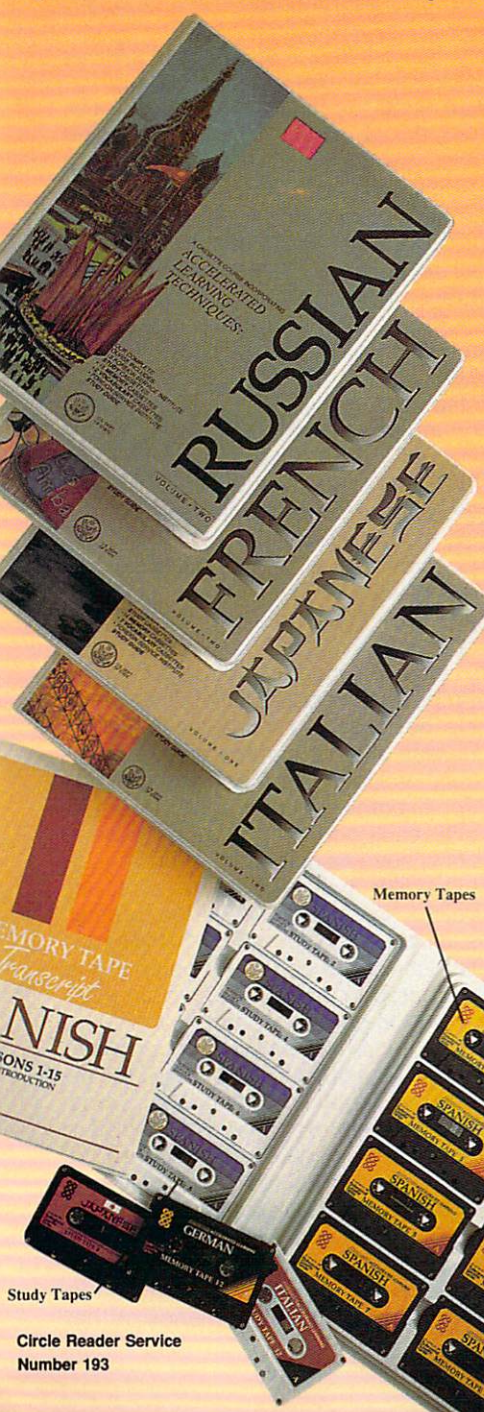
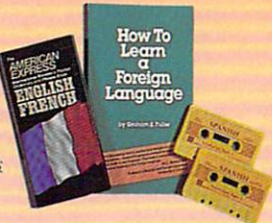
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Key Macros

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Terminal, the Windows 3.0 telecommunications program, for example, allows you to store frequently used strings on function keys or buttons that you can click with a mouse.

These definitions are retained with each setup you save, so if you call two or three online services or bulletin boards, you can partially automate your telecommunications processes by building a consistent set of macros.

For example, in each setup, place your log-on string (account number, password) on key 1 or button 1 and place the log-off command on key 10 or button 10. If you use other commands, place them similarly in each setup.

Once that's done, you won't have to struggle to recall the syntax for each service; if you're logging on, use key 1, and that's all there is to that.

Front-End Software

Dedicated front-end software programs are designed to work with a specific telecommunications service, such as GENie, CompuServe, or Prodigy. These programs are structured to minimize online time by allowing you to read data and select information for downloading while offline and to navigate more quickly while online.

If you plan to be a regular user of these services, it pays to investigate these front ends since they're optimized to work with each service. With GENie's *Aladdin*, for example, you do most of your work offline—reading messages, composing mail, selecting files to download. Once everything is prepared, press a key, and *Aladdin* logs on, delivers your mail, downloads selected files, performs any other tasks you've queued up, and then logs off as quickly as possible.

CompuServe's *CompuServe Information Manager* is a shell that allows you to move about the massive system faster and more efficiently. By using *CIM*, you can retrieve mail and move to your favorite areas with a single menu selection. Discussion topics and files to download can be marked and retrieved for offline perusal in batches rather than one at a time.

script that dials a service, logs you on, and then turns control over to you. This type of script saves you the trouble of remembering and repeatedly re-typing account codes and passwords.

Once you have your log-on script built, you can enhance it to gather your mail, fetch stock quotes, or take you directly to a favorite round table where a lively discussion is going on.

To help you create these scripts, turn on your system's CAPTURE or LOG file as you go about your normal telecommunications business. After you log off, print out the file, and you'll have a record of all the prompts you encountered and all the commands you issued in your online travels. Then program those steps into your script and let your program, rather than your fingers, do the walking.

Rest assured, though, that it's not as simple as all that. As you know, different situations pop up when you're online. For example, when you're reading your mail, what prompts do you encounter if you have no mail, have one letter, or have several letters? To build a successful script, you have to anticipate all the possible situations and create a branch in your script for each.

The sample scripts included with this article are simple linear scripts. They start at the top and go step-by-step to the bottom. If problems are encountered along the way, these scripts have no way of recovering. They'll either just sit and wait, not knowing what to do, or rush ahead supplying the wrong commands at the wrong prompts. Nevertheless, these scripts can serve to automate the most repetitive of your telecommunications chores.

After you come to understand the simple commands outlined in this article, however, you can begin to tap the dozens of other commands and functions provided in the script languages. For example, you'll want to begin to test result codes after various operations, such as uploading or downloading a file. By testing the result code, your program will know if the transfer succeeded, and based on that information, the script can either go on to the next step or branch to a routine designed to correct a problem.

For those not familiar with programming, *Aspect* and *SALT* scripts are built by combining a series of procedures. In the examples provided here only one procedure, *main*, is used.

Procomm Plus requires you to declare the procedure with the command PROC MAIN and end it with the command ENDPROC. *Telix* declares the procedure with the command MAIN and then encloses the commands in that

Download and Upload Files

Procomm:

```
GETFILE protocol [filespec]
```

Telix:

```
RECEIVE(int<protocol>,str<name>);
```

Procomm:

```
SENDFILE protocol filespec
```

Telix:

```
SEND(int<protocol>,str<name>);
```

Activating a telecommunications program's file transfer utility is fairly simple. You enter the send or receive commands followed by parameters specifying a transfer protocol and a filename. *Procomm Plus* uses full words to specify protocols, as in GETFILE ZMODEM "myfile.txt", while *Telix* expects the protocol parameter to be a one-letter code as in SEND('Z',"myfile.txt").

These commands are only the final step in an automated file transfer. First, you must make sure you've navigated the host system's menus properly to get you to the right spot and that you've supplied the host with a valid filename for its purposes. Then, only after the host is ready to begin the transfer, your script issues the GETFILE or SENDFILE command.

Uploading and downloading from script files is usually best suited for specific cases in which the same filename

can be used repeatedly.

For example, at COMPUTE, orders for disk products are entered into a dBASE database application as they are received. Periodically, a program is run that organizes all pending orders, copies the order information to a separate file, shells to DOS, and activates a telecommunications script that transfers the order files to another location where the disks are packed and mailed.

Depending on the number of orders to process, this series of steps can take an hour or two, so the automation pays dividends by allowing the operator to go off and complete other tasks or even go out for lunch.

In my desktop publishing business, I use a version of the sample *Telix* script to upload files to a typesetter for high-resolution output. The hard-coded filenames work because I always group my files and a READ.ME file with instructions for the typesetter into a zipped archive with the name ROBERTS.ZIP. I can start the script file and go off to a meeting with a client knowing that the script will keep dialing until the typesetter's constantly busy modem is able to answer and my file is transmitted.

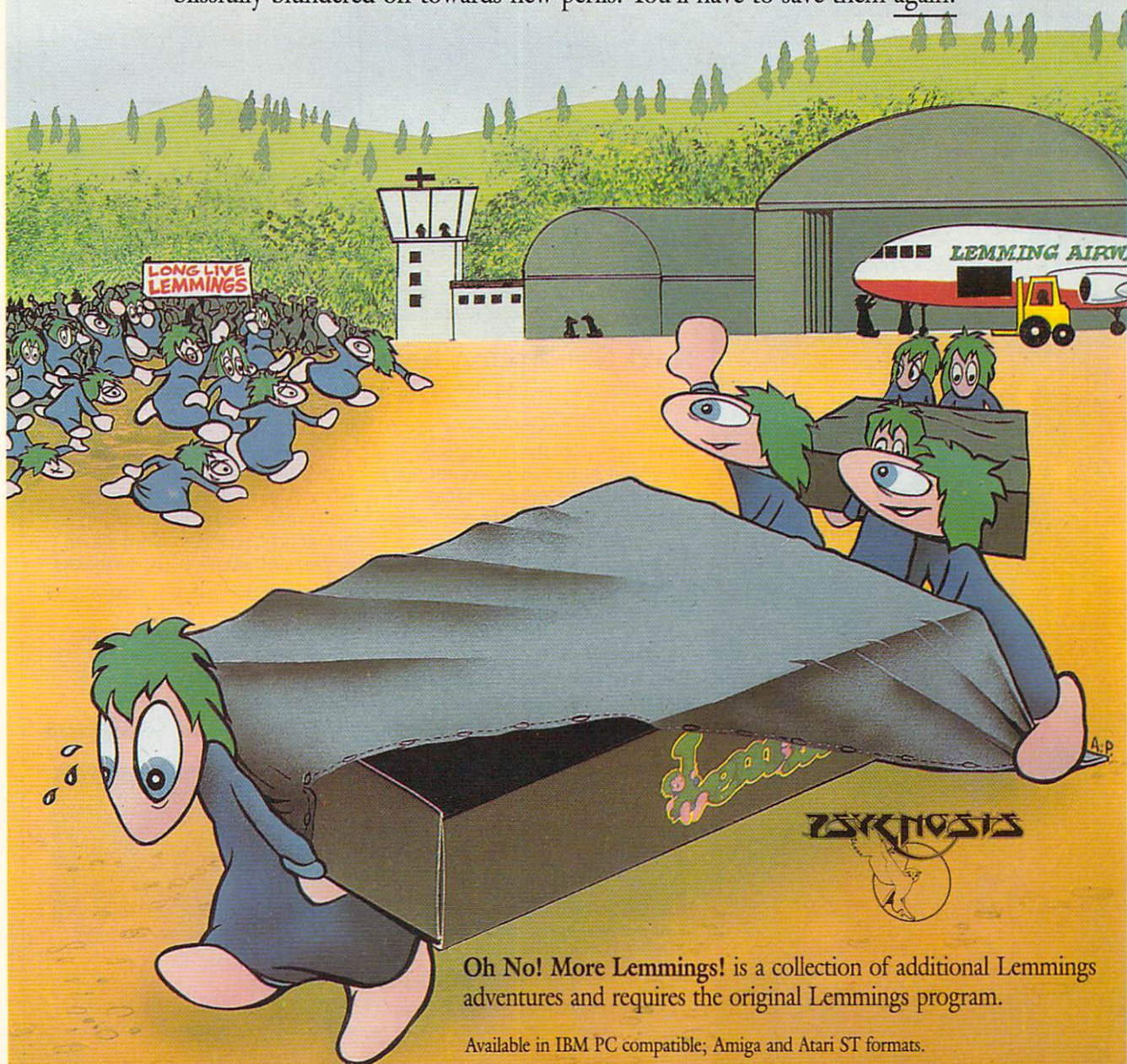
Strategies for Successful Script Design

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procedure in curly braces ({}). *Telix* also requires that each program statement end with a semicolon. Subprocedures can be developed that are called from the main command.

Although not discussed in this article, both languages allow the use of variables, and both require that the variables be declared, or initialized, prior to use. Study the sample scripts provided with your telecommunications software to see how variables can be used as counters, to store account numbers and passwords, to hold filenames, and much more.

Before a script can be used, the source code must be compiled. Compiling turns program code that you can read into more compact instructions that the computer understands. If you make changes in your script, you'll have to recompile it before the changes take effect.

Procomm Plus will attempt to compile and run an uncompiled script on the fly, but if it's unable to compile the script successfully, *Procomm Plus* doesn't provide much information about the problem.

It's usually better to compile your scripts from the DOS prompt using the command `ASCOMP scriptname` from *Procomm Plus*, or `CS scriptname` from *Telix*. If errors are encountered, the com-

piler will give you some information about the error and tell you on what line of the script the problem occurred. Then you can go about making the correction and recompiling the script.

Compiled scripts have the same root filename as the original script, but the extension is different. In *Procomm Plus*, compiled scripts bear the extension `ASX`, and in *Telix*, compiled scripts are identified by the `SLC` extension. Once your script is working properly, you can remove the original source code from the system because it's the compiled version that does all the work. However, be certain to keep a copy of the original on hand in case you need to make modifications. Compiled scripts cannot be reedited.

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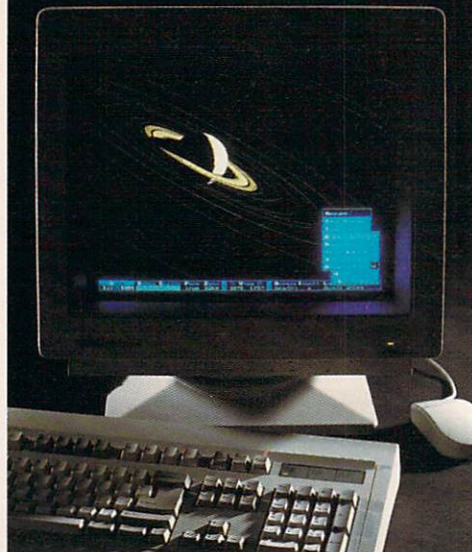
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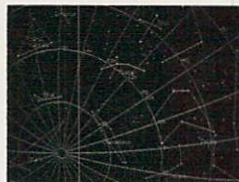
Richard Berry, *Astronomy*

This reviewer has encountered no similarly rich entrant in the existing corpus of programs for the personal computer.

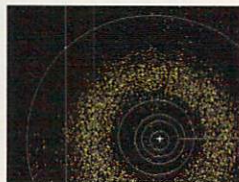
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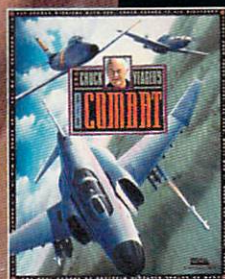
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TELECOMMUNICATIONS ON THE GO

Macros and scripts aren't the only path to quick and easy telecommunications. Sometimes a portable modem is what you need. But you can't plug a pay phone cord into a modem jack. I discovered that painful fact one afternoon when I pounded a city's sidewalks for an hour in search of a telephone cord that could be used with my laptop's modem. I never found a direct-line phone connection.

If you have to telecommunicate when you're on the road, you'll truly appreciate the acoustic interface supplied with Com 1's Le Voyager MV 214 modem. Although the model I tested can use a direct-line phone connection (if you can find a compatible jack), the modem works best using a simple acoustic coupler that straps directly to the telephone handset. And unlike earlier generations of acoustic couplers that worked well only on telephones with rounded ear- and mouthpieces, Le Voyager MV 214's coupler swivels and slides to adapt to handsets that are flat, round, or almost any other shape.

The modem itself is a small rectangular box about the size of a deck of cards. Powered by either a nine-volt battery or an optional transformer, it connects to your computer's serial port with a 25-pin cable (purchased separately). There is no power switch; Le Voyager comes on when you access it through your communications soft-

ware. Compact and powerful (transmitting at 2400 bps normally and 4800 bps or higher using the MNP5 protocols, if you're communicating with a similarly equipped modem), Le Voyager offers business travelers, laptop users, and other mobile telecommunicators an efficient way to send and receive information.

The user handbook is concise and helpful despite its lack of an index and a troubleshooting section. Although it has its positive points, I did discover an anomaly in the handbook. It includes instructions for autodialing while using the acoustic coupler, but it's impossible to autodial with the acoustic coupler.

It's unfortunate that you have to dial manually while using the coupler, particularly if you are using a telephone that dials from the handset; the coupler gets in the way of the keypad.

At first, I had trouble using Le Voyager. My initial connections were plagued by scrolling screens of garbage, but Com 1's helpful telephone support crew came to the rescue. I was able to eliminate the problem by using the JCL command, which lowers the modem's sensitivity to phone line noise.

I tested Le Voyager by transmitting the same file several times at different noise levels from the desktop PC in my home office. The modem had no trouble transmitting

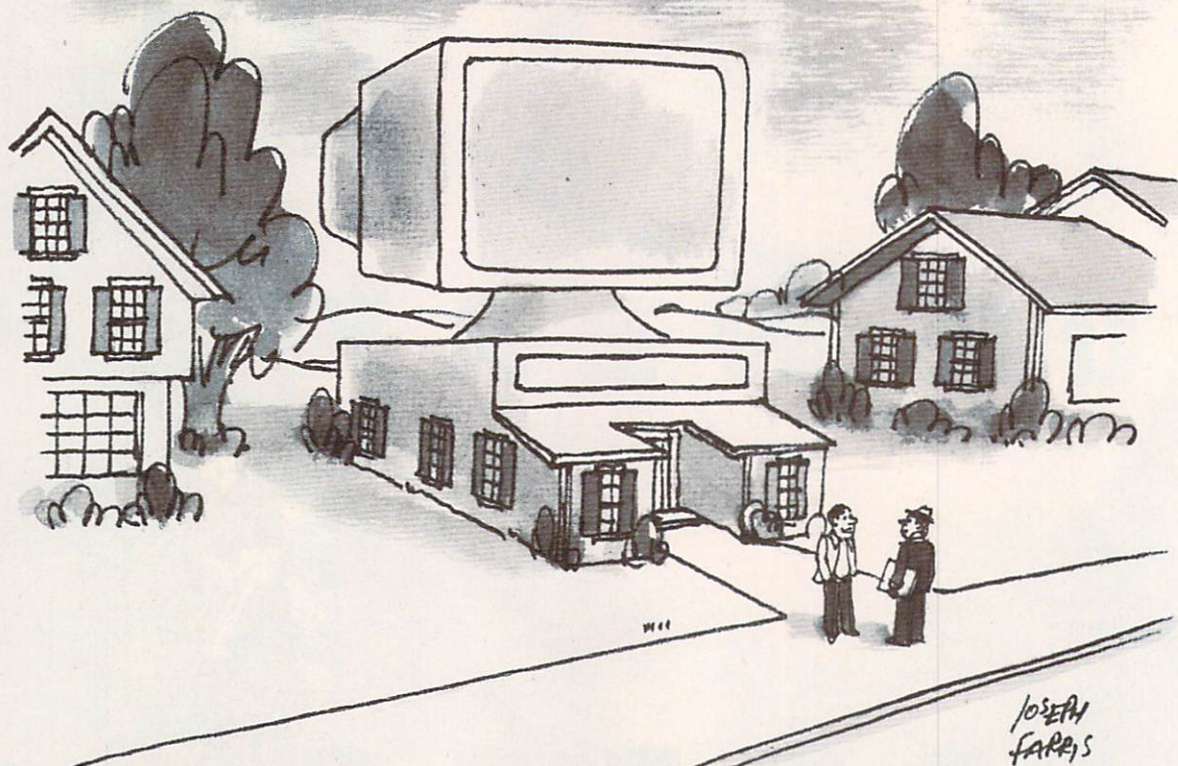
clean copy through such routine noises as a stereo and a window-unit air conditioner, but my files quickly became cluttered with garbage when I transmitted while my wife and I shouted at each other and banged on the filing cabinets. The logical next step was to take Le Voyager out into the field. The first try would be from an outdoor phone at an auto racetrack, followed by an attempt from the lobby of an arena where a rock concert was taking place, with the final test from an outdoor phone at Cape Canaveral during a space shuttle launch. Since the results of the tests in my home office seemed conclusive, however, I decided that field tests would be redundant.

Actually, under average conditions, the modem appeared to have no trouble providing error-free transmissions to a variety of systems over a reasonable level of external sound. As long as you avoid loud, sharp noises during transmission, Le Voyager MV 214 provides flexible telecommunications power in a small package.

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TIPS & TOOLS

Check Out a Directory

I recently discovered that CHKDSK can check individual directories for noncontiguous files. Noncontiguous files aren't contained in a single block of data on a disk but are scattered among the data clusters. These files are slower to load and slower to write to. There are plenty of commercial programs that shuffle the data to make it contiguous, but this technique gives you an idea of your situation without a disk optimization program.

Simply type CHKDSK *.* and the files in the current directory will be checked. You can also type CHKDSK C:\DOS*. * for a directory other than the current directory. You can also set the file mask to include only the file type you want to check by typing an extension, as in CHKDSK *.EXE.

What you'll see is a report on any files that have noncontiguous blocks and how many of these noncontiguous blocks they contain. If you've noticed a slowdown in drive access speed and you find a large number of noncontiguous blocks, you might consider using a disk optimizer to increase disk performance.

SHANE DEVENSHIRE
WALNUT CREEK, CA

Near Letter Quality

I do a lot of printing from the DOS prompt. Most of the files I output are pure ASCII files. Sometimes I find it necessary to print files in near letter quality. I've found a method of setting the NLQ mode without loading a word processor or flipping switches. I created a utility with DEBUG that allows me to do this.

Make sure the DOS program called DEBUG is in your path or the current directory. In this example, the italic text is what the computer

prints; the roman text is what you should type. The hatch marks (####) represent the four-digit segment number, which will vary.

DEBUG NLQ.COM

File not found

-A 100

####:0100 MOV AX,001B

####:0103 XOR DX,DX

####:0105 INT 17

####:0107 INT 20

####:0109

-RCX

CX 0000

:E

-W

Writing 000E bytes

-Q

Make sure your printer is on. This utility does no error checking. Now, from DOS, type NLQ and press Enter. Now you can copy files to PRN or use the DOS TYPE command and redirect to PRN, and the output will be in near letter quality.

THOMAS E. HINES III
CLARKSVILLE, TN

Reflective Computing

Here's a tip for people who constantly twist their necks to see who's walked into the room while they're working on their computers.

Go to the nearest auto store and buy a spot mirror. They come in round or rectangular shapes, cost under \$2, and give a wide-angle view of traffic. Attach one to the computer with the supplied adhesive. Then, when someone walks into your office, you can quickly glance at the mirror and know who it is. It's great for added security and saves on the neck twisting.

NEIL SCOTT
FINDLAY, OH

Easier PC Shell

While it's not obvious in the documentation, there's a method of dragging a mouse to se-

lect or deselect files with Central Point's PC Shell. Hold down the right mouse button with the cursor over the name of one of the files to be selected. Press and hold the left button and drag the cursor over the names of the files to be selected. All the filenames touched by the cursor will be selected (or deselected if the cursor was over an already selected file when the left button was originally pressed).

This can be used when certain files in a line or within a rectangular region are to be selected without specifying a common file extension with the Select command.

BEN SEREBRIN
LAKELAND, FL

Just the Dirs, Ma'am

If you want to use the DOS DIR command to see a list of directories, you're out of luck. You can create a special program, though, that does just this. It's called DIRDIR, and it displays subdirectories located in the current directory.

Make sure the DOS program called DEBUG is in your path. In this example, the italic text is what the computer prints; the roman text is what you should type.

DEBUG DIRDIR.COM

File not found

-E 100 B4 4E B9 10 00 BA

39 01 CD 21 72 29

BA 9E 00 BE

-E 110 95 00 F6 04 10 74

18 2A C0 8B FA B1

0F F2 AE 4F

-E 120 C6 05 0D C6 45 01

0A C6 45 02 24 B4

09 CD 21 B4

-E 130 4F CD 21 73 DD

B4 4C CD 21 2A

2E 2A 00

-RCX

CX 0000

:3D

-W

Writing 003D bytes

-Q

Checking the spelling of a single word in WordPerfect, a directory listing—of directories, controlling your printer from machine language, and more

After creating this program, I put it in my DOS directory (which is in my path), and wherever I am, I can get a look at the subdirectories within the current directory.

RICHARD C. LEINECKER
REIDSVILLE, NC

Don't Lose a Thing

Have you ever been typing along when, all of a sudden, your computer mysteriously seizes up on you? Or perhaps a power failure or your failure to save a document before turning the computer off has cost you several hours' work? *WordPerfect's* timed backup feature can save you from the heartache of losing precious work. You can tell *WordPerfect* to save your work automatically at timed intervals. Here's how.

From the *WordPerfect* document screen, press Shift-F1 for Setup. At the Setup menu select 3 for Environment; then press 1 for Backup Options. You are now at the Setup: Backup screen. Press 1 for Timed Backup Options; then press Y for Yes.

You can set the intervals to anything you want, but remember that if you are working on long documents, *WordPerfect* could take some time to save them. If you set timed backup at every five minutes, you will be interrupted too often. Setting the intervals too far apart will run the risk of losing work completed between backups. Fifteen minutes is a good setting. Type the number of minutes you want; then press Enter and then F7 to exit.

WordPerfect will then automatically save your documents to a file with a BK1 extension (if you are using the Doc 2 screen, the backup is saved to BK2). The first time you boot *WordPerfect* after a crash or power failure, you are asked to rename the backup document. Name it some-

thing you will remember. Then retrieve the file you renamed from the WP51 (or WP50) directory the same as you would any other *WordPerfect* document.

WILLIAM HARRELL
VENTURA, CA

Perfect Spelling

Have you ever wondered whether you spelled a single word correctly in *WordPerfect*? Perhaps you are curious enough that you don't want to wait until you check the spelling in the entire document. If so, *WordPerfect* allows you to check one word, but doing so requires several keystrokes.

You can create a macro to check the spelling of one word with just one keystroke. After typing a word in a *WordPerfect* document and making sure that you have not hit the space bar yet, press Ctrl-F10 for Macro Define. At the Define Macro prompt, press Alt-W. If no Alt-W macro exists, *WordPerfect* will ask you to describe the macro. Type *check the spelling of a word* and press Enter. If a macro named Alt-W already exists, *WordPerfect* will ask if you want to replace it. Press 1 for Replace and Y for Yes; then type *check the spelling of a word*. (Note: If you don't want to replace Alt-W, you can define this macro with any Alt-letter combination you want.) The flashing *Macro Def* tells you that *WordPerfect* is now recording your keystrokes. Now check the word by turning on the spelling checker with Ctrl-F2. Press 1 for Word; then turn off Macro Define by pressing Ctrl-F10. If *WordPerfect* recognizes the word, the Check menu is displayed across the bottom of your screen. You can turn off the spelling checker by pressing Esc. If the word isn't in *WordPerfect's* dictionary, it's highlighted, and you have all

the spelling checker options for replacing or editing the word.

WILLIAM HARRELL
VENTURA, CA

Safe Disk Review

The importance of the information stored on a disk ultimately determines the value of the disk itself. When disks are cared for properly, they can remain operable forever. Here's how to extend the life of your disks.

- Do not interchange high and double density disks between high and double density disk drives.
- Clean the heads of the disk drives after every 100 hours of operation or every six months at a minimum. Align your drives once a year.
- When disks are not in use, it's preferable to keep them in an enclosed container.
- Always keep 5¼-inch disks in their paper sleeves.
- Acclimate all disk media for at least 24 hours before use if changes in ambient temperature are sudden or extreme. Keep disks away from direct sunlight where heat is not deflected. You should maintain the temperature around 50-125 degrees Fahrenheit.
- Never lay a disk on top of your monitor.

JAY STAHAN
KAO INFOSYSTEMS

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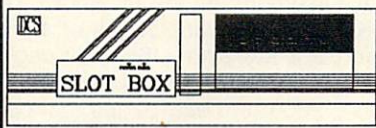
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HARDWARE CLINIC

Mark Minasi

THE INCREDIBLE EXPANDING RAM

Last month, I discussed using the DOS 5.0 memory manager to create extra memory for DOS programs, in particular TSRs and device drivers. This month, I want to continue that discussion by talking about another kind of memory: expanded memory.

Most PC users eventually come to feel that 640K of memory—the most DOS will allow—is insufficient for most needs. Most 286- and 386-based computers have memory beyond 640K, called extended memory. Unfortunately, expanded memory is generally useless under most DOS programs—unless that DOS program was written with a kind of program development tool, called a DOS extender. One well-known example of a program that uses a DOS extender is *Lotus 1-2-3* version 3.1; it can use extended memory directly. That's good, but there aren't too many programs blessed with DOS extenders. So what to do?

Lotus Development faced exactly the same problem back in 1985. Lotus had captured the spreadsheet market with the runaway bestseller, *1-2-3* version 1A. Eager to improve its flagship product, Lotus feverishly worked to create version 2.0. *Lotus 1-2-3* version 2.0 had some really nifty features when compared to version 1A. But it also had a real problem—it took up more memory than 1A did.

Growing Pains

This was a problem because there were loads of *1-2-3* spreadsheets out there designed by pioneering spreadsheet users. Many of those spreadsheets had been built under version 1A for machines with 640K, and they used every single byte of mem-

ory. So the 1985 introduction of 2.0, with less free RAM, was viewed as something of a bad thing.

Lotus needed some extra memory from somewhere. It could have built a spreadsheet with a DOS extender, giving *1-2-3* access to extended memory, but remember that only 286 and better machines have extended memory. In 1985, very few people had 286 machines, and no one had a 386 machine.

So Lotus turned to Intel, the folks who build the chips. Intel used an old trick to get more memory for *1-2-3*, a trick called paging.

Recall from last month that the memory area from 768K to 959K is allocated for ROMs (Read Only Memories) on add-in adapter cards. Most cards don't use those addresses, leaving much of that space, called the Upper Memory Area (UMA), unused. So Intel and Lotus designed a board that placed a 64K memory window up at address D0000 hex, or 832K.

Now, adding another 64K doesn't sound like much help; that's why I said it was a 64K window, or, more correctly, a page frame. The idea is that Intel designed a memory system that could accept up to 8MB (it later became 32MB) of RAM—that is, RAM not addressed in the normal way, but in pages 16K in size. It works this way: A piece of software, such as *1-2-3* version 2.1, can direct this paged memory board to move any four pages—say, pages 20, 200, 215, and 470—from the paged memory into the four 16K slots in the 64K page frame located at 832K. Then *1-2-3* can put data into those pages, and the pages can be copied from the page frames to their original memory locations in the paged memory board.

Gang of Three

For some reason, this isn't usually called a paged memory board; it's called an expanded memory board. And Lotus and Intel weren't the only players here; Microsoft got involved a bit later on. This led to another name for these boards: LIM, for Lotus-Intel-Microsoft.

As of version 4.0, up to 32MB of paged or expanded memory (whichever you want to call it) can be installed in a PC. It's also sometimes known as the Expanded Memory Standard (EMS).

Basically, the LIM memory isn't viewed by the system as memory. All the PC knows is that there are pages of storage available—16K-sized pages. LIM can support up to 2000 of these pages, hence the 32MB maximum size. LIM boards allocate 64K of memory—enough space for four pages—somewhere in the reserved area between 640K and 1023K, so a program can manipulate up to four pages at a time.

LIM is manipulated, then, by pulling in a page from LIM memory to your computer memory's reserved area (this memory is called a page frame, and moving data to and from LIM and page frames is called paging), reading and/or modifying the page frame, and possibly writing the page frame back to the LIM memory.

So *1-2-3* version 2.1 supported LIM, and that was reason enough for people all over the PC world to go out and buy add-in LIM memory boards for their 8088- and 286-based machines.

Perhaps you're wondering if all this paging takes time. It does—LIM memory is slower than conventional memory. LIM gets around DOS's 640K limitation, but at a cost in speed. And these days we're

Call it what you like—paged, expanded, EMS, LIM—it can help you break DOS's 640K barrier.



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seeing more and more new applications use extended rather than expanded LIM memory.

I know all of this is confusing, so let's review. Extended memory can be used with (1) 286 or later machines, (2) DOS when used with a DOS extender, and (3) both *Windows* and OS/2. Expanded or LIM memory (1) can be used with any machine, XT and up, and (2) is only useful with applications designed to use it.

Doing the Limulation

Last month, I introduced the DOS 5.0 386 memory manager, EMM386.EXE. You saw that it was pretty neat in that it allows you to create new memory areas in the UMA. It also lets you put programs into those UMA areas, freeing up space in DOS's lower 640K. But a memory manager does another neat trick—it can take your extended memory and make it behave like expanded memory.

Recall that expanded memory is also called EMS or LIM memory, so this process—emulating LIM—has gotten the name *limulation*. It's useful because there are still a number of applications out there that can use LIM if it's present, so it's nice to be able to make some of your extended memory work like expanded.

I must stress that you need a 386-class machine to do this. It's possible to do limulation with a 286 machine, but only with a small subset of the 286 machines out there. This makes for a difficult buying decision for 286 owners—when buying a memory board for your 286, should you buy extended or expanded? (Remember that for 386 owners, it's easy—just buy extended, and limulate if necessary.) Many 286 memory boards are reversible for extended or expanded. These are good buys, as

you may need expanded today and want to be able to use extended later.

In general, limulators for 286s aren't a good idea, as full LIM 4.0 powers can't be emulated and the 286 isn't built to limulate.

Double Duty

So how do you make a memory manager like EMM386 do limulation as well as create and manage UMBs—Upper Memory Blocks, recall? You've already learned the hard parts. In last month's column, we invoked the memory manager, telling it to include and exclude certain memory areas with the following CONFIG.SYS:

```
BUFFERS=30
FILES=30
DEVICE=HIMEM.SYS
DEVICE=EMM386.EXE NOEMS
I=CE00-EFFF
DEVICEHIGH=SMARTDRV.SYS 512
512
```

The DEVICEHIGH= just loads SMARTDRV.SYS above 640K. The I=CE00-EFFF says, "Use the memory areas from 844K through 959K." If you missed last month, don't worry too much about it—it doesn't affect this discussion. I just carried it over for continuity's sake.

There's a separate keyword to activate limulation. In the case of EMM386, you replace *NOEMS* with *RAM*.

Remember the page frame? EMS needs a 64K window between 640K and 1023K for a page frame. That's 64K that gets taken out of your UMBs. As before, DOS's default locations for the page frame may not be the best, so you may have to step in and help EMM386 out. I change *NOEMS* to *RAM* in the EMM386 line and reboot.

You'll get different results on different machines, but

most machines just issue a message such as *EMM386 not loaded—page frame could not be set*. What it's saying is "I'm confused" or, put another way, "I'm DOS—and I'm lost." For some reason, EMM386 throws up its hands if you insist on employing the E0000-EFFFF area. (I'm going to shift to hex for this last bit. If you're uncomfortable with hex, use the *Calculator* that comes with *Windows* 3.0 to do the decimal/hex conversions.) Now, you could just give in and remove the I=CE00-EFFF parameter—in fact, I find that's what most users do. But it's a terrible shame, because then you end up with a wasted 64K. Left to itself, EMM386 will waste the area from E0000 to EFFFF.

We forced DOS to use the full address space before. This time, we'll force it to place the page frame at E0000-EFFFF; that way, we'll have a 64K-EMS page frame from E0000 to EFFFF and 72K of UMB space from CE000 to DFFFF.

The option we want is *FRAME=*. You specify the starting address of the page frame with, as before, the rightmost hex number dropped off. To specify a page frame starting at E0000, we just use the following.

```
DEVICE=EMM386.EXE RAM I=CE00-
EFFF FRAME=E000
```

That's all there is to it. Now you've got 256K of LIM memory available to your DOS programs. What if you want more LIM memory? Just put a number after EMM386.EXE, as in the following.

```
DEVICE=EMM386.EXE 512 RAM
I=CE00-EFFF FRAME=E000
```

That would set aside 512K of RAM for LIM emulation. □

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INTRODOS

Tony Roberts

MADE TO ORDER

For ten years now, I've had computers around the house during the holiday season. For each of those ten years, I've expected a holiday gift of something computer related. Either the members of my family can't believe I'd want something as practical as a computer program for Christmas, or they have no idea what an appropriate computer gift would be.

If you're in the same boat, this year can be different. If you haven't already upgraded to MS-DOS 5.0, start dropping hints now. It's an easy purchase even for someone with no computer knowledge. If you still need help, clip the following paragraph and leave it where it will be noticed.

Microsoft's MS-DOS 5.0 Upgrade is the perfect gift for anyone with a DOS-based computer. DOS is a program that allows a computer to run other programs, and MS-DOS 5.0 is the best version of DOS available. If you're wondering what to buy your computer-loving friend, the answer is simple—an MS-DOS 5.0 upgrade. It's the gift your friend would buy for him- or herself.

Once you have DOS 5.0 installed, take a moment to study the new options for the DIR command. If you don't feel like dragging out the manual, just enter HELP DIR at the command line to see a screenful of information about DIR and its new switches.

In addition to the /P and /W switches that have been around for years, DIR now includes /A to display files with specific attributes, /O to specify a sort order for your directories, /L to provide lowercase output, /B to provide bare output (filenames only), and /S to include subdirectories of

the current directory.

Of these, the /S switch is the most intriguing, since it provides a quick file find utility. For example, say you've forgotten where you stored a certain test file you created recently. Try the command DIR TEST*.*/S, and you'll see every file on your hard disk that begins with the letters TEST.

I use this syntax regularly to locate files pertaining to a specific client. When creating the files, I reserve the first two letters of a filename for a client code, usually the initials of the client's business. For example, the letters EM signify a business called Envirosense Management. The command DIR EM*.*/S shows me all the files relating to that business, including correspondence files in my word processing directory, page layout files in the PageMaker directory, and even invoice records in my accounting subdirectory.

The /O switch lets me order subdirectories in various ways. Normally, /ON is most useful to me for sorting the directory by name. Often, though, I want a good look at the most recently created files, so I sort by date, as in DIR /OD. To reverse the normal sort order, use a minus sign in the command. DIR /OS orders a directory by size with the largest files listed first. Use this command when you're short of disk space and want to determine which files occupy the most real estate.

In addition to permitting sorting by date, size, name, or extension, this command also includes an option to list subdirectories first, which results in a cleaner, easier-to-read directory listing. DIR /OGN creates a directory sorted by name with the directories listed ahead of the filenames.

You can display files with various attributes by using the /A switch. When executed from

the root directory, DIR /AH /S will display the hidden files on the entire disk. As you can see from this command, it's permissible to combine more than one switch in the same line.

Another new and handy switch is /B. This provides a listing of filenames only and can be combined with other switches. This command is useful when combined with DOS redirection to create a file that contains a list of selected files. DIR *.TXT /ON /B > FILELIST.DOC builds a directory of all the TXT files in the current subdirectory sorted by name. That directory is then stored in a file called FILELIST.DOC, which you can edit.

The best thing about these switches and options is that you don't have to remember how to use them. You can teach DOS which directory style you prefer. Then whenever you type DIR, you'll get a directory with all the switches and options you want.

This is accomplished through DIRCMD, an environment variable. My preferred settings are /L /OGN, which provide a lowercase listing sorted by name with subdirectories first. To make this my default directory, I included the command SET DIRCMD=/L /OGN in my AUTOEXEC.BAT file.

Whenever I use the DIR command, I get the information I want presented the way I want to see it. If I need different information for a specific case, I just specify it with the usual switches, and the command line switches override the default switches. You can even reverse the effect of the default lowercase switch by including a /-L on the command line.

The improved DIR command is one very basic way MS-DOS 5.0 makes computing easier. As many times as I use that command, it's nice finally to have it my way. □

Once you start using DOS 5.0, you're ready to explore the many new options for the DIR command.

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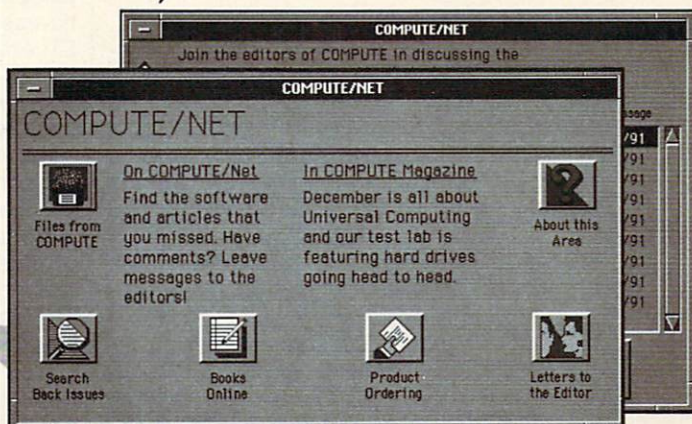
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COMPUTE/NET

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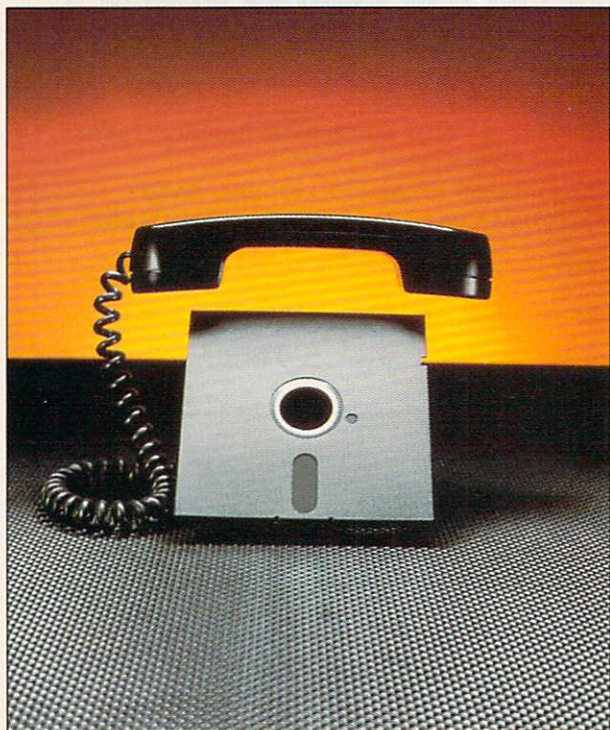
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What else is up on COMPUTE/NET? Lots of back issues. Currently you can find back articles from January 1989 through October 1991. We'll keep the current magazines coming and, over time, work our way back to January 1987. And if there's a demand, we'll upload issues prior to 1987. Some of you have asked about the Getting Started booklets bound inside newsstand editions of *COMPUTE*, and those are there if you missed any of them.

There's another very important dimension to COMPUTE/NET. You can ask technical questions about your computer 24 hours a day and get answers very quickly—usually within a day. Here at COMPUTE we specialize in helping people who are new to computers and helping people who are seasoned veterans to expand their system's capabilities. This morning I fielded a question about shadow RAM. And as I read the messages, I saw half a dozen questions asked and answered in the course of one evening. If you want answers or have brilliant insights or solutions of your own, join us in our discussion areas. On GENie it's our Bulletin Board—COMPUTE Round-Table main menu, choice 1. On America Online it's our

Talk to the Editors section.

COMPUTE has a history as long as that of the personal computer. We published our first issue in 1979. Those early issues covered machines like the PET, the KIM, and others, equally venerable, that have since departed. We were among the first to give serious attention to upstarts like the IBM PC and the Amiga.

Because of our long history, we've covered lots of different computers, so we have a lot to offer for PCs, Amigas, Atari STs, and Commodore 64s and 128s. If you're looking for information and software for those computers, then COMPUTE/NET is your ticket. You'll find back issues of *COMPUTE!'s PC, Amiga Resource, COMPUTE!'s Atari ST, and COMPUTE!'s Gazette* magazines along with the software that was published for them. If you normally use an IBM compatible but have an Amiga, an Atari ST, or a Commodore 64 or 128 standing by, let COMPUTE/NET help you enjoy your computer all over again.

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PROGRAMMING POWER

Tom Campbell

OBJECT LESSONS

Most people know better than to ask me for programming advice, but when they do, the refrain they hear most is not to reinvent the wheel. And if you own an object-oriented version of *Turbo Pascal* (version 5.5 or later), you have a lot of reinventing *not* to do.

In other words, you may be wasting a lot of time rewriting code that comes free with every copy of *TP*. The *Turbo Pascal* class libraries represent a large body of well-written, well-tested code designed from the ground up for general-purpose use. If you plan to write a linked list, EMS handling code, or anything that uses buffered file I/O, you owe it to yourself to learn how to use the class libraries that come with *Turbo Pascal*. *Turbo*'s own documentation is not at its best when dealing with the class libraries; an otherwise good tutorial on linked lists in the OOP guide omits mention of the class library at all, and the reference documentation is hideously short of examples (the sample programs and tutorials will take you a good way there, however).

This month's column uses *Turbo*'s collections to implement a simple but functional database in a hundred lines of code. The database uses two fields, Name and Address, and sorts by name.

Collections let you store objects of any size in a dynamically allocated list that may contain up to 16K objects. This may sound only moderately interesting until you hear the whole story. The objects stored in a collection do not have to be of the same uniform size; that is, unlike in an array or most linked list implementations, you can store different types and sizes of objects in the same list.

Collections can be sorted

or unsorted; the only code you need to supply is a comparison routine. Procedures to add items, delete items, loop through the list one item at a time automatically, and even treat the list as an array are all supplied. All you have to do is let the collection know what kind of objects you want it to deal with, and library code takes care of the rest.

Think about this for a moment. Here is a canned set of routines that let you do all of the most common list-processing tasks your programs will need—and all you have to do is decide what data type you want to use and supply an occasional glue routine.

I once wrote a commercial product in C that used four different kinds of linked lists. Each kind required slightly different handling, so scattered throughout a 250,000-line program are four different sets of routines to allocate items for the list, add them to the list, deallocate the list, and so on. Finding a bug in one routine meant finding and fixing three other similar bugs in the other linked list code. It was not a pretty picture, as far as maintenance went. With objects, I would only have had to do the work once.

The first thing to do is define your data types:

```
PDatabase = ^TDatabase;
TDatabase =
  OBJECT(TSortedCollection)
FUNCTION KeyOf(Item : POINTER)
  : POINTER; VIRTUAL;
FUNCTION Compare(Key1, Key2:
  POINTER) : INTEGER; VIRTUAL;
END;
PInfoRec = ^TInfoRec; TInfoRec =
  OBJECT(TObject)
Name, Street : PString;
CONSTRUCTOR Init;
DESTRUCTOR Done; VIRTUAL;
END;
```

TDatabase is the name we give to an object type that de-

scends from the sorted collection type. Sorted collections have lots of neat features, such as automatic sorting and optional duplicate key suppression. By convention, object types begin with *T* and pointer types with *P*. The *KeyOf* and *Compare* routines are virtual because you may later decide to override them (that is, provide similarly named routines for different purposes in the same program).

Objects let you embed procedures and routines in them, calling them with the same notation used for records: for example, `Database^.ForEach(@PrintClient)`. But thanks to objects, you will see little of that in the accompanying program, because the collection routines that call the glue procedures defined in `COLLECT.PAS` are in the library code.

This sophisticated use of objects has a soft white underbelly: Type checking is frequently impossible because untyped pointers (similar to the void pointers of C) are required for truly reusable code.

The *KeyOf* function tells us what field to sort on. In a real application you could take advantage of *Turbo Pascal*'s virtual routines and allow sorting via any field in the database. It contains a single line in the example and uses typecasting, a relatively new language feature inspired by C's *KeyOf*: `:= PInfoRec(Item)^.Name;`

Since *Item* is an untyped pointer, the code `PInfoRec(Item)` forces the runtime code to treat the parameter called *Item* as a `PInfoRec`, or pointer to an `InfoRec` type. The dot means that it should further be constrained to treat it as a `Name` field, which is a pointer to a string. The caret means that *Item* is a pointer to a record, not the record

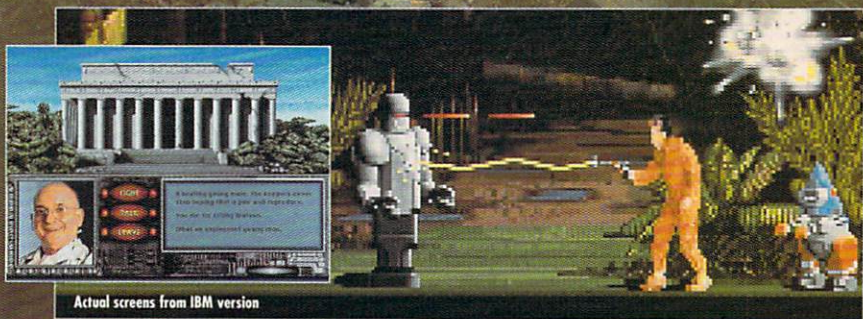
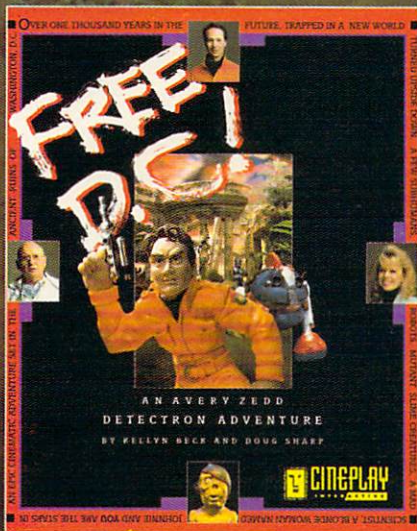
Don't reinvent the wheel if there's an expert wheelwright available: Use Turbo Pascal's class libraries.

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itself. Why not just make the Item parameter a VAR InfoRec or PInfoRec? Because the TSortedCollection type must let *any* data type appear in the collection, and that means using Pointer types and casting them to the appropriate type.

The TInfoRec.Init procedure is a constructor, which means that it is called automatically when an object of type TInfoRec is allocated. Other than that, it's a regular, run-of-the-mill procedure.

Constructors ease maintenance greatly because one of the most common programming errors is forgetting to initialize dynamically allocated data. Constructors make it a lot harder to forget. This program is so small that it makes sense to put the data entry routine right in the constructor; more complex programs would normally put this in a different module.

The most interesting part of the program, and the toughest to cover here, is PrintAll, which lists all the clients. PrintAll uses the ForEach iterator (a term stolen from Small-Talk, like the concept of collections itself). An iterator routine steps through the collection item by item, while a routine you plug in deals with the item. One severe shortcoming is that the user-supplied code (PrintClient, in this case) must appear as a procedure nested within the ForEach procedure.

That's pretty much it—a database program in 97 lines. The price you pay for using the wealth of code in the class libraries is a few intense days with the *Turbo* manuals.

Learning objects isn't as easy as learning the drivers in the Borland Graphical Interface or deciding when a FOR loop is better than a WHILE, but it's high time you got started. You can't afford not to. □

This program is so small that it makes sense to put the data entry routine right in the constructor.

```
{ COLLECT.PAS -- Demonstrates sorted string collections. }
USES CRT, Objects; { The fundamental Turbo Vision unit. }
TYPE
  PDatabase = ^TDatabase; { Pointer to Database object. }
  TDatabase = OBJECT(TSortedCollection) { Minimal SortedCollection object. }
  FUNCTION KeyOf(Item : POINTER) : POINTER; VIRTUAL;
  FUNCTION Compare(Key1, Key2 : POINTER) : INTEGER; VIRTUAL;
END;
PInfoRec = ^TInfoRec; { Pointer to TInfoRec object. }
TInfoRec = OBJECT(TObject)
  Name, Street : PString; { These are the heart of the database. }
CONSTRUCTOR Init; { Allocate and enter data. }
DESTRUCTOR Done; VIRTUAL; { Reclaim memory at shutdown time. }
END; { OBJECT definition. }

{ Determine how the database is sorted. }
FUNCTION TDatabase.KeyOf(Item : POINTER) : POINTER;
BEGIN
  KeyOf := PInfoRec(Item)^.Name; { Cast this to a pointer to a Name string. }
END;

{ Compare strings as key values. }
FUNCTION TDatabase.Compare(Key1, Key2 : POINTER) : INTEGER;
BEGIN
  IF PString(Key1)^ = PString(Key2)^ THEN { Given pointers to strings, }
    Compare := 0; { return 0 for equivalence, }
  ELSE IF PString(Key1)^ < PString(Key2)^ THEN { -1 if left is lexically }
    Compare := -1; { below right value, and 1 if }
  ELSE { left is lexically above }
    Compare := 1; { right value. }
  END; { TDatabase.Compare }
END;

{ Allocate memory for an object; then immediately enter data for the object. }
CONSTRUCTOR TInfoRec.Init;
VAR
  NewName, NewStreet : STRING;
BEGIN
  WriteLn;
  Write('Name? '); ReadLn(NewName); { Get the name, and init to a null }
  IF Length(NewName) = 0 THEN { string if user enters nothing. }
    NewName := '';
  Write('Street? '); ReadLn(NewStreet); { Ditto for the street. }
  IF Length(NewStreet) = 0
  THEN NewStreet := '';
  Name := NewStr(NewName); { Copy contents of local vars to }
  Street := NewStr(NewStreet); { dynamically allocated strings. }
END; { CONSTRUCTOR Init }

{ During shutdown, this deallocates memory for each record. }
DESTRUCTOR TInfoRec.Done;
BEGIN
  DisposeStr(Name);
  DisposeStr(Street);
END; { DESTRUCTOR Done }

{ Use the snazzy ForEach iterator method to go through each record in the
database and call a nested procedure. The nested procedure here simply
prints the field names and contents. }
PROCEDURE PrintAll(Database : PCollection);
PROCEDURE PrintClient(Info : PInfoRec); FAR;
BEGIN
  WITH Info^ DO
  BEGIN
    WriteLn('Name: ', Name);
    WriteLn('Street: ', Street);

    WriteLn;
  END; { WITH Info^ }
  END;

{ Boilerplate code to call ForEach on each record in the collection. }
BEGIN
  Database^.ForEach(@PrintClient);
END; { PROCEDURE PrintAll }

VAR
  Database : PSortedCollection;
  Choice : CHAR;
BEGIN
  { Allocated to initialize a sorted collection. This creates a ten-item
collection. When memory is allocated for new items after ten, it's
allocated in five-item chunks for speed (rather than single-item chunks,
which would slow performance). }
  Database := New(PDatabase, Init(10, 5));
  REPEAT
    ClrScr; { Each iteration of the }
    WriteLn('1. Add an item'); { main loop clears the }
    WriteLn('2. List the database'); { screen, prints a simple }
    WriteLn('3. Quit'); { menu, and awaits a }
    Choice := ReadKey; { keystroke. }
  CASE Choice OF
    '1' : Database^.Insert(New(PInfoRec, Init)); { Get a new record. }
    '2' : BEGIN { Print header before list }
      WriteLn; { is printed; then print }
      WriteLn('-----'); { the collection. }
      PrintAll(Database);
      Write('Please press Enter to continue. ');
      ReadLn;
    END;
  END; { CASE Choice }
  UNTIL (Choice = '3') OR (Choice = #27);
  Dispose(Database, Done); { Deallocate the database. }
  Halt(0);
END.
```


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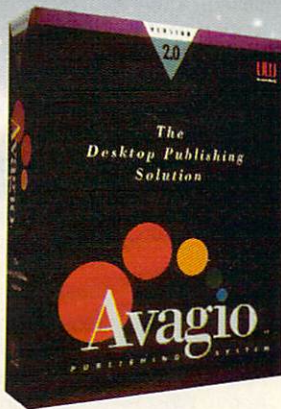
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Clifton Karnes

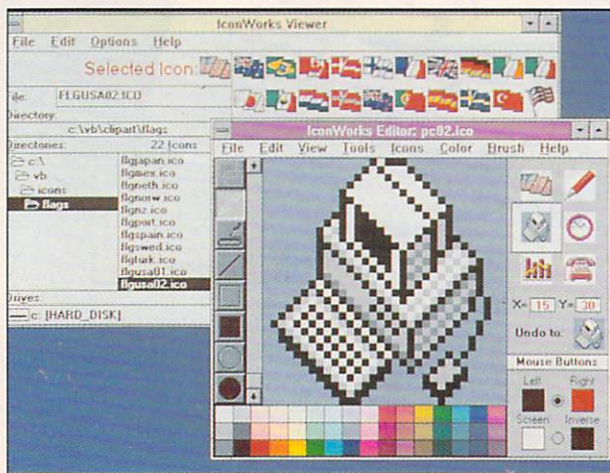
EXTEND VISUAL BASIC FOUR WAYS

As I pointed out last month, one of the most exciting things about *Microsoft Visual Basic* is that it's extensible. Extending a language is nothing new, but the power of *Windows* combined with *VB*'s open design creates an unusually rich environment for add-on developers.

From *Windows*, *VB* gets the ability to use DLLs (Dynamic Link Libraries)—routines linked at runtime rather than at compile time. And unique to *VB* are custom controls—*Visual Basic* extensions (VBXs)—that become part of the *VB* design and runtime environments.

The custom control camp is

Custom Control Factory and ButtonTool are both excellent ways to extend the power of Visual Basic.



represented by two excellent programs: *ButtonTool* (OutRider Systems, 3701 Kirby, Suite 1196, Houston, Texas 77098; 713-521-0486; \$49.95) and *Custom Control Factory* (Desaware, 5 Town & Country Village #790, San Jose, California 95128; 408-377-4470; \$48.00). Both of these programs dramatically increase *Visual Basic*'s button power.

ButtonTool couldn't be much easier to use. To access the program's custom button control, you load the BTOOL.VBX file into *VB*'s de-

sign environment, and a new button tool appears on your toolbox. To create a button, you select it and draw your button the way you would with *VB*'s native button control. When you look at the properties bar, you'll see the difference between this button and *VB*'s.

ButtonTool adds 23 properties to *VB*'s already healthy group of 21. For starters, you'll find 3-D shading and thickness, button down (which allows you to control exactly how the button looks when depressed), toggled (which allows you to treat command buttons like the option or check buttons used on tool bars), and symbols (which allows you to place 18 predefined symbols or your own bitmap, metafile, or icon on a button top). The ability to add a graphic to a button is especially welcome. It's amazing that Microsoft left this feature out of *VB*'s first release.

After you've compiled your *VB* program with *ButtonTool*'s controls and you're ready to distribute it, you need to include BTOOL.VBX runtime, which weighs in at a mere 14,288 bytes. The Runtime can be distributed royalty-free.

Desaware's *Custom Control Factory* (CCF) offers button control features similar to OutRider's, but *CCF* includes animated buttons and multi-state check buttons.

You use *CCF* just the way you use *ButtonTool*. You choose Add File from the File menu and load CCBUTTON.VBX. However, when you draw a *CCF* button on your form, you're starting at square one. You'll see a blank button with handles for moving and resizing. You have to build most of its properties yourself. *CCF* is powerful and correspondingly more difficult to use than *ButtonTool*. Programs compiled with *CCF* require you to distribute the 94,960-byte CCBUTTON.VBX runtime.

Like *ButtonTool*, distribution of this runtime is royalty-free.

ButtonTool and *CCF* are both excellent ways to extend the power of *VB*. When you find yourself wanting runtime routines, look at packages from MicroHelp and Crescent.

MicroHelp's *VBTools* (4636 Huntridge Drive, Roswell, Georgia 30075; 404-594-1185; \$129) combines some unusual custom controls with a large toolbox of routines and forms. Controls include mouse scroll bars, an enhanced list box, 3-D labels, playing cards, percent gauges, and an enhanced text box.

Custom forms include a color editor, automatic text recall, project windows, and file selection routines. The library of runtime routines reinstates some common BASIC keywords Microsoft omitted from *VB* (like BSAVE and BLOAD) and contains graphics special effects, many examples of using the *Windows* API, and a blackjack game. Runtime modules can be distributed royalty-free.

VBTools is an impressive collection of controls, custom forms, and utilities. MicroHelp also touts a communications library and another collection of subroutines called *Muscle*.

Crescent Software's *QuickPak Professional* (32 Seventy Acres, West Redding, Connecticut 06896; 203-438-5300; \$199) was still in prerelease when I reviewed it, but the software was very stable. This product obviously tries to provide every subroutine you'll ever need.

If you've used Crescent's *QuickPak Professional* for *QuickBASIC* and *MS-BASIC*, you have an idea of what's inside—lots of routines, most with source language included. More than just a translation of previous *QuickPak* modules, this collection boasts a large number of *VB*-specific routines. I'll include an update when I've seen the finished product. □

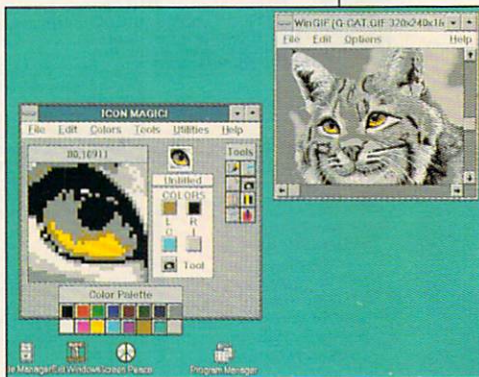
ON DISK

Tony Roberts

MAKE TIME, MANAGE ICONS, AND MORE

For those in our audience who like precision, one of this issue's programs is a must. It allows you to set your computer's clock from the cesium-beam atomic clocks at either the U.S. Naval Observatory in Washington, D.C., or the National Institute of Standards and Technology in Boulder, Colorado.

Icon Magic allows you to capture and edit icons from EXE files, permits drawing in 16 colors, and includes a snapshot tool.



Timeset 6.0 is the most accurate and the most complete of several time-setting programs we looked at. Programmer Pete Petrakis has been at work on this gem for several years, keeping it in tune with the times, so to speak.

Timeset 6.0 directs your modem to call one of the atomic clocks and to receive the time string that's constantly being transmitted. Upon receiving the official time, *Timeset 6.0* sets your computer's clock, taking into account even the tiny lag between the instant the time string was sent and the moment it could be processed by your computer. The length of a typical time-setting phone call is something less than four seconds.

Once your computer's clock is set, you can display the time in large numerals on-

screen to help you bring your other timepieces into compliance. Depending on your own accuracy requirements, you can run *Timeset 6.0* several times a day or once every few weeks.

Timeset 6.0 is shareware that carries a \$35 registration fee. Registration entitles the user to technical support, a printed manual, and discounts on future upgrades. Registered users also receive an evaluation copy of *Right Time*, a companion program that learns to compensate for the inevitable drift

in your computer's clock.

Even if you don't plan to use this program, read the documentation on this month's disk for an engaging discussion on the subjects of time setting, line delays, and computer clocks.

Icon Magic

For all its power, *Windows 3.0* is perhaps best loved for its icons and screen savers. We've seen people caught up for hours in making their desktops look just right.

The *Icon Magic* program on this month's disk provides top-flight tools for desktop artists. *Icon Magic* makes creating and managing icons a breeze.

The creators of this shareware offering, Steve Stedman and Jeff Ayars, are rightfully proud of their program. "When we decided to write this program, we decided to do it with the commitment of making the best icon-drawing program we could," Stedman says.

Their goal was to provide more tools than were available in other icon-drawing pro-

grams, and they succeeded. In addition to the usual drawing tools, *Icon Magic* includes clear and inverse functions, allows you to capture and edit icons from EXE files, permits drawing in 16 colors, and includes a snapshot tool that can grab images directly from the screen and turn them into icons.

Stedman and Ayars are university students in Washington state who plan to pursue careers in *Windows* application development. *Icon Magic* is shareware. Anyone using the program after an evaluation period should send in the \$15 registration fee.

Delete Except

Michael Earl's *Delete Except* is one of those specialty tools that we like to have available when the situation dictates.

Delete Except works just as its name suggests. The program deletes all files in a subdirectory *except* those specified in the command line.

For example, `DEX *.ZIP` would clear out everything but ZIP files; `DEX WIN*.*` would delete all files in the current subdirectory but those beginning with the letters *WIN*.

Earl, a student at the University of South Florida, offers *Delete Except* as freeware. No registration fee is required to use this excellent program.

XPATH

XPATH helps break the nagging 127-character barrier that even the latest versions of DOS impose on the *PATH* statement.

With more and more programs *demanding* a place on the directory path these days, I've found myself writing special batch files that alter the path as I run and exit from certain programs. Thanks to *XPATH*, I can now retire those batch files.

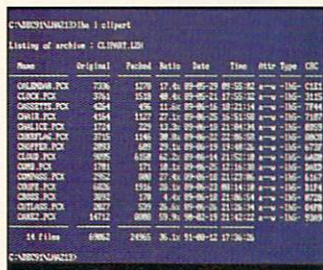
XPATH allows you to cre-

ate extended directory paths that can grow well beyond 200 characters.

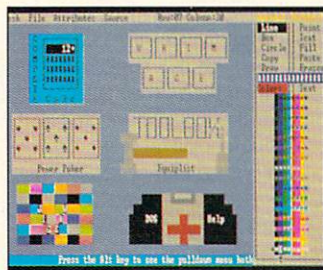
In addition, the program includes command line switches that permit you to add or



Timeset



LHA



SEDIT

delete subdirectories on the path on the fly. This is a great convenience when you need to reference a temporary subdirectory but you want to avoid retyping that long, cumbersome PATH command.

XPATH is shareware and can be registered with its author for a fee of \$15.

LHA Archiver

LHA version 2.13 is a free utility that is designed to compress and archive disk files. Mainly used for telecommuni-

cations and file storage, LHA has been around for several years and has been in a constant state of refinement.

Archivers are often thought of as only telecommunications utilities, but there's a place for an archive utility on most every PC.

For example, if you generate a lot of correspondence, you may find your disk filling up with dozens or even hundreds of old letter files. You hate to delete them because you occasionally use them as reference, but the disk space they consume irritates you.

LHA can help you clean up this confusion. Using the program, you can combine some or all of your correspondence into one or more compressed files. Depending on the structure of the files you archive, you might save as much as half the space occupied by the files.

SEDIT

SEDIT is a text-based screen editor that works like a paint program to create attractive screens that you can use in batch files or other programs.

Created by Richard C. Leinecker, COMPUTE's programming manager, SEDIT can be used with a mouse or with the keyboard; includes commands for drawing lines, circles, and boxes; and allows work to progress in up to eight separate drawing areas. There's even an animation mode that can flip through the pictures in the various drawing areas.

The screens created in SEDIT can be saved as ASCII screens or as source code that can be incorporated into assembly language, BASIC, or C programs.

Included on the disk with SEDIT is SHOWIT, a utility that allows you to display your creations from the DOS prompt. SEDIT is freeware. □

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HOME OFFICE

COMPUTE CHOICE. Microsoft makes Windows programming simple for everyone with this distant cousin to BASIC.

George Campbell

VISUAL BASIC

With *Windows 3.0* just 18 months old, the rush to create programs for that operating environment is on. Until now, though, writing software for *Windows* was difficult, to say the least. *Visual Basic* changes all that. With its introduction, Microsoft has made it easy for anyone with BASIC programming experience to create software for *Windows 3.0*.

While it takes about 100 lines of code using C and *Microsoft Software Development Kit (SDK)* to do something as simple as print *hello* on a *Windows* screen, *Visual Basic* can do the job with one simple line, using the old familiar *Print* command. Simple ideas often herald revolution!

Priced at \$199, this new programming environment begins to prove its worth right out of the box by installing in just a few minutes. The included interactive tutorial takes you through the first phases of creating a *Windows* program, and full-scale online help supplements the two manuals. With the familiar *Windows* dialog boxes and menus, you'll soon be comfortable with the interface.

Since you learn new programming languages best by example, Microsoft offers plenty of examples in its manuals and tutorial. You also get several sample programs, ranging from a simple card file to an outstanding icon viewer and editor. You can use all or part of these samples any way you like, without worrying about paying royalties. Finally, *Visual Basic* can create EXE files, unlike *ToolBook* or other comparable authoring systems. You'll still need *VBRUN100.DLL*, *Visual Ba-*



sic's runtime dynamic link library, but you can distribute it free with your programs.

If you're familiar with *QuickBASIC*, also from Microsoft, writing code in *Visual Basic* will present no real challenges, but that's where the similarity ends. *Visual Basic* works in a way that's completely different from what you're used to, and that's its charm.

Instead of the laborious process of creating a user interface in another language, *Visual Basic* lets you simply draw the interface on the screen. Starting with an elementary window, which Microsoft calls a form, you use a toolbox similar to those in drawing programs to add controls—command buttons, check boxes, text and picture boxes, and other elements—to the form. Your program can have several of these forms.

Sizing and positioning forms and controls is as simple as clicking and dragging the mouse. *Visual Basic* even includes list and combo boxes like those in most *Win-*

Windows applications. There's more. Since any *Visual Basic* program uses all the facilities of *Windows 3.0*, you won't have to worry about printer or display availability. You can also use the *Windows* Dynamic Data Exchange (DDE) functions to form links with other programs or call on *Clipboard* for cut-and-paste operations.

More than just attractive objects, the icons from the toolbox provide you with the functions that they illustrate, and you don't need to write a single line of code. For example, a text box automatically provides normal text-editing functions, from word-wrap and text selection to keyboard cut-and-paste operations. Similarly, adding a file list box to your form automatically gives you the ability to select files when your program runs. A menu design option in the *Visual Basic* menu lets you design a menu bar, complete with nested menus, by simply typing in menu names.

For each object on the screen, you can set options,

ranging from background color and border type to text fonts and the type of mouse pointer used in the display. Any object can be visible or invisible, and you can change most options with simple commands as your program runs. Adding graphic images is a simple matter of loading a bitmap file into a picture object. All this means that you spend your time designing a terrific interface for yourself or other users without worrying about how the interface works.

Once your interface looks the way you want, you begin to write the program itself. Here, too, *Visual Basic* will surprise you. Using what Microsoft calls event-driven programming, you write code to tell *Visual Basic* what to do when the user takes some kind of action, such as clicking on a command button, pressing a key, or clicking the mouse. When you're designing your program, a double click on any object takes you to an editing screen. Then, you choose an event from a drop-down list and write the code needed to handle that event. For example, to tell your program what to do when a user clicks on a command button or a menu entry, you select the Click event and then write your code, using language and syntax similar to that in *QuickBASIC*.

Unlike *QuickBASIC*, however, some elements of the *Visual Basic* language feel both familiar and different at the same time. Although *Visual Basic* isn't an object-oriented language in the technical sense, it does deal with objects. For example, the familiar old Print command must be preceded by the name of the object. To print to the printer, the command `Printer.Print` is used. To print to a text box object, the command

would be `Text1.Print`. It's easy to get used to this new syntax, however.

You'll miss some old familiar *QuickBASIC* commands such as `Play`, `Inkey$`, and `Chain`. These missing commands aren't needed in most programs, however, and *Visual Basic* offers its own equivalent commands.

Some missing language features, however, make *Visual Basic* programming more difficult. While you're in a loop in a program, you can't watch for a keystroke and then exit from the loop. Also, there's no way to determine what line your cursor is on in a text-editing box. While you can write your own routines to handle these needs, they'll run slower than built-in commands.

Also on the negative side, locating a particular part of your program when you're editing sometimes proves difficult. Rather than keep your code together, *Visual Basic* scatters it into many separate modules. Before long, though, you'll learn the system and forget this minor inconvenience.

When it's time to debug your program, *Visual Basic* has all the tools you need, ranging from stepped execution and breakpoints to the ability to restart the program after making changes. And your *Visual Basic* programs run quickly, so you won't be slowed down when using programs you've written.

One of the best things about *Microsoft Visual Basic* is that there are already a large number of add-ons to help both beginning and advanced programmers get more from the product.

Microsoft itself has led the way here with its *Control Development Kit*, which allows ad-

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Microsoft Visual Basic

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vanced *Windows* programmers to create custom buttons and other controls.

Also from Microsoft is the *Windows Help Compiler*, which gives both beginning and advanced *VB* programmers all the tools they need to create online help that's the equal of any *Windows* program's online help.

Both products are available from Microsoft, One Microsoft Way, Redmond, Washington 98073; (206) 882-8080. *Control Development Kit* and *Windows Help Compiler* sell for \$49.95 each.

If you have a yen to create your own programs for *Windows 3.0*, Microsoft has opened the door wide with this amiable programming environment. *Visual Basic* can turn anyone familiar with *BASIC* into a *Windows* programmer almost instantly. □

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WORKPLACE

Daniel Janal

REMOTE-CONTROL SOFTWARE

If there's a remote chance you'll need to access your files, use a printer, or send a fax while you're away from the office, try a remote-control program.

There are several software programs on the market now that let you access office computers from your home. Among those are *Commute* from Central Point Software (15220 NW Greenbrier Parkway, Suite 200, Beaverton, Oregon 97006; 503-690-8090; \$129), *CO/Session* by Triton Technologies (200 Middlesex Turnpike, Iselin, New Jersey 08830; 800-322-9440; \$195), and *pcANYWHERE* by DMA (1776 E. Jericho Turnpike, Huntington, New York 11743; 516-462-0440; \$179).

In a nutshell, these programs let you run your office computer by remote control. You load the software into your home computer and your office computer. When you leave the office at night, you

leave both the office computer and modem turned on. The software allows you to do more than just upload or download files. You're actually able to operate your office computer from home, run whatever applications you want, transfer files, and even print out files.

Some interesting uses for remote-control software have developed along the way. For example, one user starts the computer from home in the morning and tells it to update and print reports based on sales figures gathered the evening before. By the time he gets to work, the reports are ready. This can be really handy when you have large jobs like month-end financial statements. The report prints, and you don't have to babysit the computer in the meantime.

You can also send and receive faxes from your home. For laptops, the uses are far reaching—literally. Instead of manually transferring files to your laptop before a trip, just load in the remote-control software and access your office computer from a hotel room.

For something really cool, you and your associate can work on the same file at the same time, taking turns editing and revising a document. You make your comments; your associate responds. How's that for instant feedback?

As for computer troubleshooters, can you imagine how much easier it would be to get support for your PC if someone looked at your AUTOEXEC.BAT file and CONFIG.SYS files remotely? My experience has been that a lot of users don't know what or where these files are, so the customer-support person has to spend a lot of phone time describing how to change directories and how to use the TYPE and EDLIN commands before finding the problem. Remote-control software could

easily eliminate that problem.

So what's to prevent competitors or mischievous coworkers from peeking inside your computer? Plenty. Security is built into most systems through passwords. Busybodies have as much chance of reading your spreadsheet as they do of seeing your bank account balance on an ATM machine.

Security doesn't end with passwords, however. You can determine how much access a person has to your system. For instance, someone might have access to the spreadsheet program but not the accounting program. Another person might have clearance to read files but not overwrite them, while a third person could have clearance to read and write files.

Here are a few tips: In a perfect world, modems should talk to each other, regardless of the manufacturer. However, for the best possible communication (the least amount of hassle and error), use modems made by the same manufacturer. Also, if you're using graphics files or a graphics-based program like *Windows* or *AutoCad*, a high-speed (9600-baud) modem will pay for itself many times over in the time you save. For text and spreadsheet applications, a 2400-baud modem is fine.

One other potential area of conflict is with TSR programs, those handy utilities that sit in the background just waiting to make your life easier. Since remote-control programs are also TSRs, the chance for memory conflict exists. Test your system before remotely transferring mission-critical files.

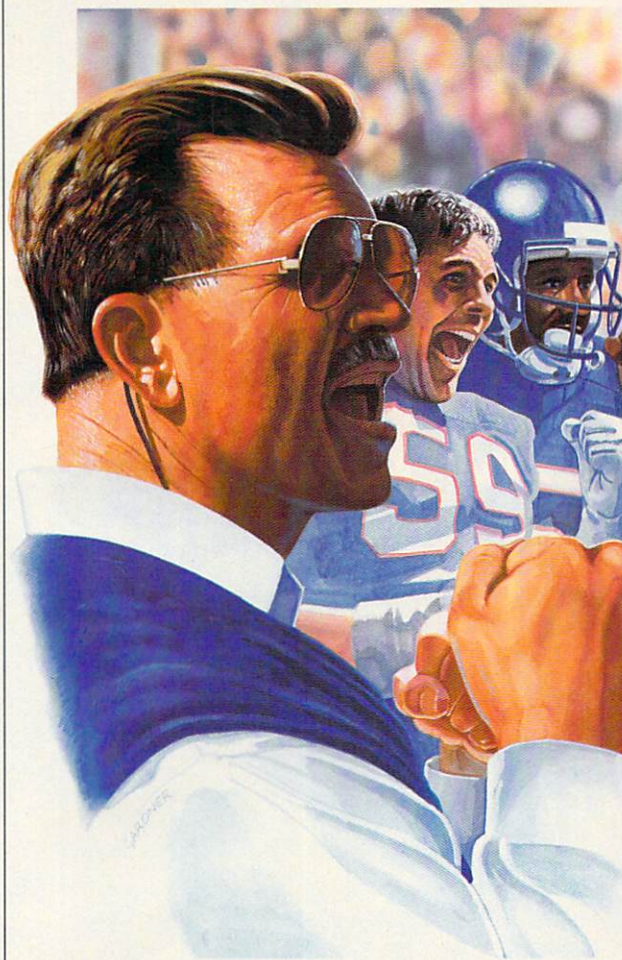
Also, because TSRs eat memory like Jethro at Granny's picnic table, you might not have enough memory to run your main applications. If this happens, determine which other TSRs you can live without so you can accomplish your remote tasks hassle-free. □

Load remote-control software in your laptop before that next trip and run the office from your hotel room.



Mike Ditka
Ultimate Football

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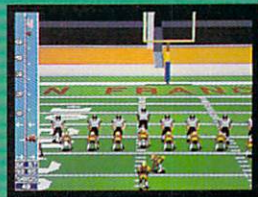
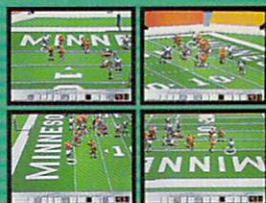
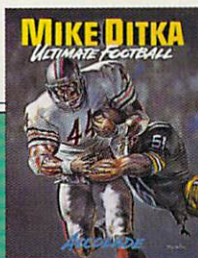
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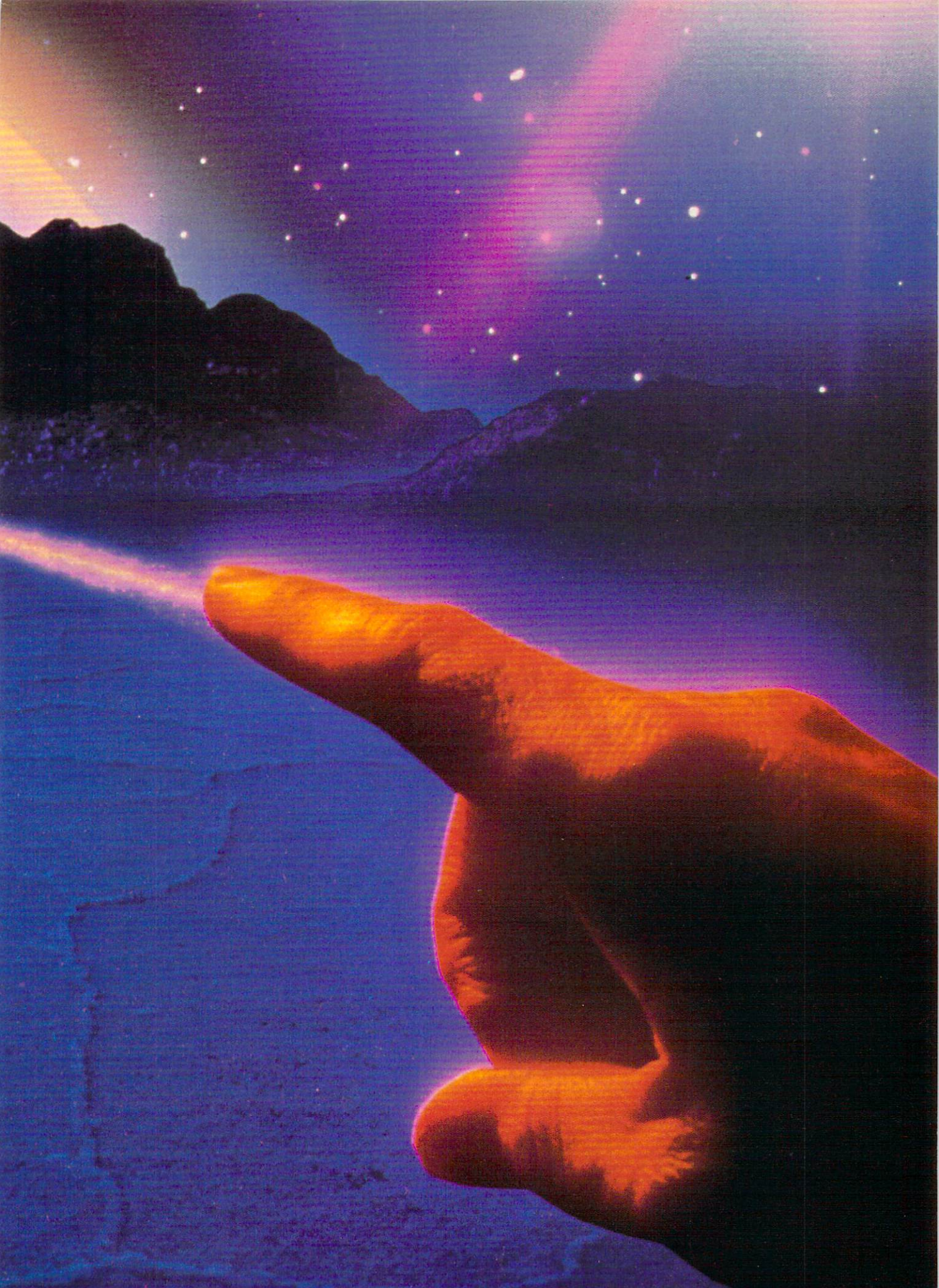
YOU'RE AS GOOD AS THERE

BY GREGG KEIZER

Get with it. Take a cue from your TV's channel changer, from manmade probes circling Venus, even from your garage door opener. Remote control makes it possible to select, command, and operate everything from million-dollar robots in space to your cable box, all without leaving the home planet or the comfort of your chaise lounge or easy chair.

PC remote-control software lets you step away from the confines of a corporate office or the limitations of a puny laptop. You can run your computer long distance, with the help of some software, a modem, and the telephone lines. You can control a PC a thousand miles away, just as if you had sat down in front of its keyboard.

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Invasion of the Computer Snatchers

You're on the road, far from home and your home office. Or you're tucked into your office at home, working late on a project due tomorrow. But your nagging suspicion has turned out to be true; you left some important files and programs on the other PC—indispensable customer lists and data handlers. The hours you set aside to work have been wasted by a simple oversight. It costs you time and money.

This scenario plays all too often for anyone who uses more than one computer in more than one place. It used to be that all you could do was groan with frustration. Now you can laugh it off—if you have a remote-control package ready to run.

Using modems at both ends and a telephone line in between, remote-control software turns one computer into a host, the other into a guest. Normally, the guest computer calls the host and then takes it over. Connect the two computers with remote-control software, for instance, and anything you type on the keyboard of the guest appears on the screen of the host.

Remote-control software can link the two computers as closely as Siamese twins. You can easily send files, grab files from the host PC, or—if there's someone at the other end—even work interactively on the same document or work sheet (many consultants and software engineers use this capability to train users in remote locations).

The host can be a stand-alone computer at your home or work office or a machine linked to your corporate local area network (LAN). You can access its disk drives and any printer connected to it or, if the host is part of a LAN, you can even read and respond to your E-mail.

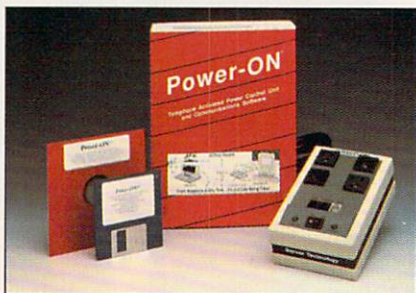
Remote-control software can be a real help to the home office worker, acting at times like a personal electronic bulletin board system, at others like a distant terminal of a primary PC. It multiplies the power of a PC that isn't tied to a network.

You can, for example, head home early from the office and later that night connect to your workplace PC. When you finish a memo or report, you can print it on your office laser printer so that it will be waiting for you in the morning. If you travel with a laptop, you can complete work on the road and then safely store it on your home office PC via the telephone. Or you can access a file or application you couldn't fit on your portable's small hard disk drive. And if you're working for a long-distance client, you can collaborate in realtime and interactively compose a report or design a newsletter.

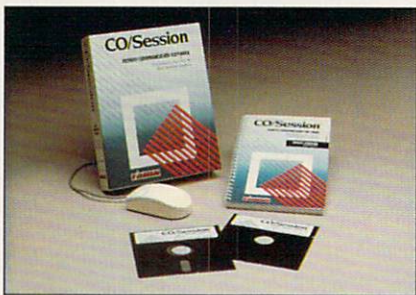
Remote Computing

One of the best remote-control packages is also one of the newest. Central Point Software's *Commute*, offered both as part of *PC Tools Deluxe 7.1* and as a separate program, is about as simple to use as remote software gets. Highlights include a clear interface, data compression to speed up file transfer, and features that automate parts of the process. Other programs own a bigger slice of the market—*Carbon Copy Plus*, *Close-Up*, *pcANYWHERE*, and *CO/Session* come to mind—but the new product from Central Point has earned a niche and deserves your attention.

Calling and control with *Commute* are straightforward. You install the software on both host and guest, set up the host to wait for a call, and then tell



Server Technology's Power-ON



Triton Technology's CO/Session

the guest to phone home. In moments, you can access the host's drives or send files to its printer. The display and control, minus momentary pauses for telephone transmission, is identical to what you would see sitting at your office machine.

Along the way, *Commute* lets you specify the callers who can legitimately connect to the host, locks out certain callers (or everyone) from accessing drives A: or B:, and prevents guests from rebooting the host (either accidentally or maliciously). Security-conscious, *Commute* requires callers to identify themselves with the proper password before it completes the connection to the host. You can even set *Commute* so that the host calls back

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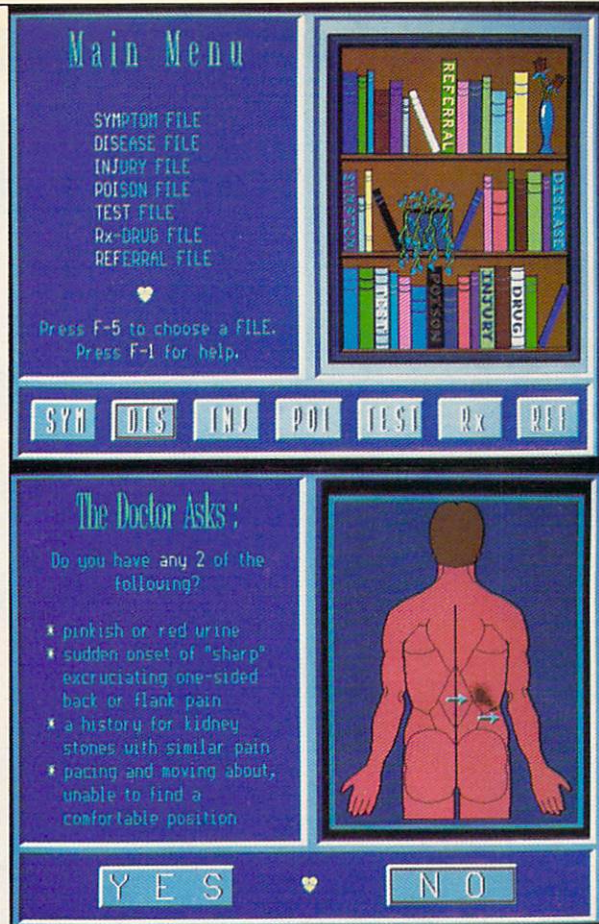
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Circle Reader Service Number 169

the guest computer after a few seconds on the line, in effect reversing charges so that the call will be billed to your office phone. If you're calling with a credit card or from a hotel or if there's a time difference in your favor, this feature could provide lower rates.

Sending and transmitting files—easily the most popular application of remote-control software for home office workers—could be easier. You have to provide the path and filenames for both source and destination files, a clumsy manual method that could have been avoided if Central Point Software had thought to provide a graphic directory tree approach instead. Nonetheless, transferring files between host and guest goes like clockwork. You can even transfer subdirectories and their entire contents in a single step.

If you repeatedly step through the same process—filing sales reports from the road, for instance—you can automate *Commute* so that it calls, sends DOS commands to the host, sends or receives files, and hangs up without your attention. *Commute* can even call by itself late at night when phone charges are the lowest. You get to choose the remote-control software if you work for yourself, but your hands may be tied if you want to con-

nect with a corporate PC, especially if it's on a LAN. *Commute* handles LAN traffic, too, but your firm may have already standardized on something else, such as *Carbon Copy* or *pcANYWHERE*. All remote-control software works much the same, though, with the crucial differences being in interface, screen speed, and LAN compatibility.



Norton-Lambert's Close-Up

Fast, Secure Control

Remote-control computing depends on the telephone, so the faster you take care of business, the lower your costs will be. When you go to remote control, equip both the host and the guest with the fastest modems you can afford. You will probably find products that claim to work at 1200 bps, but if you value your peace of mind and

your time, you will want faster rates.

The guest PC's screen is updated via the phone connection, a laborious and expensive process if you're working with 1200- or 2400-bps modems. Move up to 9600-bps modems if you can. It's especially critical to run a fast connection if you're expecting to control *Windows* software running on the host from the guest. (Several *Windows* remote-control programs are nearly ready as this is written and will be available by the time you read this. Chief among these is Ocean Isle's *Reach Out for Windows*. It requires VGA and a mouse on the host and VGA, mouse, and 512K RAM on the guest. It can make do with a 2400-bps modem, though 9600 bps is recommended. Ocean Isle can be reached at 80 Royal Palm Boulevard, Suite 202, Vero Beach, Florida 32960; 407-771-4777.) Practical Peripherals' PM9600SA is an excellent choice because it includes advanced error correction and data compression features and is often discounted to around \$450.

A speed-of-light remote-control connection won't help if the host PC isn't powered up. To ensure that the host is always waiting, you can try one of two approaches. The first, a remote-control power strip, lets you turn on the PC's power with a phone call. You plug the

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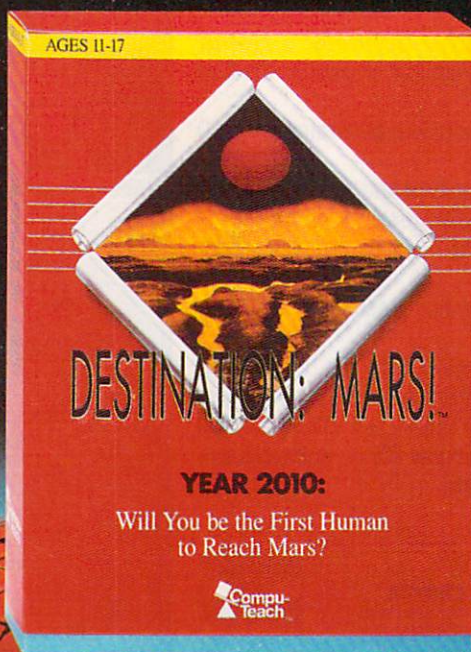
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computer and peripherals into the strip and then connect it to the phone line via a built-in jack. Call home, for example, and enter the security code, and your home office PC starts up. Server Technology's Power-ON is a compact four-outlet unit that you can conveniently stash on the floor of your workspace. When you complete the session and hang up from the guest, the Power-ON powers down the host PC until the next call.

If you want to leave the host on all the time but need to make sure it doesn't go down if the power fails, consider an internal power supply (IPS) like the Powercard. Its board fits inside the PC and connects to the computer's own power supply; an external battery provides temporary power. The Powercard detects even the briefest interruption of power, kicks in its battery, and then saves an image of memory to disk. As soon as the electricity revives, the PC is ready to take your call.

Do It from a Distance

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Commute

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ARTS & LETTERS

Robert Bixby

VENTURA OR PAGEMAKER?

Which is better: *Ventura Publisher 3.0* for *Windows* or *PageMaker 4.0*? When earlier versions of these products were available and *Windows* was much less a force than it is today, the correct answer to that question was a courageous "It depends." What it depended on was whether you had *Windows* and whether you were publishing or doing page makeup.

If you were creating books or newsletters, certain features of *Ventura Publisher* were particularly suited to your work. For more fanciful jobs, such as creating posters or making up individual pages (like the opening spread of a magazine article), *PageMaker* was the clear winner, having so many design features *Ventura* lacked or that were easier to use. And then some people were more tolerant of *GEM* (the operating system shell under which the original *Ventura Publisher* ran) than others.

Now that even Digital Research seems to be accepting

the fact that *GEM* will eventually be relegated to the slag heap of history, *Ventura* has made the transition to *Windows*. However, its makers pledge to continue supporting the *GEM* version—they claim it's the only viable alternative for those who are interested in top-of-the-line desktop publishing using only DOS.

To test these products, I put together a series of 32-page books. My resulting impression is that *PageMaker* makes much better use of *Windows* resources (no surprise there—*PageMaker* was available for *Windows* for years before *Ventura Publisher* was).

PageMaker formats faster and prints faster (by a wide margin), and its editor makes simple text editing much easier to do than in *Ventura*. I also liked *PageMaker's* interface better. It allowed freer movement among pages.

Most of the problems with *Ventura Publisher* for *Windows* have to do with the fact that it isn't as mature a product as *PageMaker*. For example, the odd and even printing option in the Print dialog box doesn't work. *Ventura* paid little attention to the setup and has always balked when Setup specifies portrait printing and the Page Setup dialog box specifies landscape printing. If I don't go back and make the change in *Ventura Publisher* (and even sometimes when I do), the program will crash immediately after printing. And if I don't think to save my most recent changes, I'll lose them.

Ventura Publisher has one distinct advantage, however, that overcomes all the disadvantages: While *PageMaker* combines all the data necessary to generate a document into a single file, *Ventura Publisher* maintains all of its files separate from one another.

This is a significant advantage;

it allows you to edit in the word processor or text editor of your choice. Any changes made in the text will be instantly reflected in the *Ventura* document without the need for further importing or cutting and pasting.

You can really appreciate this feature when you need to update a document with an outside application. For example, suppose you're confronted with the task of creating a newsletter, the back page of which lists the top sellers of a company's inventory. The file that makes up the back page can be the product of a database that's programmed to spit out the names, descriptions, and prices of products that have shown the most activity in the past 30 days.

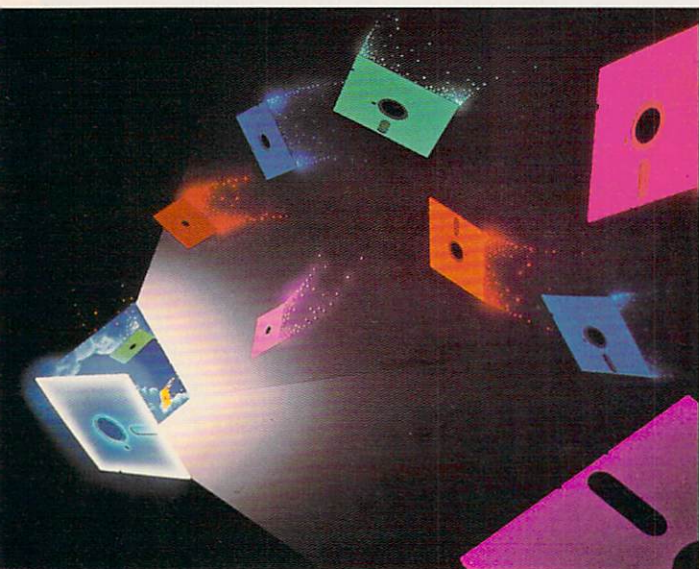
Most databases can be programmed to print out text, such as the text you might find in a form letter. By telling the database to print to file the format tag for the product name, the product, the tag for the description, the description, and so on, you'll end up with a perfectly formatted text file, ready to be printed with *Ventura Publisher*.

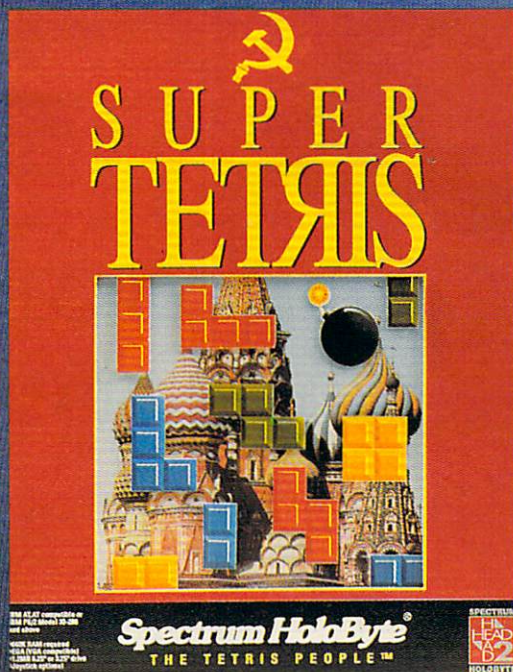
Your file can be used by either version of *Ventura Publisher*—*GEM* or *Windows*. Each time you generate a newsletter, it will contain the latest information provided by your database or inventory program.

In my experiment with formatting books, I saved time in *Ventura Publisher* by making a master disk with copies of all the style sheet and chapter files and then using a different text file for each booklet. If you create a number of similar products, this is a very efficient way to handle the task.

After all was said and done, I ended up appreciating *PageMaker's* slickness and speed, but valuing more highly *Ventura's* open design. □

Duking it out!
Finally,
Ventura Publisher
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David English

COMPTON'S MULTIMEDIA ENCYCLOPEDIA

What has 9 million words in 32,000 articles; 15,000 images, maps, and graphs; 60 minutes of sound, music, and speech; 45 animation sequences; 5,000 maps, charts, and diagrams; and the complete *Webster's Intermediate Dictionary*? No, I'm not talking about your local library. This is much smaller—in fact, it's all stored on a single five-inch disc that's only a fraction of an inch high. Give up?

It's *Compton's MultiMedia Encyclopedia* on CD-ROM, and it's now available in a *Windows* version as well as a *DOS* version. The *DOS* version won a 1991 *COMPUTE Choice Award* earlier this year. But as good as the *DOS* version is, the new *Windows* version is a significant upgrade. While both offer a screen resolution of 640 x 480, the *Windows* version has as many as 256 colors instead of just 16 colors (the *DOS* version has to switch to 320 x 200 in order to show its photos in 256 colors).

The *DOS* version currently supports only the IBM Speech Adapter, Covox Speech Thing, Digispeech DS 201, and Tandy Sound, in addition to the CD-ROM drive's own audio output. The *Windows* version can produce sound with any sound board (including the Sound Blaster and Sound Blaster Pro) that's compatible with *Windows*' new multimedia extensions (called *Windows with Multimedia*).

Finally, because the *Windows* version supports the multimedia extensions, you can

now have an article, a high-resolution picture, an animated sequence, and music—all going at the same time. The *DOS* version contains all of these elements but has to stop and switch from one to another. The *Windows* version truly lives up to the name *MultiMedia Encyclopedia*.

The only catch with the *Windows* version is that you must have *Windows with Multimedia* and the hardware necessary to run it. This can take the form of one of the new MPC (Multimedia PC) computers or an upgrade kit (which usually includes the *Windows* multimedia extensions, a CD-ROM drive, a compatible sound board, and possibly a Super VGA video-display card). You'll then be ready for the many multimedia applications due to be released during the next 12 months. *Compton's* is just the tip of the iceberg.

With all 26 volumes of the *Compton's Encyclopedia* and more on just one CD-ROM

disc, you need more than just an online index to find your way around. Fortunately, Britannica Software (a division of Encyclopedia Britannica) has designed an extremely easy-to-use interface. Wherever you are, you can always see the same eight icons on the right side of the screen. Using them, you can quickly find the information you need.

To some degree the icons take you to categories of information, but to a larger degree they offer different views or doors to the same overlapping information. For instance, after clicking on the History icon, you can click on Stock Market Crash and bring up an article on the 1929 crash, which can lead you to related articles on the Great Depression, Franklin Delano Roosevelt, and the stock market.

Each of these articles can have pictures, sound, and animation and can lead you to other related articles. For example, "Stock Market" can lead you to the related articles "Business Cycle," "Foreign Exchange," and "Herbert Hoover."



As an alternate route, you can click on the Topic Tree icon and move from Economics to Finance and Government to an article on inflation. There you can call up the same "Business Cycle" article that you saw when you took the path through the History icon.

As a third route, you can click on the Finder icon, type the word *business*, watch the words *business cycle* move to the top of the list, double-click on the phrase, and find yourself once again at the "Business Cycle" article.

For an even closer look at how these various paths work, let's take a brief look at each of the eight icons. The eight icons are History, Topic Tree, Search, Finder, Science, World Atlas, Picture Tour, and Go Back.

The History icon brings up a time line of American history from 1492 to 1990. Above the time line are the important periods of history, including Revolutionary War, Major Inventions, and Roosevelt's New Deal. Clicking on any of these will lead you to a list of related articles.

Below the time line are more specific events, such as Boston Tea Party, Telephone Invented, and United Nations Formed. Clicking on any of these will lead you to that specific article.

With the Topic Tree icon, you begin with a list of 19 broad categories of knowledge (Arts, Communication, Earth, Economics, and so on). Clicking on any of these broad topics brings up a list of three or more subcategories and a list of related articles. The subcategories lead to another list of related articles. Using the Topic Tree to branch

from the general to the specific, you can quickly follow a logical path of learning—such as Living Things, Animal, Animal Products, and Silk.

The third icon, Search, lets you type in a word or phrase and see a list of related articles. You can then double-click on the article's name and read the article. Each instance of the word or phrase is highlighted in the article so you can quickly find the reference. You can also search through the pictures (or, more precisely, through the pictures' captions) to call up related pictures and articles.

Finder, the fourth icon, is simply an alphabetical index for the entire encyclopedia. To help you deal with this extremely long list, the program includes an intelligent title finder. Type a letter, and the list will move to the words and phrases starting with that letter. Type a second letter, and the list will move to the words and phrases that start with both letters (for example, type *di*, and the list will move to *diabetes*).

The fifth icon, Science, offers still another way to progress from the general to the specific. Four broad science categories—Living Things, The Human Body, Inner Earth to Outer Space, and Going Places—lead to subcategories and their related articles.

World Atlas, the sixth icon, leads to a map of the world which you can use to zoom into a country or region. You can click on the name of a country, city, or body of water and quickly call up its related article.

Picture Tour, the seventh icon, lets you randomly browse through 15,000 pictures and drawings. Click on

Bringing You the World of Knowledge with Sights and Sounds.

COMPTON'S
MULTIMEDIA
ENCYCLOPEDIA

1991 EDITION

BRITANNICA SOFTWARE

the button marked Article, and you can move directly to the related article.

The final icon, Go Back, simply lets you move back through the various screens you've visited up until that point—including screens from past sessions.

I had a great time exploring the new *Windows* version of *Compton's*. Using the various search methods, I enjoyed browsing through the lists and stopping at whatever article seemed interesting. While you lose the higher-resolution pictures and immediacy of the printed page, you gain the ability to search on a grand scale—in addition to the music, speeches, sounds, and animation.

It's not a bad tradeoff, especially when you consider that this 26-volume encyclopedia is considerably smaller than a paperback novel. □

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PATHWAYS

Steven Anzovin

SYNTHETIC STARS

Bogey leans forward and in that unmistakable voice says, "Here's looking at you, kid." He clinks glasses with Marilyn, who winks and laughs breathily when suddenly, through a floor grate, up oozes a metallic polyliquid that turns into—yes—Ronald Reagan. But he's only half human; his legs are still silvery puddles. "Where's the rest of me?" Ronnie demands. That's up to you, for the age of synthetic stars is upon us.

If you've seen *Terminator 2*, you know it's possible, using a computer, to mutate the human form in ways unimaginable just a few years ago. But what's pulling people to this film is more than Arnold Schwarzenegger's masterful impersonation of a robot; it's the incredible computer-generated special effects. As the new terminator, T1000, Robert Patrick plays his best scenes as a polymorphous blob. Talk about star quality!

The idea of shape-changing beings is as old as humanity. One of the best known, Proteus of Greek mythology, changed his form at will, but if you could hold him fast, he would answer any question you asked.

Recently, a number of sci-fi films, such as *The Thing*, have toyed with the same notion, but never has the concept been realized with such vividness as in *Terminator 2*, thanks to some very advanced computer graphics techniques and the cunning skill of Mark Dippe and the programmers at Industrial Light and Magic.

Much of what ILM did for *Terminator 2* is proprietary stuff involving the custom compositing of high-resolution frame-by-frame laser scans of 35mm film with 3-D reflectance-mapped computer models.

While some of this is only useful for characters who need to melt into mercury puddles, the same techniques can be used to *re-create* real people. That's the goal of Nadia and Daniel Thalmann, Swiss computer-graphics wizards and the masterminds behind the 1987 short film *Rendez-vous à Montréal*.

The plot is simple and brief: Computer-generated actors Humphrey Bogart and Marilyn Monroe, bored with the afterlife, return to earth to rendezvous at a cafe in Montreal. When Bogey appears, he finds a stone Marilyn waiting. A kiss brings her to life, and their romance begins.

It may not be stunning drama or even graphically convincing (the film now looks positively Stone Age), but there's an undeniable frisson in seeing Bogey and Marilyn together as they never were in reality.

As the Thalmanns claim in their recent book, *Synthetic Actors* (Springer-Verlag, 175 Fifth Avenue, New York, New York 10010; 212-460-1500; \$49.50), there are basically no barriers to creating convincing computer-generated versions of Hollywood stars.

From an artistic point of view, the authors say, such films allow "the creation of new stories with existing people

such as cinema stars or historical or political personalities. Fictitious persons may live alongside existing or dead ones."

How about Abe Lincoln versus Godzilla or Madonna in a video with Mother Teresa? What the authors don't say—because it's the obvious goal of synthetic-actor research—is that when the techniques are perfected (they nearly are), it will be close to impossible to distinguish real film and video personalities from synthetic ones. The old truism about politicians' being creations of the media could be the literal truth.

Thanks to the PC, you don't have to accept synthetic characters foisted upon you by media wizards. Yes, you too can build your own Marilyn, Terminator, or as-yet-undreamed-of blockbuster synthetic star.

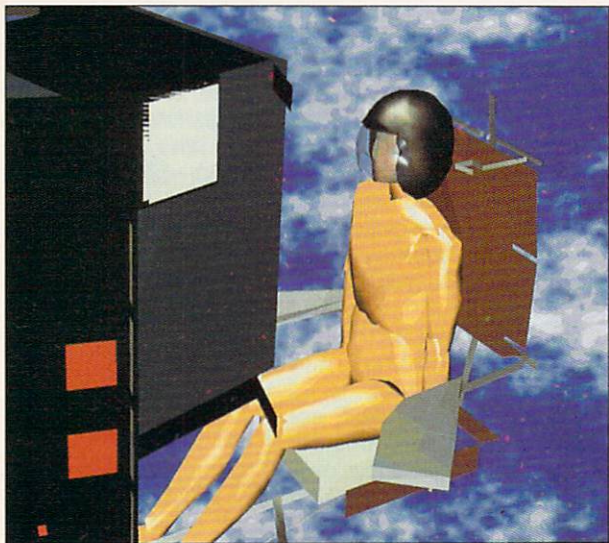
Software isn't quite at the ILM-level of sophistication yet, but a program called *Mannequin* from HUMANCAD (1800 Walt Whitman Road, Melville, New York 11747; 516-752-3568; \$699) can get a 3-D body into your computer.

Using an extensive library of ergonomic data, *Mannequin* lets you create the likenesses of men, women, and children of different body types and nationalities. The models are fully articulated, and can bend at any joint with the same range of movement as a human's, and they can be animated.

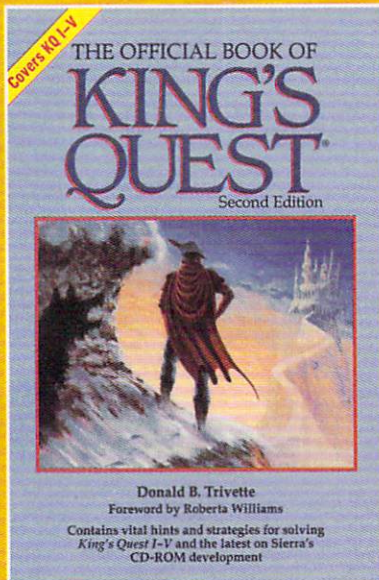
Not much can be done to personalize their faces from within *Mannequin*, but you can export models to any 3-D modeling program that accepts *AutoCAD*'s 3-D file format, tweak the features there, and add clothes, hair, and 50-mm Gatling guns.

In fact, you can metamorphose a model any way you want. Animate your synthetic star in front of a digitized background, and you can start underbidding ILM on Hollywood's next sci-fi epic. □

Someday it may be impossible to distinguish real film and video personalities from synthetic ones.

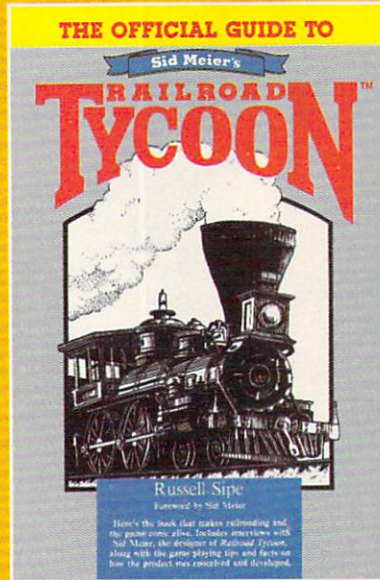


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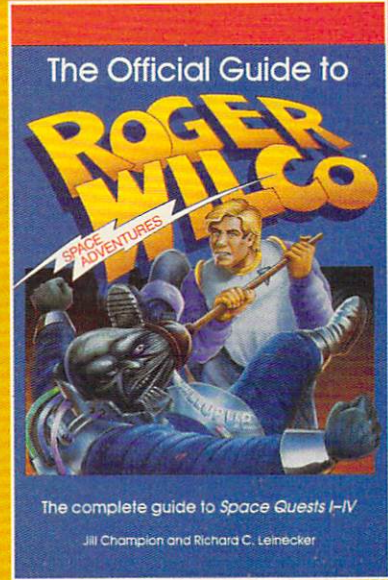
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This is the book that makes railroading and the game come alive. Inside players will find interviews with Sid Meier, the designer of Railroad Tycoon, along with facts on how the product was conceived and developed. Also includes formulas the program uses to determine income and expense.



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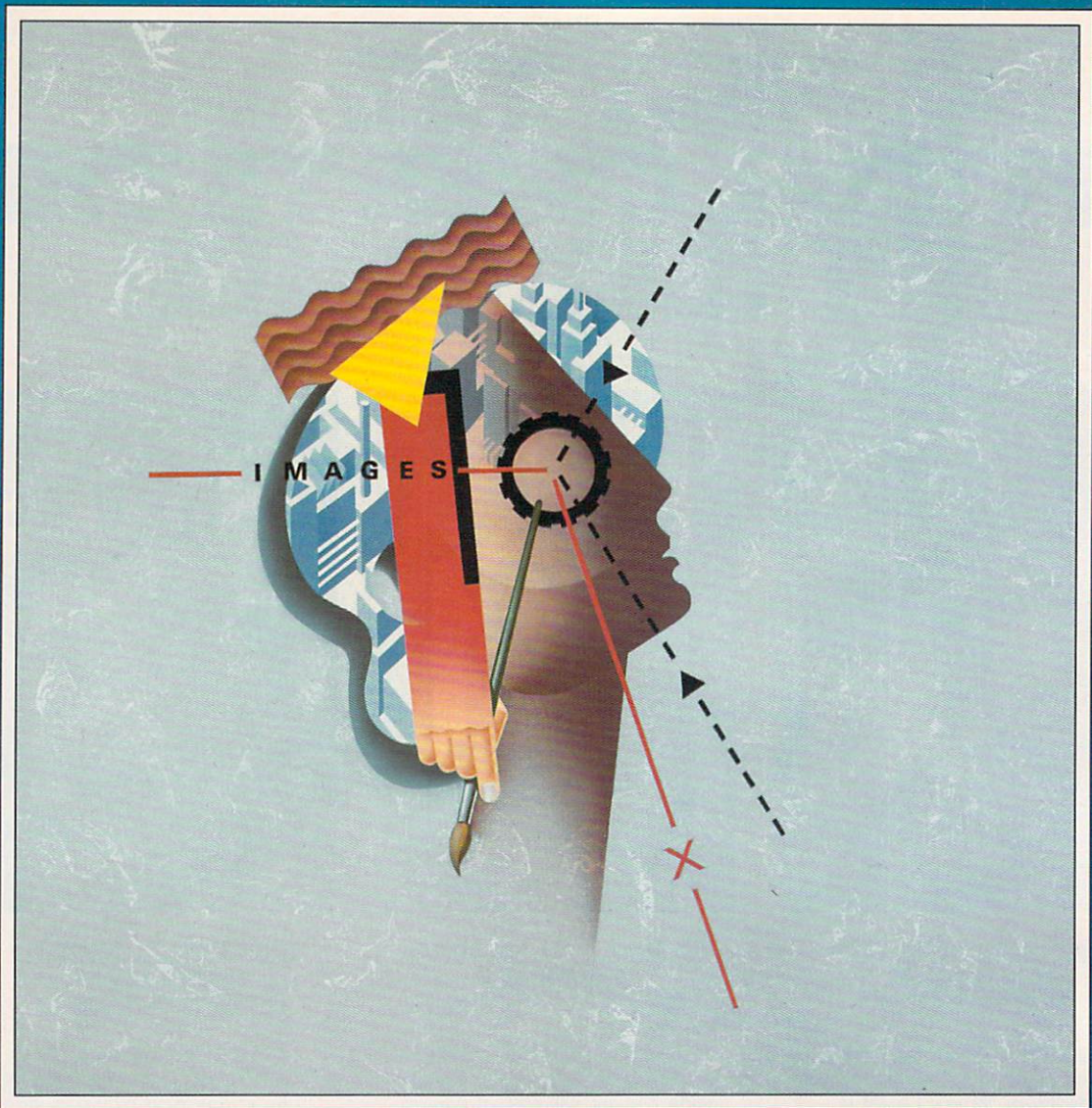
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NOT SURPRISINGLY, ARTISTS
ARE LEERY
OF MACHINES MAKING ART.
SO WHEN THE
COMPUTER IS THE ARTIST,
WHAT DEFINES ART?

They write; they paint; they make music. They pretend to be human. But they're not. They're PCs.

And PCs are, with our help, masquerading as novelists, painters, musicians, poets, and sculptors. If they're good, they can fool the best of us. If they're bad, they still get a laugh.

But as their mimicry improves, the lines between what *they* make and what we create begin to blur. Ethical, legal, and artistic questions dance around like balls in a pinball machine.

They're not doing it by themselves, though. We're still pulling the strings, crafting the programs, and pushing the technology to fire our own creative juices—or to see if we can make these machines jump through the hoops.

But computers of the future may not be willing to play second fiddle.

Synthetic Photos

Says John Grimes of the Institute of Design at the Illinois Institute of Technology, "I don't really think machines can replace what humans intrinsical-

ly do. Whatever computers become, we will define ourselves in contradistinction." Yet Grimes has spent years developing *CameraWork*, which makes images in ways no human could.

A professional photographer, Grimes wanted to experiment with images, try countless variations—many of which he knew would fail—quickly and interactively. *CameraWork* was the result. By offering 30 fundamental processes and then letting users combine those artistic atoms in any number of ways, *CameraWork* can add, subtract, and metamorphose images in an almost infinite variety of ways. Painters have used it to transform charcoal drawings into sweeping pastels, and Grimes uses it to produce variations of his photographs.

"What you end up with is something unimaginable," he says. "You create a new image that cannot be anticipated." While these synthetic photographs wouldn't be possible without the computer, Grimes dismisses the idea of computers as cre-

ators. "They don't make instant art, nor do they make anyone an instant artist. What the computer provides is a lever for the imagination."

But the definitions blur. Harold Cohen, a Los Angeles-based painter, has spent the last 15 years perfecting a program that paints. Written in LISP, a computer language long associated with artificial intelligence research and development, *Arro*'s works have appeared in several electronic art shows.

AutoDesk's *Chaos: The Software*, though not styled as an art program, certainly produces interesting images. Fire up the program, walk away, and when you come back, you'll find strange clouds, mountains, or abstracts on your monitor. To some, those images are as much art as any Jackson Pollock.

Computerized self-animations—such as the MIT Media Lab's classic *Cootie*, in which an animated *Cootie* toy scuttles from place to place by its own set of rules—evoke images of the

kind of electronic life software only now filtering down to the home computer. Maxis Software's *SimAnt*, a simulated ant colony, is a good example. "Who knows if that isn't an art form?" asks John Grimes.

Total Eclipse of Art

Dead women tell tales. So claims Scott French. This Foster City, California freelance writer brought Jacqueline Susann back from the grave. She was the flamboyant author of such sultry 1960s novels as *Valley of the Dolls*.

Using a Macintosh IIcx and off-the-rack artificial intelligence software, French painstakingly re-created Susann's style, characters, and stories, and then collaborated with the Mac on *Just This Once*, a steamy pseudo-Susann novel updated for the 1990s.

French picked apart Susann's writing and then, using the AI software, distilled her prose and plot lines into several hundred formulas. These told the computer how to write, shape the plot, and develop characters. After French

THE ARTIFICIAL ARTIST

BY GREGG KEIZER

made some suggestions, the computer gushed out copy that would make the late author proud—or ashamed.

Just This Once is no fiction-by-silicon fiat. "It's really a collaboration," says French. "I like to think we did it together." French estimates that he wrote about 10 to 15 percent, while the computer cranked out another 25 percent on its own. The rest was a back-and-forth between authors, much as in any other writing tag team.

How good is *Just This Once*? How good was Jacqueline Susann?

Susann, in *Valley of the Dolls*: "She went into the house and grabbed a bottle of Scotch off the bar. Then she went into her bedroom, pulled the blinds to shut out the daylight, shut off her phone and swallowed five red pills. Five red ones hardly did anything now."

French/Macintosh in *Just This Once*: "Lisa picked up the large propane torch and cracked the valve open a hair. The compressed air hissed out like an angry rattlesnake. She snapped the flint wheel on her lighter and the

pull up some titles, proverbs, and idioms with rhyming words, and you'll end up with something like the headline at the beginning of this section.

Corporate Voice, a souped-up grammar and style checker, tries to mold your text to a standard you set. For companies that want all outgoing material to reflect a single style, *Voice* can twist words to sound as if they came from Raymond Chandler or Mark Twain.

Strangest of all, a computer went undercover on UseNet, an online network that links corporate, academic, and government research labs, and spewed out bizarre messages. Never challenged, Mark V. Shaney, the computer's nom de plume, sent back nonsensical ditties like "I am afraid of it becoming another island in a nice suit." No one suspected it was software. They thought it was just another electronic nut.

Sculpt-O-Matic

Computers can help artists visualize 3-D works, but they can't put hands to clay to execute the dream. Not yet.

the moment, they'll stay in high-profit manufacturing where they're used to create ceramic molds and heart valve prototypes. But if prices drop, on-the-edge artists may grab the technology to build works of art at their desks without getting their hands dirty.

It's Pretty, but Is It Art?

"Is it possible for computers to be a great aid in expression?" asks Grimes. "Yes. Is it possible for the computer to be an integral part of that process? Yes. Can computers replace artists? No."

No? Artificial intelligence is still in its infancy, even after years of research. Artists and nonartists will continue refining electronic efforts that ape our ability to express ourselves in words, paint, and music if only to prove that it can be done. "The computer suggested changes that I couldn't see," claims French. "No human could do it; it's simply overwhelming."

If computers can create something pretty, something *art*, it's our fault. We taught them everything they know. □

IN SEARCH OF ART

Computers not only make art, they sell it, too. ArtSearch, a Denver art information and marketing company, plans by year's end to wield its custom database of nearly 100,000 contemporary works of art like a broad brush, painting a quick picture for corporate and private collectors, art galleries, and even the occasional novice.

Now up and running on Macintoshes, soon to make it to 386 PCs, the ArtSearch database shows digitized images of each work, displays a photo and biographical sketch of the artist, and plays the brief audio remark taped by a few artisans. Art lovers can search the database by price, artist, subject, title, size, and color, all for a quarterly membership fee of \$49. Fruitful online searches produce a color printer-produced image that's sent to the user. Future plans depend on CD-ROM technology making the massive database more affordable.

ArtSearch even helps rookies refine their artistic inclinations. As you scroll through randomly selected images, you tell the database which ones you like and which ones you hate. "The Personal Curator starts forming hypotheses about what people like and then tunes in to what their tastes are," says John Graham, president of ArtSearch.

With works that range in price from a few hundred to hundreds of thousands of dollars, ArtSearch's inventory gives people a far greater choice than they can have any other way, Graham says.

Imagine the world's biggest art gallery. Imagine it on your desktop. "ArtSearch is a natural extension [of a common database] but with the added dimension of multimedia," Graham says.

The computer makes. The computer sells. All that's left is the appreciation.

stream of invisible gas flashed into an iridescent blue streak."

French has signed with a New York agent and hopes to see *Just This Once* in bookstores soon. If so, it will be the world's first fiction written primarily by a computer. But French isn't ready to rest on just one novel—or one writer. "It's possible to take two separate writers, in the same genre perhaps, and combine them to come out with a synergistic product. You're making a third person out of it."

Other artificial writers are less ambitious. *Headliner* helps write advertising slogans but is more of a brainstorming tool than anything else. Give this PC program a word—say, *art*—and ask it to

Advances in desktop manufacturing foreshadow a future where artists sit at the screen, create a sculpture with something akin to CAD (Computer Aided Design), and then build it on their desktop, all under computer control.

Several competing technologies that range from solidifying liquid plastic with an ultraviolet laser to hardening a powder with a jet of silica, deliver small-sized replicas of computer-generated designs. The computer scans a design in superthin slices and then translates the image into just-as-thin cross sections of the object.

The high cost of such desktop manufacturing machines—they go for up to half a million dollars—means that, for

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A new flight simulation experience from Konami. Learn jet fighter tactics from three veteran war aces, thrill to multiple target views including "missile cam," and fly missions solo or in simultaneous, two-player split screen!



MARTIAN MEMORANDUM

Private eye Tex Murphy is back in a hilarious new interactive movie adventure from Access Software. For the first time, players will be able to interact with full motion video characters on a disk-based product, as they help Tex face murder, romance, deception, and prophecy from present day San Francisco to the year 2039.



WORDTRIS

A new challenge from the TETRIS people at Spectrum HoloByte. The fast action, falling blocks now have letters on them, which players try to form into words. Time is of the essence as you try to maneuver letter tiles to spell words, as they fall from the top of the screen into the well. If you like TETRIS, you'll love WORDTRIS.



FACES...TRIS III

You'll meet some pretty strange characters playing this addicting Soviet mind-teaser from Spectrum HoloByte. Falling block pieces of famous and not-so-famous faces must be stacked in the proper order (mouth to chin, eyes to nose) to form complete faces. Remember there are no points for "double chins" in this game!

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MULTIMEDIA PC

David English

COLOR VIDEO ON THE RUN

High-quality color LCD laptops have finally arrived, and I've got good news and bad news. The good news is that these latest color LCD screens are sharper and have less distortion than standard color monitors. The bad news is that the International Trade Commission plans to slap a heavy tariff on this promising new video display technology.

With improvements in technology, modem manufacturing, and intense competition, the price of color LCD screens, like the one on this Dolch portable, is coming down. Or is it?



First, the good news. Toshiba, Sharp, NEC, and Dolch all offer color laptops—though they're currently expensive and run on AC power only. Fortunately, prices are dropping quickly (Toshiba's T3200SCX slid from \$8,995 to \$7,249 in just three months), and battery-operated versions should start popping up within the next six to nine months (Dell hopes to have one out by the end of the year, but that's a real long shot).

If you saw a color LCD screen in 1990 or 1989, look again. You probably saw a passive-matrix color screen using the same technology as the passive-matrix gray-scale screens that are so popular on today's laptops. Passive-matrix screens—either color or gray-scale—have only a 4:1 to 12:1 contrast ratio, so graphics and text appear to be

washed out when compared to regular monitors.

Screens using active-matrix technology have a 100:1 contrast ratio, which is about the same as that of a regular color monitor. In addition, active-matrix screens switch their pixels on and off as much as ten times faster than passive-matrix screens (or about the same speed as a regular monitor), so you don't have those ghost images that make it hard to follow a moving cursor or find it in a field of text.

Best of all, because these new color LCD screens are immune to pin-cushioning, color bleeds, mis-convergence, and magnetic interference, they actually provide a sharper image with better color saturation than a standard cathode-ray tube (CRT) monitor. (You can expect to see wall-mounted color televisions based on this same technology by the end of the decade. Eventually, color LCD screens will replace our current CRT-based monitors and televisions.)

The current generation of active-matrix color LCD laptops offers various VGA graphics modes, including 320 x 200 with 256 simultaneous colors and 640 x 480 with 16 simultaneous colors. However, each system varies in the number of possible colors that are available for these modes.

The Dolch screen increases the palette for a color LCD screen from 512 colors to 24,389 colors by using a proprietary combination of pulse-width modulation and dithering. The Toshiba T3200SXC expands the palette to more than

185,000 possible colors. The Sharp PC-8501 offers a 256,000-color palette for 320 x 200 with 256 simultaneous colors and a palette of 4,096 colors for 640 x 480 with 16 simultaneous colors. The NEC Pro-Speed 486SX/C goes further, offering a Super VGA 640 x 480 mode with 256 simultaneous colors while limiting the available palette to 4,096 colors.

Expect 1992 to bring more available colors and more modes. Passive-matrix color screens may make a comeback on the low end as manufacturers grapple with the problems of making active-matrix color screens battery compatible (at present these screens use 1000 times more power than black-and-white passive-matrix screens). I wish I could say that prices will keep dropping, but that brings us back to our bad news.

At the time of this writing, the International Trade Commission has slapped a 62.67-percent tariff on Japanese active-matrix screens. A group of domestic LCD screen manufacturers has argued that Japan is dumping these screens on the American market at less than fair market value. IBM, Apple, Tandy, Compaq, and other computer makers have countered that American companies lack the necessary manufacturing facilities and expertise.

If the tariff is imposed, it will make it nearly impossible for American computer manufacturers to offer active-matrix screens over the next 6 to 12 months—unless they manufacture their computers outside this country. Most will simply move their manufacturing plants offshore. Presumably, the Japanese companies that are currently in the forefront of active-matrix color technology—including Toshiba, Sharp, and NEC—will be able to work around the tariff by manufacturing their laptops in Japan. □

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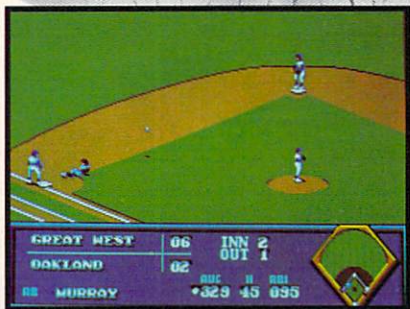
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2	SCOTT	P	205	194	19	245	3-13	0	3.32	37	245
3	VALDESQUE	P	196	187	20	223	11-10	0	3.63	26	223
4	MULLINSO	P	193	221	20	214	10-14	0	3.45	35	214
5	DARWIN	P	162	135	27	230	11-4	2	3.83	20	214

Bullpen											
	T	IP	H	ER	SO	W/L	SU	ERA	HR	AVG	
1	SHANKS	L	209	185	20	255	7-12	0	3.79	28	222
2	CLANDY	P	76	100	19	202	2-8	1	3.32	13	222
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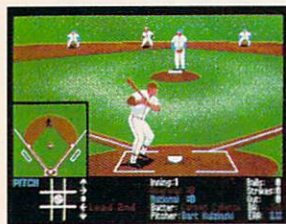
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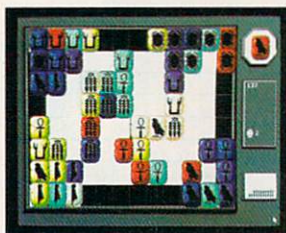
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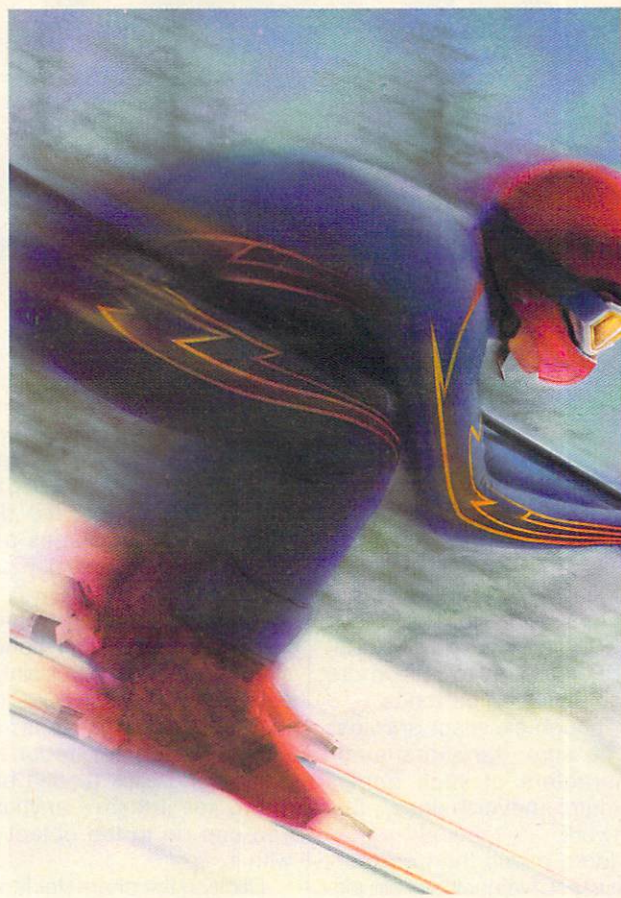
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ENTERTAINMENT

COMPUTE CHOICE. Assume the role of Jake "Lucky" Masters, a wise-cracking American ace flyer.

Richard O. Mann

HEART OF CHINA

After the Great War, the old ways of life in China changed forever. During this era of turmoil, American ace flyer Jake "Lucky" Masters, slightly down on his luck, flies trade goods such as silks and paper parasols from the interior to Hong Kong.

As Lucky's alter ego, you immerse yourself in a part of history that Americans consider romantic, and, as any red-blooded American would, you rise to the challenge to become a wisecracking hero.

Beautiful nurse Kate Lomax nobly works to save downtrodden Chinese children, until she's kidnapped by an evil warlord. Kate's father, ruthless American tycoon E. A. Lomax, determines that you, Lucky Masters, must rescue her. E. A. Lomax's clever plot forces you to accept the assignment, and he assigns an impossible deadline.

Once free of E. A. Lomax and the introductory sequence, you begin actual play on a dock in Hong Kong, alone (except for a friendly and later useful seagull) and in charge of your fate again. Thus starts your dynamic crusade to recruit a ninja, rescue the girl, and escape to the safety of Paris.

Along the way you'll visit the back alleys of Hong Kong, the warlord's palace in Chengdu, the primitive village of Kathmandu, and the bazaars of Istanbul. You'll ride the Orient Express to Paris, and—if you do everything exactly right—win the heart of saucy Kate Lomax. You haven't won the game until you're married.

The plot intrigues with its attendant puzzles and mysteries but lacks great inspiration.



The game's gorgeous graphics and the near-cinematic look and feel push *Heart of China* to the cutting edge. Most adventure games, including the Sierra line (Dynamix is a division of Sierra), amount to little more than animated cartoons.

Though excellent drawings to be sure, the screens and characters of such games remain, nevertheless, just artwork.

More movie than cartoon, *Heart of China* includes still pictures with small moving parts added, but it approaches realism. Shot like a movie with actors and sets (although, as in a real movie, many of the exteriors are paintings), the images were then digitized and, in some cases, animated.

These sequences of what Dynamix calls full-motion video—movielike animations of video footage—consume vast quantities of hard disk space. Don't expect to see a lot of it in the game, which already takes up a full eight megabytes of disk space.

This visual treat does, however, remind us that the day when computer games and movies will integrate fully isn't that far away.

Easy to master, the interface works best with a mouse, since it allows you to point at anything on the screen. Click the right button to get a description of the object under the pointer and click the left button to see if there's anything you can do to the object or with it.

Click on the character icons in the lower corners of the screen to view the objects you carry. Once you learn to drag the gun from the inventory to Lucky's hand to arm him and to drag the ninja hood over Chi's picture to have him change into his ninja garb, you're well on your way to controlling the situation.

You can also change your viewpoint character. Click on the Chi icon to become Chi, a necessity in certain parts of the game. Later, you'll need to play the part of Kate to spring Lucky from a Turkish prison,

where he's incarcerated for committing certain unspecified acts with the nabob's daughter (before he met Kate, of course).

As you confront the characters, you may choose to talk to them. Usually, a series of ornate dialog boxes provides the first part of the conversation without any action from you.

After these necessary preliminaries, a dialog box offers you three or more choices for your reply to what the character said. The choices you make will either get you what you want (if you happen to know) or eventually get you killed.

You'll need to save the game frequently, as you will die innumerable times on your way to your wedding in Paris.

The dialogs with the characters provide challenging fun. Some conversations give you a series of five or more consecutive sets of possible comments, depending on what you say each time.

There are many ways through this conversational maze to your objective, some quicker than others. Some paths lead to unfortunate dead ends. I particularly enjoyed the romantic verbal jousting on the Orient Express, played from either Lucky's or Kate's viewpoint.

If you select the right series of comments, you'll end up in wedded bliss. Say the wrong thing, and you'll end up in a Paris bar trying to impress a new girl.

These conversations add depth to the game through characterization. To get what you want, you must deal with characters' motivations and personalities as revealed through dialogue.

Your relationship with Kate, which leads to the ultimate goal of the game, serves as the primary example, but in other situations, understanding the distinctive personalities of each character can assist you significantly.

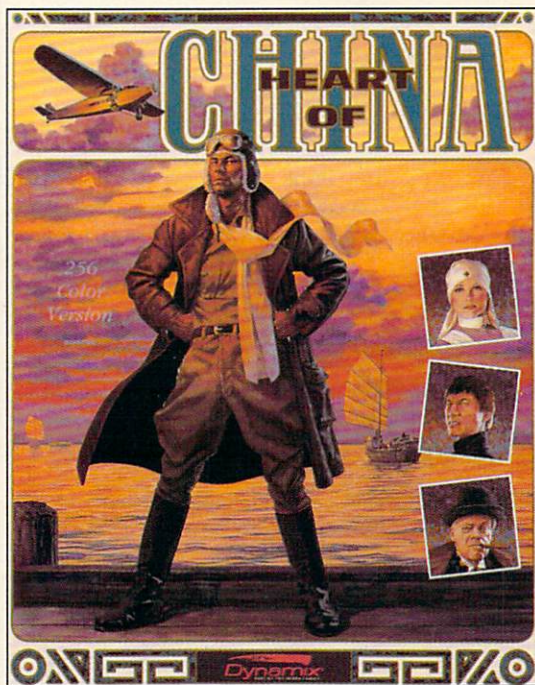
On the other hand, the preset paths through the conversations limit your choices. At times you want to scream something at a character, but it's never one of the choices. You have to have faith that somewhere in all that conversational blather something useful will emerge.

In an effort to please everyone, Dynamix threw in a couple of essentially gratuitous arcade sequences, but then, don't most movies include gratuitous violence these days?

As you escape the warlord's stronghold, you thunder away in an old army tank. As the arcade sequence begins, you have the option of skipping it entirely. If you opt to play, you'll work through a tank chase presented in simple filled-polygon video. After a while, if you haven't found your plane, a dialog box pops up asking if you're tired of playing tank and if you want to move directly to the plane.

Another arcade sequence on the Orient Express has Lucky and a thug brawl on the top of the train as it roars through a series of low-clearance tunnels—a traditional cartoon-character game. I suspect most of us will skip these parts after playing them once or twice.

Dependable overall, the documentation contains some frustrating minor inaccuracies. For example, the explanation of how the mouse works will slow you down as you puzzle



it out; it should have been clearer. In reality, the mouse and the interface won't give you the least trouble; the manual just makes it appear that way.

Heart of China represents another step forward in game technology. Its exciting (if somewhat limited) full-motion video sequences and romantic elements make for fresh and pleasant gaming. If you have the 286 or 386 computer with a VGA monitor and eight megabytes of free hard disk space—by all means—lose your heart to China. *Heart of China* might not offer enough challenge to fervent adventure game veterans, with its readily solvable puzzles and mysteries and its involved but not wearisome story line. For the rest of us though, the visual experience alone should have us clamoring to climb the Great Wall, if need be, to buy our own copies. □

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GAMEPLAY

Denny Atkin

FILES UNDER PRESSURE

You've finally figured out the complexities of downloading a file. That neat shareware game you read about in *COMPUTE* now sits on your hard drive ready to play. Or so you think. You type the name of the file and are rewarded with BAD COMMAND OR FILE NAME. What's wrong?

Either your download wasn't successful, or the file you transferred was stored in a compressed format and requires processing before it can be put to use.

Just about all the files you'll find online, games or other kinds of files, have been compressed. You'll recognize these files by their extensions—such as ARC, BXY, LZH, SIT, and ZIP—which help you identify the program that was used to compress the files. Some compressed files are self-extracting; they have a tiny decompression program appended to the beginning of the compressed file. These files can be hard to identify, since they end with a standard EXE extension on MS-DOS machines. (They're even harder to identify on Macs and Amigas.) While it can be disconcerting to type a program name and have it create lots of smaller programs on your disk, at least self-extracting files don't require a separate program to decompress.

Why are program files compressed in the first place? Compressed files are generally about half the size of their uncompressed counterparts, so they can be downloaded in about half the time. On commercial online services or BBS systems where you have to call long-distance, time truly is money. Even on local bulletin boards, where time isn't as much of a consideration, com-

pressed files speed you along so someone else can log on.

Another benefit is that you can transfer a group of related files in a single step. Compressed files are called archives because they can contain more than one file; you can archive a set of related files together. Many programs require a set of data files to run. If you had to download each necessary file individually, not only would you have to spend more time picking downloads, but you'd risk missing vital data files. Also, most modern compression programs will save the original subdirectory structure for all of the files; if your file needs separate directories for data files, keeping its directory structure intact will save you from having to type a series of COPY, MD, and DEL commands.

The final benefit of archiving a file or series of files is that the archiving programs will check each file's integrity as it's decompressed. If a file has errors in it due to a download problem, the archiving program will alert you to the problem. The programs generally don't provide a method to fix the errors, however.

Compression programs also provide a sort of file-transfer standard, allowing you to transfer files intact between different computer platforms. For instance, the Macintosh, the Amiga, and OS/2 PCs don't suffer from the MS-DOS eight-character-plus-three-character-extension filename length limitation. But if you wanted to transfer a Mac file named PostScriptOutput to an Amiga using a PC-based BBS as an intermediary, your filenames would be truncated to POSTSCRI.PTO when the file was stored on the PC. By "encapsulating" the file in the safety of an archive, only the archive filename would be truncated; when you finally decompress

the original file on the Mac, its filename will be intact.

There is a downside, though—compatibility. Different archive programs are more popular on different platforms. And each platform has more than one archiving format available; you'll find that you need more than one decompression program even if you don't have to deal with files from foreign computers.

The most popular format on MS-DOS computers is the shareware *PKZip*, by Phil Katz. Katz created the ZIP format, which was faster, more versatile, and better at storing directory structures than ARC, a precursor. ZIP has become the de facto standard on MS-DOS machines.

The only serious challenger has been *LHarc*, a freeware program from Japan. It offers compression similar in speed and efficiency to *PKZip*'s, but at a lower price—free. Because of the poor implementation of *PKZip* on the Amiga, *LHarc* has emerged as the Amiga standard.

Mac files are usually compressed with *StuffIt* (SIT) or *Compack* (CPT). I could devote an entire column to the intricacies of decompressing Mac files on other platforms—you have to deal with Resource and Data Forks, fun stuff—but *UnSit* will let knowledgeable users extract Mac files on their platforms.

If your file is going to be used by Mac, Amiga, and Atari ST users in addition to MS-DOS folks, your best bet is to use *LHarc* to compress the file. If the file is of interest to MS-DOS users only, though, stick with *PKZip*. Avoid self-extracting files if possible. Not only are they potential virus carriers (some virus programmers hide the virus in the extraction code), but they prevent your file from being used on incompatible platforms. □

**Guest columnist
Denny Atkin:
Just about all the
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you'll find on bulletin
board systems
have been compressed
in some manner.**

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CONDUCTORS USING ROBOTIC
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OF MUSIC IS JUST AROUND THE CORNER.

THE INFINITE CRESCENDO

BY CHANTELE OLIGSCHLAEGER



The ear changes with the generations, and what is cacophony to me may well draw iron tears down the cheeks of my nieces and nephews.

Sir Edward Marsh, an English art patron, was referring to Georgian poetry when he penned those words, but you could easily say the same about music. Since Leon Theremin invented the first electronic instrument in 1920, music has changed in ways never before imagined. And the movement that computers began is still playing its overture.

The electronic music revolution is turning science fiction into science reality in the labs of Stanford University's Hugh Lusted and San Jose State University's Ben Knapp. In 1987, the two researchers brought together their visions of a device that would produce music from the electrical activity in muscles. Their creation: the Biomuse, an apparatus that uses a headband and a muscleband to sense bioelectrical activity, which, in turn, is sent to a computer to produce musical signals.

The headband eye controller detects the direction in which your eyes are moving, and a muscleband controller, which you wrap around your arm or leg, detects muscle tension. For example, if you're playing a keyboard with both hands, you can send additional commands to the computer or create other instrumental sounds with the headband by moving your eyes or by flexing the banded muscle. The computer is programmed to interpret the information and send a command to the synthesizer, which results in music.

The Biomuse could be a godsend for physically disabled musicians. Lusted and Knapp introduced it to patients last March at Loma Linda Hospital in Southern California. One man, a former computer programmer without full use of either his arms or legs, was able to play the violin using the remaining control of his upper arm.

Virtual Biomime

Musician Galen R. Brandt sees other possibilities for the Biomuse. She plans to use it and Vivid Effect's virtual reality software, *Mandala*, in her multimedia show, *Let Us Consider the Rising of Dreams*. During a performance, a mime might wear a Biomuse band to trigger changes in light and sound while *Mandala* allows the performers to interact with preprogrammed graphics.

A video camera records the performers' images against a solid background, and those images are sent to a computer via *Mandala* where they're separated from the background and digitized. The images are then projected into the field

of graphics, allowing the performers to "interact" with, say, images of drums, beating them as though they were real.

To pull it all together, Brandt uses multiple MidiTaps controlled by *Virtual Studio* software. The MidiTaps use MediaLink, a multimedia LAN protocol that provides a new way of transmitting digital information, like MIDI, over a high-speed, high-bandwidth, bidirectional network. Each MidiTap, an interface between MIDI and MediaLink, acknowledges that it has received a message and translates the MIDI information for the electronic instrument.

Brandt's show will also be an experiment in audience interaction. You might see yourself on the screen interacting with performers in a story line. Or you could interrupt an infrared beam, triggering an audible response, or you might interact with the show from your wired seat with your own Biomuse device. Brandt hopes audiences will be able to experience and interact with her show in one to two years.

Super Conductor

While the Biomuse interprets a muscle flinch that can help the physically disabled create music or allow an audience to interact with a show's performers, the Radio Baton, developed by Max Mathews of Stanford University, monitors arm gestures, which it uses to conduct

music electronically. As he waves a Radio Baton, it sends radio signals to a flat surface below him that senses the location of his hand in space. Once the computer receives the messages, it sends them to a synthesizer called Sound Canvas, or SC-55, "telling" it how he wants the melody to sound.

Cellist Ami Radunskaya, who worked with Mathews at Stanford and is now at Rice University, has written four compositions for the Radio Baton. With her right hand controlling the tempo and her left hand influencing the expressive qualities of the music, Radunskaya can perform her music with all the drama and passion of a symphony conductor. But instead of a live orchestra, her music is preprogrammed using Mathews's *Conductor* program.

"I like the generality and freedom of it—the theatrical action and expressive capability," she says. Faculty and students at ten colleges, including Radunskaya's Rice, are experimenting and composing music with Radio Batons.

Electronic Session Man

As musical conductors, they're one thing, but computers traditionally haven't been the best accompanists. However, researchers like Roger Dannenberg, senior research computer scientist at Carnegie-Mellon University, are developing software that lets the com-

THE FUTURE OF MUSIC—IMAGINE IT

We're only beginning to discover what dynamic reverberations occur when music and computers converge. Acoustic instruments will still have their place in the future, but what will computers bring to your listening pleasure?

Roger Dannenberg, who has created a computer-accompaniment program (not yet available on the market), sees interactive software in music's future. Programs will be able to respond differently to different musicians.

Although a piece will still have a recognizable melody, it won't be the same each time it's played. Instead of repeatedly banging the notes of "Chopsticks," your children's children will play the tune in different ways.

Tunes won't be the same if light and color are added. Imagine flashes of green, blue, and teal, and then an explosion of color, all radiating to the beat of "Chopsticks," monopolizing your entire field of vision. Walt Disney fiddled with such a concept in *Fantasia*, but future musicians will play the video images as if they were playing the piano. Images will respond to music, and music will respond to images.

While you're surrounded by color and light, you'll also be surrounded by sound. Tod Machover of MIT's Media Lab says the concert hall of the future will feature hundreds of loudspeakers in the walls, floor,

and ceiling. You'll listen to 15 or 20 musicians playing instruments that are partially acoustic and partially electronic. They'll make a united sound, but their distinctive parts will be heard all around you—like a holographic image, only the sound will occupy physical space.

Machover also envisions sound galleries in which several miniconcerts take place simultaneously. You'll move from one to the other just as you would from picture to picture in an art museum. The only music you'll hear, though, will be the concert you choose for the moment.

As in Mozart's time, even opera won't remain unchanged, and it could be very different from the black-tie affair you now know. Somewhere in Machover's notes is a "brain opera" where you'll be able to see how your mind understands music.

Riding through the opera as if you were on a roller coaster, you'll be able to hear and see the pieces of music come together as your brain processes them. You'll experience how sound becomes a note, a melody, a rhythm—and how composers play with these elements to create music. Then you'll hear how they're all put together to compose the opera's score.

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puter play second fiddle. You can either improvise or play exactly what's on your sheet music instead of trying to play along with tape-recorded electronic music. The computer listens and synchronizes itself with your playing, regardless of your artistic whims. "It is a more live experience if *everything* is live," Dannenberg says.

The computer uses pattern-matching algorithms to compare your performance to its own, considering all possible matches of pitch. It listens to you through a device that converts instrumental output from pitch to MIDI and applies strategies to maintain synchrony. It can anticipate what you'll do next and then send commands to the synthesizer to play any chosen instrumental sound.

Dannenberg is enhancing the program so it can handle more arbitrary musical patterns and stay synchronized with each member of an ensemble. He hopes to market his program soon.

Hypermelodies

One man who knows what it's like to perform with computers is Tod Machover, associate professor of music and media at MIT. Machover brought his hyperinstruments to the studio with the recording *Flora* and even to the Paris stage with the opera *VALIS*. You may have seen him with a conducting

PRODUCT INFORMATION

For more information about the products mentioned in this article and other essentials for the computer-inclined musician, contact the companies listed below.

<p>Mandala \$495.00 Vivid Group 317 Adelaide St. W, Ste. 302 Toronto, ON Canada M5V 1P9 (416) 340-9290</p> <p>MidiTap System \$1,595.00 Lone Wolf 1509 Aviation Blvd. Redondo Beach, CA 90278 (213) 379-2036</p> <p>Dexterous HandMaster \$15,000.00 for one full hand, accompanying computer boards, and software EXOS 8 Blanchard Rd. Burlington, MA 01803 (617) 229-2075</p>	<p>SampleCell Soundboard \$1,995.00 without RAM \$2,995.00 with 8MB RAM Audio Media Soundboard \$995.00 Digidesign 1360 Willow Rd., Ste. 101 Menlo Park, CA 94025 (415) 688-0600</p> <p>MIDI Interfaces and Software \$39.95-\$995.00 Opcode Systems 3641 Haven Dr., Ste. A Menlo Park, CA 94025 (415) 321-8977</p> <p>Sound Canvas \$795.00 Roland 7200 Dominion Cir. Los Angeles, CA 90040 (213) 685-5141</p>
--	---

glove—a mess of wires called Dexterous HandMaster that looks more like a prop for *Terminator 2*.

Hyperinstruments enhance your performance by adding "color" to your music. The computer listens to MIDI and

other information from your traditional instrument or conducting glove and decides what to do with the sound. It takes the information to a synthesizer to add more notes, for example, or to make the rhythm very precise. The louder you play, the more a hyperinstrument will add. You might be playing one yourself before too long. Machover expects hyperinstruments to hit the market within two years.

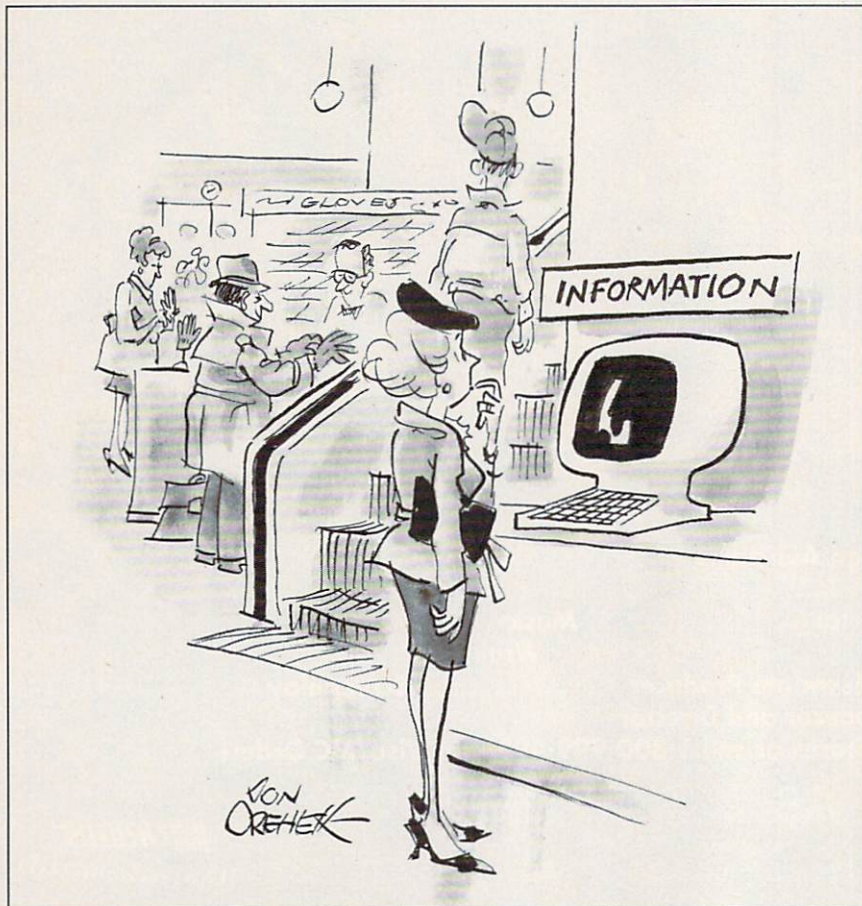
Music Above All

One concern about computer-generated music has been that less skillful artists might use it as a crutch. But the idea behind hyperinstruments is to put the musician in control, not to make up for shortcomings. "Computers should take what you do very well and make that special," Machover says.

Others say that while a computer's precision helps musicians manage complex rhythms, creating music still requires an ear and imagination. "[Computers] are good for a person who doesn't have years and years of practice and technique, but who still wants to enjoy playing," Radunskaya says.

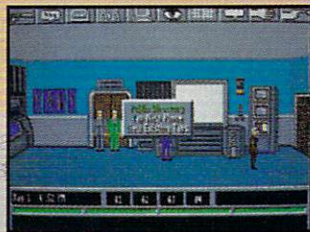
Playing a duet with a computer or conducting with a robotic glove may seem just as alien to us as the electric guitar did to our parents 40 years ago. But with the strides computer music is making, future generations may not be able to imagine a concert without seeing the sweep of Radio Batons, without interacting with the performers, and without expressing themselves with a Biomuse.

Indeed, the ear *and* the instrument change with the generations. □



ATTEMPT TO DEFUSE A HIGHLY CHARGED PLOT OF MURDER, CORRUPTION AND INTRIGUE.

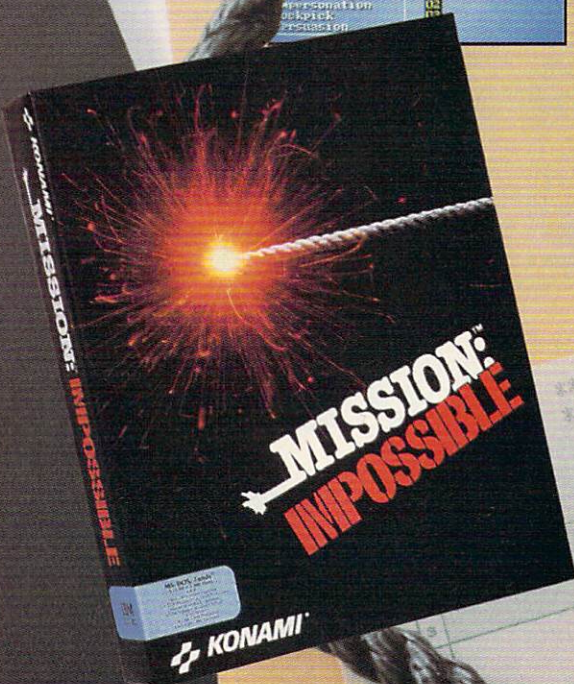
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64/128 VIEW

A new column that looks at Commodore activities around the world makes its debut in this issue.

Tom Netsel

Anyone who owns a 64 or 128 knows that he or she is *not* a member of an exclusive club. There are millions of the 8-biters around the globe, and if all their owners got together, they'd make one huge user group.

In fact, Commodore owners have a lot in common, no matter where they live. Teachers in Canada, Texas, and Israel use their machines to help educate youngsters. Game players in Alaska and India entertain themselves for hours with shoot-'em-ups and role-playing games. Programmers in Pakistan and New Zealand crank out code in BASIC and machine language. And everyone bemoans the fact that new releases for the 64 are as scarce as Sahara snowballs.

In an effort to bring 64 and 128 users even closer together, to share ideas and information, I am planning a new column for Gazette called "World View." It will be written by 64/128 users in different countries who'll discuss Commodore topics of interest in his or her country. Topics may include software, hardware, computer shows, user group activities, BBSs, or anything else that may interest 64 users.

We kick off "World View" in this issue with a look at Commodore activities in England as described by Steve Jarrat. Steve is the editor of *Commodore Format*, the United Kingdom's most popular Commodore 64-specific magazine. Steve touches on a variety of topics, including the ill-fated 64 Game System, the popularity of tape as a storage medium, and

something called game cheats. I hope you'll enjoy his comments about 64 and 128 happenings in the UK.

I'd like to hear from Commodore owners in other countries around the world. So if you'd care to submit a 1000-word article on disk, we'll pay for the ones we publish.

The holiday demand has caused increased production of 64s and 1541s, and Commodore reports that sales have been particularly lively in central Europe. Companies that have needed a computer but couldn't afford one or didn't have access to one until just a short time ago are now buying 64s.

Now that the Eastern nations are swapping the Iron Curtain for Blue Light Specials, low-priced computers such as the 64 and 128 could become hot items. I hope 64 owners in those countries will tell us how things are changing. Are spreadsheets becoming best-sellers, or is *Tetris* still the favorite software buy?

Those of you who own 128s should find the programs in this month's issue to be of special interest. Bruce Bowden has written a handy screen dump and a program that helps machine language programmers configure their 128's memory banking. On *Gazette Disk*, *Trig 128* from James Moore is a bonus program that will help trigonometry students with their math homework.

Another disk bonus is Don Radler's collection of traditional Christmas songs and carols. Don used a music program that we published some years ago to transcribe a number of tunes for your enjoyment. □

GAZETTE

64/128 VIEW

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Check out our new column from the United Kingdom and several 128 programs. By Tom Netsel.

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Questions, answers, and comments.

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It's in the Mail

Do you people read your mail up there? For eight years we've been sending you a copy of our monthly newsletter, *Syntax*, and you didn't mention us in your listing of user groups. Would you care to offer a good explanation for such an oversight?

WILLIAM O. NELSON
EL-SHIFT-OH USER GROUP
P.O. BOX 36148
MELBOURNE, FL 32936-1348

Last spring our user group coordinator sent letters to every user group in our files. We mailed hundreds of letters to groups in 50 states and dozens of countries, asking officers to verify addresses and BBS telephone numbers. We carefully explained that if the letter were not returned, we would assume that group was no longer in operation. For the convenience of U.S. groups, we even provided a stamped envelope for the letter's return. As letters came in, we checked them off our list, deleting the ones that did not respond. Your letter was not returned, so we assumed your group had disbanded.

Now, for any other group that was also omitted, here's a chance to make the updated list that we will publish soon. Send your club name, address, and any BBS telephone number to Commodore 64/128 User Group Update, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. Don't rely on your newsletter; send a note.

User Group Association

The North American Commodore User Group Association, which was mentioned in the September issue, is an organization of Commodore 64/128 user groups across the U.S., Canada, and the world. We currently have 73 member groups, representing more

than 5200 individual members. Our goal is to help user groups help users.

NACUGA was formed at the World Of Commodore in Toronto in December 1990. We have grown so fast that we now have two separate offices, one serving Canada and the other serving U.S. groups. The Canadian address is Dave Quinn, NACUGA, Box 2984, Station A, Moncton, New Brunswick E1C 8T8, Canada.

JOSH JACOBY
NACUGA
98-151 PALI MOMI ST. #110-189
AIEA, HI 96701-4332

Unscrambled Words

I once owned a TI-99 computer and had a program that unscrambled words. Unfortunately, I can't remember the name of the program, but my description speaks for itself.

I now own a 128D and was wondering if there is a program of this type for it.
GEORGE H. QUENNEVILLE
VICTORVILLE, CA

I trust you mean a program that will unscramble an anagram, which is a word that is formed by transposing the letters of another word. Enter the following program and see if it does what you want.

When you run the program, it'll ask for a word to unscramble. The program works best with words that are fewer than nine letters in length. The program counts the letters, sets up an array, and prints all the possible combinations of those letters.

The program is not too sophisticated; it merely prints combinations of every letter that you enter, even if that letter has already been used. As a result, a four-letter word will have 24 combinations printed on the screen. A five-letter word will have 120, and a six-letter word will have more than 700 onscreen words. To

make it a little easier for you to find the word you want, the program prints only 80 words at a time until it has exhausted all possibilities.

Oh, yes, if you do check a nine-letter word, you may want to have a sandwich nearby. If the program takes seven seconds to fill a screen with 80 combinations, you'll be at the keyboard for more than eight hours, watching 362,880 combinations print out. Allow for a few extra minutes if you actually read the words that are printed.

```
DF 10 PRINT "{CLR}{WHT}"
CR 20 CLR:INPUT"WORD TO
      {SPACE}UNSCRAMBLE"
      ;SS=N-LEN(SS):DIMC
      (N-1)
GS 30 I=N-1:F=F+1:PRINTS
      $,:IFF=80THENGOSUB
      100
DG 40 SS=LEFT$(SS,I-1)+R
      IGHTS(SS,N-I)+MID$
      (SS,I,1)
GX 50 C(I)=C(I)+1:IFC(I)
      <=N-I GOTO30
AD 60 C(I)=0:IFI>1THENI=
      I-1:GOTO40
KF 100 PRINT:PRINT"HIT
      {SPACE}ANY KEY WH
      EN READY"
MP 110 GETAS:IFAS=""THEN
      110
EC 120 IF F<80THEN END
JH 130 F=0:RETURN
```

128 Software Wanted

I've taken a little survey of my own, and I'm not happy with the results. In 11 issues of Gazette you'd published 44 programs for the 64, four for the 128, and four for both. That is not balanced programming. Come on, readers, submit more 128 programs. I plan to submit mine, myself.

ROGER W. MILLER
PEORIA, IL

Thanks for calling attention to the need, Roger. We encourage 128 submissions and pay for the ones we publish. I'm sure many programmers have good 128 and 64 programs that are just gathering dust. Remember, we can't

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answers
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listings,
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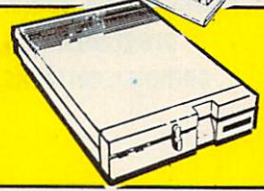
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buy it if you don't submit it.

By the way, we have published a few other 128 programs: Measurement 128 (February 1991), BX BASIC (March 1991), Typing Tutor (April 1991), and Super Cataloger 128 (September 1991). Since these programs were too large to offer as type-ins, we included them as bonus programs on Gazette Disk. The subscription price for the disk and magazine is \$49.95 for 12 issues. Call (800) 727-6937 to order.

Frugal Plus/4

All the Plus/4s and older machines we use here in rural Alaska don't make us backwards, just frugal. In the days before laptops, the Plus/4 was the easiest to convert to 12-V DC operation for use in the bush. The situation is a bit different if you live in one of our fine cities, but rural kids have been happily blasting aliens for years with their 64s and 128s plugged into generators.

My winter hobby is rewriting 64 programs for the Plus/4. Somewhere along the way, cabin fever must have cleared up, but I was left with 1200 programs and files for the Plus/4. Does anyone still use a Plus/4? I'd be pleased to get some fresh input and share some programs for this orphaned machine.

JAMES HEHL
P.O. BOX 877466
WASILLA, AK 99687

Multiplan Wanted

I am using my 64 system in my business. Over the past several years, I have generated hundreds of data disks from various spreadsheets and other programs, but now I'd like additional software. I'd like to purchase a copy of *Multiplan*. Could you help me find a copy of this program?

TED DACE
OLATHE, KS

Try Software Support International, 2700 NE Anderson Road, Suite A-10, Vancouver, Washington 98661, (800) 356-1179. They have a used copy for \$14.95.

Skip the Folds

I'm sure you've answered this question many times, but how can I print a long program listing that skips over the folds in my computer paper?

HELEN UNSER
ORLANDO, FL

Walter Johnson, from DeKalb, Texas, included just such a tip in a recent letter. "Here's a trick I discovered in making program listings skip over the folds in the paper instead of continuously printing. It makes the program listing look nicer, and it's easier to read when there are no lines printed over the perforations." Load your program, but don't run it. Then enter the following lines in immediate mode.

```
OPEN 4,4:PRINT#4,CHR$(147):  
CMD4:LIST  
PRINT#4,CHR$(19):CLOSE4
```

BAM Aid to the Rescue

I recently had a problem when my 1581 disk drive crashed, causing me to lose a number of newly created *SpeedScript* files. The *BAM Aid* recovery program you included as a bonus on the January 1991 *Gazette Disk* proved invaluable in recovering the files. Thanks.

MARK REIDEL
LOMBARD, IL

We're glad the bonus program helped. For readers not familiar with *Gazette Disk*, it is the companion disk for each month's magazine. It contains all the programs that are featured in that month's issue, plus a bonus program or two. Often these bonuses are too large to offer as type-in programs in the magazine.

Which 64 Version?

I've spent hours searching my software for a routine that reports which version of the 64 is present and another that's capable of distinguishing between Commodore computers. Can you help?

FRANK WHITTAKER
AKRON, OH

A popular way is enter *PRINT PEEK65534*. This returns a value of 72 on a 64 (or a 128 running in 64 mode), a value of 23 on a 128 in 128 mode, a value of 114 on a VIC 20, and a value of 255 on a Plus/4 or Commodore 16.

Early models of the 64 produced different colors when the screen was poked directly. Early 64s produced a white character; revised models produced characters whose color was the same as the screen background, making them invisible. Most 64s produce characters that have the current character color.

You can test this by clearing the screen on your 64, moving the cursor down a few lines, and typing *POKE 1024,1*. Original model machines will print a white letter A in the upper left corner of the screen. Revised models will show nothing, but you'll see an interesting effect if you press the Home key. Most machines will print a letter A in the current printing color, normally a light blue.

Programs usually work around this variance by poking the color nibbles, but a program could check with a peek of address 59916. Original models will show a value of 1; revised models, 218; and current models, 145.

Send questions and comments to *Gazette Feedback*, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. □

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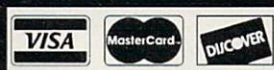
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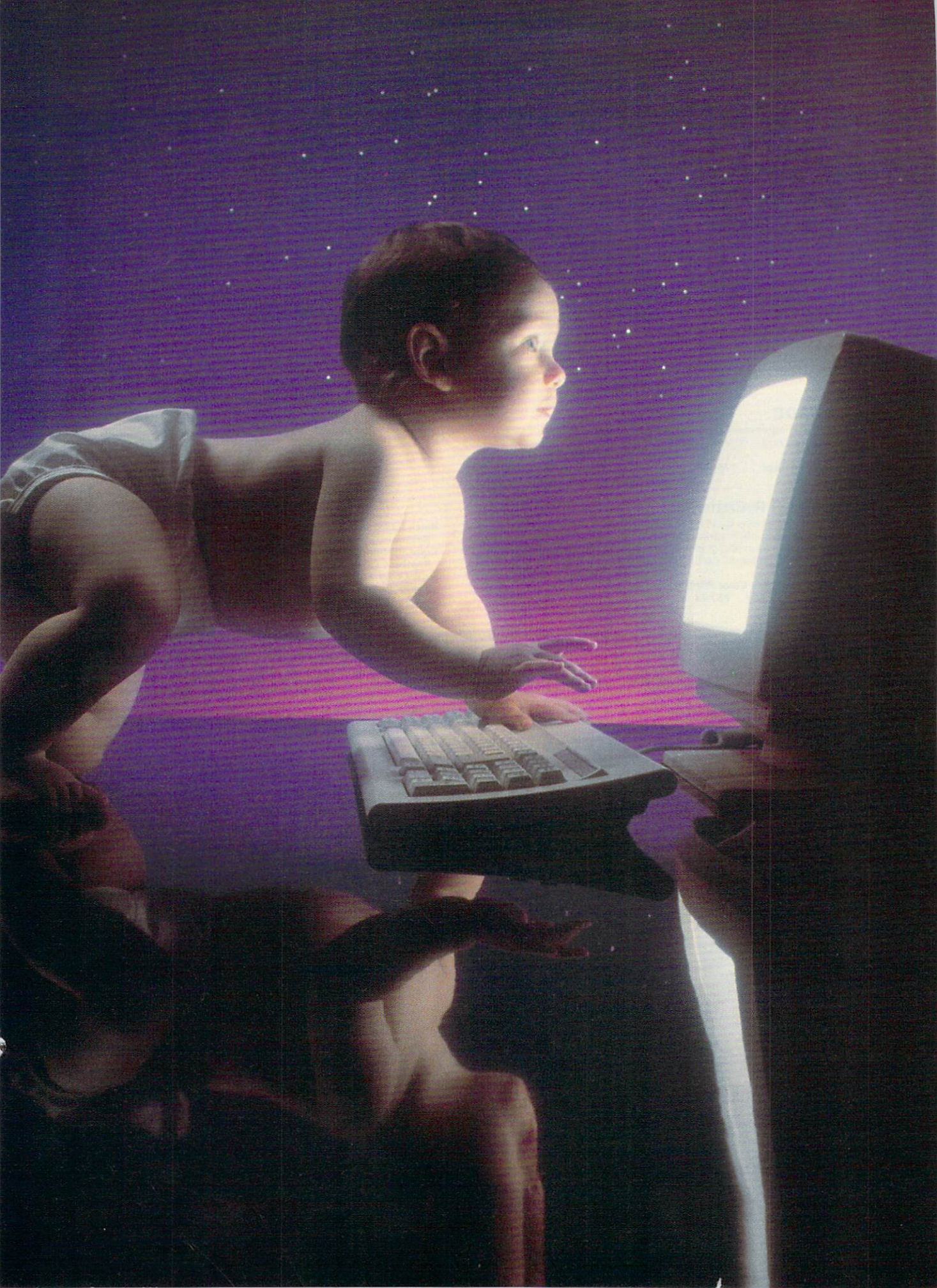
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WAYS PARENTS CAN STEER CHILDREN
FROM PLAYING NINTENDO GAMES
TOWARD DEVELOPING COMPUTER SKILLS

TOWARD COMPUTER LITERACY

So, you've decided, your youngster is a computer imbecile. The kid is interested only in manhandling a small joystick and showing images of the Super Mario Brothers around a TV screen, while his Nintendo makes the same disgusting five-tone sound after every move.

You rationalize and tell yourself that this activity is great for developing eye-hand coordination. It must be because the kid can beat you at every activity except taking out the garbage. Deep down, however, this mindless activity irritates you because you know that the kid is missing out on something. The child isn't learning.

If you have a child who spends hours with a Nintendo and if you're like me, you wonder how you can get your kid to spend more time with a computer. How can you encourage your child to become computer-literate? Aren't the schools supposed to do that? The answer, of course, is Yes. Schools do

teach classes in computer literacy, but you can help your child learn these skills—even if he or she is a teenager. Here's how.

Rely on Schools . . . Part of the Time

First, we might ask, what is computer literacy? Is it programming? Should my kid be able to write simple programs? Well, yes, computer literacy may include some programming skills, and most schools offer classes in programming these days, but there is more to literacy than programming.

My own children, introduced to computers in elementary school, learned some interesting things with little turtles and the Logo system. Making that onscreen turtle do what the child wants teaches young people some very basic programming concepts.

Even though my children forgot all about Logo in later years, the elementary course got them used to computers in general. They are not afraid

of the machine—unlike some adults—and they'll tackle any task that interests them. They know that clicking the wrong mouse button or pressing the wrong key on the keyboard won't break the computer.

In the eighth grade, my children took another literacy class. That course taught them to turn on the computer, insert a disk, and format a disk. It also taught them to write simple programs that produced some interesting graphic images. They learned to print these images on a standard dot-matrix printer. Now that was programming!

The problem was that they lost interest in computers the minute the class was over. No transfer or carryover transpired. Boredom seemed to be the main culprit. I'd taught my children these basic computer literacy skills at home, so the material they covered at school during that semester seemed old hat and a waste of time.

For my 13-year-old son, games won out. Computers meant games, and then

BY DOROTHY HEMME

games meant Nintendo. Anything else was irrelevant.

Find Their Interests

So how did I regenerate my kids' interest in computer learning, and how can you? First, cater to their interests. That means games. For years, my son used our Commodore for games. He learned enough to load a disk, call up a directory, and load a specific program in order to play the game. Also, fast load cartridges have their own specific procedures that he had to learn.

Some very intricate games on the 64, like *Airborne Ranger*, require him to format a data disk. This allows him to save his game at a certain place so he won't have to start over from the beginning each time he boots it up. In addition, he learns valuable note-taking

our test went to me.

Next, we compared features. Nintendo has a joystick and fire button. The 64 has those items plus a full keyboard and eight function keys that can be programmed with different features. This, he admitted, increased the wonderful complexity of the 64 games.

Finally, I asked him to quit his Nintendo game and go unload the dishwasher. He couldn't or wouldn't (I'm not sure which) because he would lose his game unless he finished. On the 64, several of his games have an option that lets him save a game to disk.

Cater to Their Needs

My high school daughter, on the other hand, cares nothing for games or the computer. In school she discovered that she had to write numerous essays,

activities encompass many computer literacy skills needed in today's society. More than programming, people today need to know how to use the machine and the various types of software. And I had her interested.

Let the Kids Talk

The greatest boon to computer literacy in our family came through a \$99 modem. QuantumLink garnered the interest of both kids when they discovered People Connection. People Connection lets them talk with dozens of other teens across the country. The conversations are live and cover a variety of subjects. To them it's sort of like the Citizens Band radio craze of a few years ago. The kids like to gab with anyone.

In the interest of saving money, I limit the time that they may chat on Q-Link. They have fun online, but at the same time they had to learn the simple computer and modem hookups and the necessary software commands in order to use the QuantumLink telecommunications service.

All of this learning, which was just a game to them, displayed what I consider to be some sneaky teaching on my part as a parent. I used their interests and sense of fun to help them become computer-literate. They learned about baud rates, downloading files and programs and saving them to disk, and printing sequential files when they wanted hardcopies of their electronic mail or a file from Q-Link's encyclopedia. They became experts using programs such as *Omega-Q*, *Lynx*, *Library*, and *Squeeze-Unsqueeze*.

More Than Literacy

Later, I downloaded terminal programs and files from Q-Link that listed BBS numbers for our area code. That clinched it. My son started evaluating all the terminal programs I had downloaded until he found just the one he liked. He had to learn about XMODEM and Punter protocols and about echoing and duplexes. He quickly found out how much the buffer would hold. He and his best friend called each other constantly to talk on the computer instead of the telephone. As a result, my son quickly learned keyboard skills. He downloaded dozens of files from local BBSs and user groups. Eventually, when the need arose and he wanted to conserve disk space, he queried me about how to scratch files he no longer wanted. He also learned the pitfalls of constantly scratching and saving without validating.

Finally, my son learned to play computer games via modem with a human being on the other end of the telephone line trying to "kill" him. He had

TEACHING THE TEACHERS

Wenden Elementary School in Wenden, Arizona, has four Commodore 64 computers. I have taught kindergarten through eighth grade for seven years with these same 64s. They are used and abused by a variety of students from 8 a.m. until 3 p.m. each school day. If there is any better computer for a school, I have yet to find it.

Convincing other teachers how great the 64 is, however, has proven to be difficult. Two of my friends purchased Apple computers this year, after I spent hours with them demonstrating the virtues of the 64. Obviously, advertising has a tremendous effect even on intelligent people.

Last year, through a supermarket's Apple for Computers program, we managed to save enough receipts for an Apple IIc+ and software. The graphics on the Apple are terrible; the educational programs boring and twice as expensive as most 64 programs. I am really frustrated that Commodore didn't advertise the 64 and get it into

schools. Schools don't need the expense of an Apple or IBM, and children don't benefit from extra memory or other expensive features.

I'd like Gazette to show me how other schools use their 64s in labs. I'd like to know that other teachers appreciate the variety of educational programs for the 64 that I do. I'd like to hear from others who use GEOS. It's such a fantastic program that my students always ask for it when I give them a choice of software. Students in the lower grades would spend all day with Microgram's *Big Math Attack* if I'd let them. They even choose it on game day, when they can have their choice of any software we have.

Well, I just wanted this chance to vent my feelings. I just get so irritated when people think the Apple is so great for classroom work. I'm one who knows better.

JEANNE YUELL
P.O. BOX 338
WENDEN, AZ 85357

skills when he has to write down codes, instructions, and keyboard functions and commands—this in spite of keyboard overlays. Since he loves playing games, I used that to my advantage, and he learns some important computer skills while having fun.

My son loves Nintendo, and he swears that its graphics are better than the 64's. So we did a comparison, sort of like the taste tests of the colas a few years back. I gave in on that one and admitted that perhaps he was right; the Nintendo graphics may be a little better. Since he won a point, that satisfied his adversarial urge, and he continued with the test.

Next, we compared sound. Aha! Nintendo has only a few preset tones, whereas the 64's three voices offer a wide variety of music, synthesized speech, and battle sounds. Round 2 of

and they had to be typed. The choice was clear. She could use either an old manual typewriter with erasable bond paper or the computer. When she discovered that typing errors could be corrected easily, her spelling could be checked, and her paper could look professionally printed, the computer won this contest hands down.

Even though my daughter hadn't yet taken typing in high school, she was pretty good with two fingers. All of a sudden, she became interested in a computerized typing tutor and learning keyboard skills.

With a word processing program, she learned how to call up a directory, set margins, and other skills of writing and composition.

Then, of course, she had to revise, edit, check the spelling, save her work for later drafts, and print it out. Those

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to think quickly, matching wits with a human opponent rather than a computer.

He developed time management skills: when to do his homework and household chores. He then made specific appointments he had to keep; the next game was at 8:00 p.m. As a side effect, he had to be nice to the rest of his family, since he tied up the phone and we couldn't use it while he was on the modem. He also had to accept that he had time limits for playing games and using the computer. Thus, efficiency screamed out as the watchword of this teen's day.

The Last Word

Are my children computer-literate? I think so. At least by my definition. In good time, they'll take the last high school course in computer literacy that's required by the state of Texas to get their diplomas. They may or may not turn into computer programmers or technicians, but they'll have most of the essential skills that Americans of their generation are going to need. They have the ability to work the machine and, better yet, to make the computer work for them.

Dorothy Hemme teaches English at a high school in Sugar Land, Texas. □

Gazette is looking for utilities, games, applications, educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it on disk to

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ONLY ON DISK

In addition to the type-in programs found in each issue of the magazine, *Gazette Disk* offers bonus programs and original 64 and 128 artwork. Here are this month's bonuses.

The Raven

Daniel Lightner
Sidney, MT

Enter this machine language adventure game, and you'll find yourself in a three-dimensional maze that's filled with valuable treasure. The object is to locate the treasure and return it to a special storage area. The only obstacles are the puzzles that you'll have to solve and a number of deadly creatures blocking your path.

You are not alone, though. A friendly Hobbit named Harvey will help you find your way through the maze.

Trig 128

James Moore
Cleveland, OK

Use this handy 128 program to help you solve any triangle, not just right triangles. The program calculates sides to four decimal places and angles to the nearest second. The program will also help you determine the area of a triangle if you know an angle and the length of its two sides or if you know the length of three sides.

This program can be a real help to trigonometry students—but that's not all. *Trig 128* can also be used to find the distance between any two Cartesian coordinates.

Christmas Tunes

Don Radler
Cape Coral, FL

Enjoy these traditional Christmas songs and carols that have been collected by Don Radler. They can be played on the enclosed music program.

Gazette Gallery

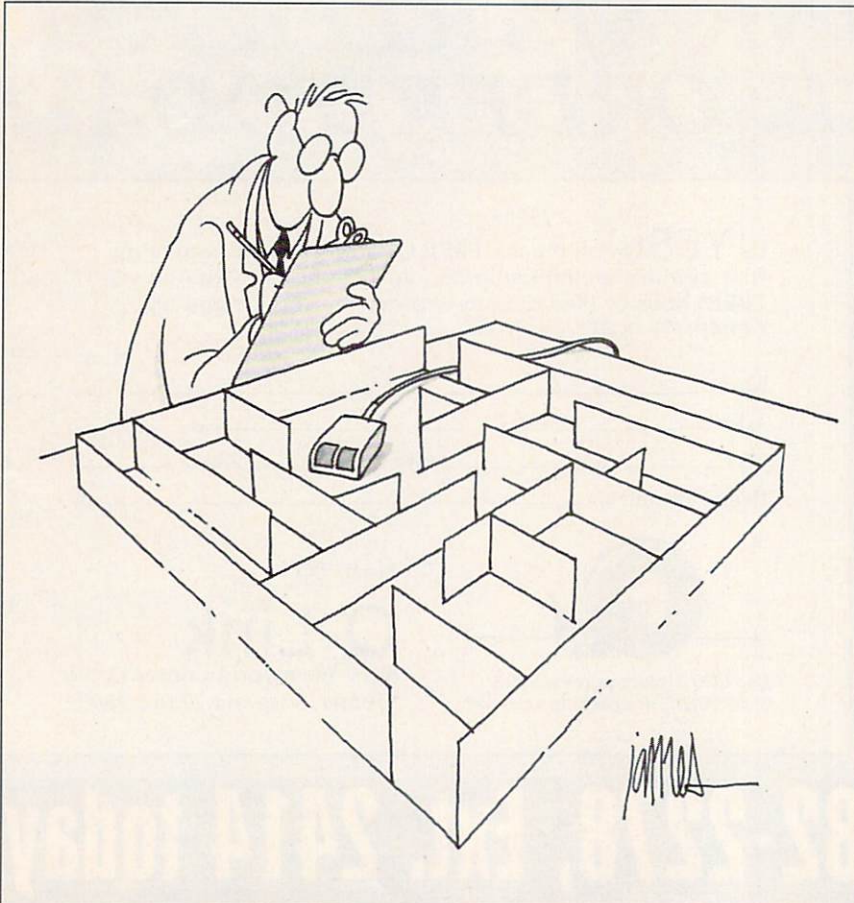
Picture of the Month
"Rage"

By Jeff Boyle
Bethlehem, PA

"'Twas the Night"

"Santa's Best"

By Robert Woodall
Rural Hall, NC



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REVIEWS

DUCKTALES: THE QUEST FOR GOLD

Do you have what it takes to lead a band of explorers around the world searching for treasure? As Scrooge McDuck you have 30 days to earn more money than your old nemesis Flintheart Glomgold. In your search for riches you can explore any combination of caves, jungles, mountains, or forests.

Each area offers a different type of adventure and chance for wealth. You can earn extra money by photographing rare animals or barnstorming in your plane. In all, *DuckTales: The Quest for Gold* offers a wide range of possible strategies, and the game works on many interesting levels. Disney has packed several entertaining games into one story line.

The game opens in Scrooge's office where you choose from three main game activities: diving for rare coins, investing in the stock market, or exploring regions of the globe. You have no cash reserves when the game begins. Diving for coins is the simplest activity, but the one least likely to yield success. You simply enter Scrooge's vault and dive into the pile of coins, hoping to retrieve one worth \$1,000. You'll succeed often enough to make this a good first-day activity, but it's not worth staying more than a day there.

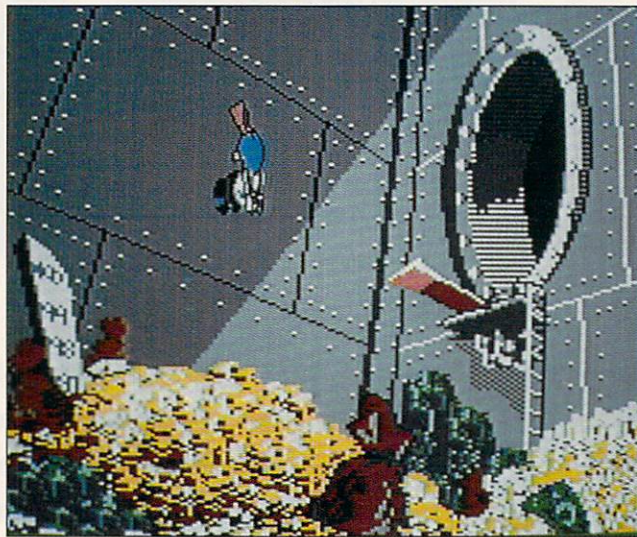
Once you have earned some money, you may choose to make it grow by investing in the stock market. The market consists of approximately 30 stocks, with prices ranging from less than \$10 to well over \$100.

As you scan the list, you'll receive more detailed information about each company and one of five chart letters.

In the documentation are five different charts which can be used to predict changes in the value of each stock. Knowing the chart letter for a stock will help you decide when to buy and sell.

Although the charts are all different, a good general strategy is to buy around the 5th

there, and the number of days required to get there. Most locations take two days of travel time and one day to explore. Once you choose a destination, you must fly your airplane there. Flying is an adventure in itself. The only controls you have are loops up, loops



Dive in Scrooge's vault and you might come up with a coin worth \$1,000, but other activities can earn you more.

or 10th day and sell on the 20th day. You may also try to hold a stock until the 30th day, when all stocks reach their top value, but this can be dangerous. Random events occur almost daily, dramatically affecting the value of individual stocks. So, if you invest, check your stock's progress frequently.

Of course, you cannot invest until you have earned some money. That means you'll have to go exploring. Scrooge's office is equipped with an electronic atlas which you use to plan your trips. The map is accurately drawn and contains approximately 30 places to explore, such as Yellerstone Park and the Whatsamatterhorn.

You can read about each location, the treasure hidden

down, and acceleration. You cannot easily make the plane fly straight.

Balloons above, mountains and power lines below, occasional falling pianos, and even clouds will impede your aerial progress. Your plane, being made of rubber, can bounce, but not often. If you can't make it all the way to the hangar and you crash, you'll still reach your destination, but you'll lose one day and a substantial part of any money you may be carrying. It is wise, therefore, to go regularly to the Scales of Macaroon to deposit your money. If you get really good at flying, you may want to try barnstorming for extra money, but the \$50 bonus it pays hardly makes it worth the effort.

The treasure locations are divided into four types. The easiest is big game hunting—with a camera. You wait at the edge of a forest to take pictures of rare animals as they peek from behind rocks, trees, or bushes. Your only limits are the clock and your roll of 12 pictures.

Each picture of an ordinary animal is worth \$50, and each unique one \$500. My three-year-old son liked this part of the program best. He loved hunting pink elephants and spotted zebras. My favorites were dolly llamas and sausage lynx.

Cave exploring has a much faster pace than photography. You are in a maze of tunnels with each screen representing a crossroad. A map of the cave is provided. The map's completeness depends on the difficulty level you chose at the beginning of the game. It is a good idea to press the P key to pause the program in order to study the map before you begin.

Once you start, avoid the green slime areas, which lead to pits, and move quickly to stay ahead of an Egyptian mummy that is pursuing you. The value of the treasure can be large, and you can pick up extra bags of cash along the way.

The other two adventures are similar to joystick-driven arcade games. In one you make your way across a swamp by climbing trees, riding on hippopotami, and swinging on vines. You must avoid an array of coconut-hurling monkeys, slithering snakes, and sinking turtles.

The other adventure takes place on a mountain where you jump on ledges and duck into caves. You must avoid goats, boulders, and other obstacles.

In each case you are allowed to send your three

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nephews on the adventure, and your party fails if all three nephews fall off the mountain. These adventures require thoughtful planning and careful execution, as well as a dexterous touch with a joystick.

DuckTales is a thoroughly enjoyable game with many features to recommend it. The graphics are outstanding, and the sound effects complement the action. The program is best run on a system with a color monitor and a joystick, but neither is required. If the program has a flaw, it is the time required to load each screen, but this is more the fault of the Commodore's limited speed than the program itself.

As an educator I appreci-

ate the way the stock price charts, the electronic atlas, and the mazes make learning and thinking fun. Having the option to choose from a variety of game formats makes the program suitable for a wide range of abilities and interest levels. This game will appeal to kids of all ages. Best of all, the program and excellent documentation are filled with Disney's whimsical sense of humor. *DuckTales* is a treasure.

JIM SMITH

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TEXT PRINT

If you use *geoWrite*, you know it's an excellent graphic word processor. However, even the best graphic fonts sometimes lack the quality to make them appropriate under all circumstances. Your printer probably has a near letter quality (NLQ) mode, but *geoWrite*'s ability to utilize the NLQ features is limited. It allows no pitch, font, or style choices whatsoever. These limitations make it necessary occasionally to use another word processor.

If you love the WYSIWYG environment as much as I do, you probably wish there was a way around these limitations so you could make *geoWrite* your only word proc-

essor. A talented programmer named Terry Van Camp has something called *Text Print* that may do just that.

Text Print V2.5 is a piece of shareware which can be downloaded from Quantum-Link or ordered from the address below. In the *Text Print* package you'll also get additional files: *Custom Print*, *Text Print* documents, Zero Fix, and three fonts to help maintain an accurate screen display.

The excellent documentation explains how to use the *Custom Print* program to create one or more customized versions of *Text Print* for any printer. Note that the *Text Print* file you want to customize must be ahead of all other such files on the desktop.

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You will be entering printer commands to be executed when an option is selected from the *geoWrite* Style menu. For average use, it's probably best if you stick to equivalent decimal printer commands, such as italic for italic, bold for bold. Look for these commands in your printer's manual.

Some printers use a 0 as one byte of their decimal command strings. Since *Custom Print* doesn't recognize 0 as a byte, the Zero Fix file may have to be used. However, I have found that substituting the number 128 for the 0 works just fine for me.

This program is easy to use. Just type a *geoWrite* document as you normally would, using any style changes you like. Then follow the manual's print-out instructions. Be sure to update the document just prior to printing. Updating isn't automatic as it is in a regular *geoWrite* printout.

Although the latest version has corrected earlier problems and added many excellent features, *Text Print* still isn't perfect. Here are two quirks.

Never attempt to format a paragraph indentation on the very first line of any page. Press Return to create at least one blank line at the top of a page and then put in the paragraph indentation.

Don't assign a style change to a word that extends to the last column in a line. That is, if the word were one character longer, it would wrap.

These are minor inconveniences that hardly outweigh *Text Print's* many outstanding features. For example, it accesses *geoWrite* documents from up to three drives and permits paging through all documents on each disk. Full justification, tabbing, and multiple document printouts are possible, in addition to supporting all style combinations allowed by your printer.

Since *Text Print* is a Desk Accessory, it isn't necessary to leave *geoWrite* to print a document. You should be impressed with its ease of use and flexibility. I know I am!

ROBERT NELLIST

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REVIEWS

DREAM TEAM: 3 ON 3 CHALLENGE

If it's too cold to go outside and shoot a few hoops with your buddies and there are no basketball games on television at the moment, then pump up your Nikes and head for your trusty 64. Players who want an exciting and quick basketball game have had their prayers answered with Data East's latest addition to its MVP Sports line, *Dream Team: 3 On 3 Challenge*.

Dream Team, a pure arcade game, offers one-on-one and two-on-two games in addition to the three-on-three mode in the title, practice modes, and demo games. There are 26 players in the game's roster, but only 3 of them are NBA players: Patrick Ewing, Dominique Wilkins, and Joe Dumars. The rest of the players on the roster possess the names of the designers and producers of *Dream Team*. The challenge of *Dream Team* is to take on these 3 stars with a team of your own.

Player selection is very liberal in *Dream Team*. You could put together two teams with the same players for an even match up. If you want to go even further than this, you can have one team with all three players the same. This flexibility allows physically impossible fantasy games as well as games of varying difficulty.

The game selection menu offers one-on-one, two-on-two, three-on-three, practice games for one or two players, and a demo game. After game selection, scroll through the players you want for the teams, select one of three courts, choose three-on-three or standard rules, pick winners or losers outs, and the game begins. You can return to the main menu at any time by pressing the Run/Stop key and responding at the prompt with Y to confirm.

Gameplay is very quick in *Dream Team: 3 On 3 Challenge*. Player control is easy to pick up, so you can keep up with the opposition after a game or two. Move the joystick to direct the currently selected player. Hold down the button to shoot the ball. Quickly press the button to pass the ball to another team member or switch players. Press the button under the basket to try to grab a rebound. In no time at all you'll be able

to take on the "dream team" of Dumars, Ewing, and Wilkins!

Dream Team games follow the rules of basketball, with violations resulting in change of possession except in the case of personal fouls. Three-on-three game rules result in quicker games than those played with a full team of five players, and it is often more difficult to win games under these conditions. There's just no breathing room. Three-on-three games differ from the standard game in a variety of interesting ways. There are no free throws, the clock doesn't stop, games are played to 25 points or 20 minutes, the shot clock and 3-seconds-in-the-key violations aren't in effect, and players abide by losers outs.

To make the game more interesting, the designers have included four rotation plays. You select a play before you pass the ball inbounds. Unfortunately, the manual doesn't describe or provide information about the plays. You have to figure them out on your own.

The players on the roster in *Dream Team* each have their own statistics. Rebounds and shot percentages really make a difference in a game. You'll notice this particularly when you shoot the ball. A lot of times, you may have let the ball go at the top of the player's jump, but the ball misses the basket. That's a result of the player's statistics. You'll learn very quickly that three guards might make an interesting team, but it's not a practical team if you want to score big. This touch of realism makes the game more difficult and frustrating. It is even more difficult to control the ball or steal it when the teams are under the basket in three-on-three games. You just can't see the ball because of the crowd of players. The designers should have remedied this situation. Other than these problems, you'll find that *Dream Team* is a capable game, full of challenge and basketball action.

Dream Team graphics are not the best. Although the animation of the characters is nice, colors for the players and the backgrounds are not very good. This leads to a problem with player identification under the basket in three-on-three games.

Although *Dream Team* looks somewhat drab, other features aid in game-

play. Messages pop up occasionally at the bottom of the screen to update the players, such as STEAL, CHARGING, and TAKE BALL OUT. Also, the shot clock and game clock are right in your face on the sides of the screen. Sound effects and music are nothing special.

Without bells and whistles, *Dream Team* manages to pull through with the gameplay and novel idea of the "dream team" of Dumars, Ewing, and Wilkins. The game is a lot of fun, and it's even better with two players because the computer sometimes runs right over you in one-player games.

Watch the computer demo first to get an idea of how to approach the game and

to learn the rotation plays for a further advantage. As one of the few software companies still supporting the 64, Data East occasionally manages to bring down a game from the high-end computers. Although other conversions have been cleaner, *Dream Team* is still worth the money. Despite the lack of pretty graphics and impressive sounds and music, *Dream Team: 3 On 3 Challenge* should keep basketball fans happy for hours.

RUSS CECCOLA

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WORLD VIEW

Steve Jarratt

VIEW FROM THE U.K.

Believe it or not, the 64 is still one of the best-selling computers in Europe. Tumbling prices, plus the fact that competing 8-bit machines—Sinclair Spectrum and Amstrad CPC—are pretty much on their last legs, mean that the 64 is the only really viable computer in the sub-100-pound (\$170) range. The next step is to an Amiga, which, at 400 pounds (\$680), is a hell of a jump. So, against all the odds, Commodore's ten-year-old machine refuses to breathe its last.

After four or five years of leaving the machine to wander in the 8-bit wilderness, Commodore finally recognized the possibilities of the beast and decided to do something with it. Great, we thought. Enter the 64 Games System (GS). Ah, not so great. Basically, they took the 64 circuit board minus its keyboard, twisted the cartridge port so that it sat on top, shoved it all into a gruesome beige case resembling a twenty-first century coffin, and—bingo—a game console!

The UK is, at the moment, in the grip of console mania. The Sega Master System and Mega Drive have taken off in a big way, while Nintendo's Entertainment System and Game Boy are starting to make waves (at last). Sega's Game Gear is now available, and people like me spend huge amounts of money on Super Famicoms (Super NES) imported directly from Japan. So, in a bid to take a share of this burgeoning market, Commodore unleashed its GS on the game world. Publishing houses across Britain started producing cartridges for the machine, and the 64 magazines all tried to make it sound

like a good really thing.

It bombed—horribly. Practically no one bought it, and within six months of its release last year, it could be found in high street retail stores slashed to around 20 quid (\$34). However, all was not lost.

As everyone knows, the majestic isle known as Britain resides on a small planet orbiting the Earth. That's why we get movies a year after you guys in the States and game machines ten years after the Japanese. It's also the reason why the majority of 64 owners load in games from tape. Yep, you heard me right: audio tape—on cassette. (You may laugh, but some tape-based fast load systems can actually get games into memory faster than Commodore's old 1541 disk drive.) As you can imagine, tapes are starting to look a little dated; they're wonderful for budget games (titles produced cheaply and quickly for sale around the 3-pound [\$5] mark), but pretty awful for big, multiloop titles.

The legacy of the 64GS is that occasionally we get games for it on cartridge. This means instant loading, loads of memory, and wonderful reliability. The best of the bunch so far have been *Robocop 2*, *Pang*, *Plotting*, and *Navy Seals* from Ocean, plus *Myth* and *The Last Ninja 3* from System 3. These cartridges (at around 20 pounds or \$34) are more expensive than normal 64 games on tape or disk, but if you're after some decent titles, you could do worse than plugging these into your machine. They may or may not find their way into the U.S.

I hear that game cheats in the U.S. are almost unheard of, which really surprises me. A major part of our 64 mags are given over to POKES which enable players to alter the game code itself, providing infinite lives, infinite time,

no collision detection, or whatever's needed to make the game completable (or in some cases, playable). You simply poke a number into a specific memory location, replacing the original variable with one of your own. In most cases it gets rid of a paltry three lives in favor of, well, lots and lots.

You can either install the new variable before the game loads or break into the game while it's running. The former involves a listing which is typed in and loaded beforehand that interferes with the game loader. The latter resorts to cold starting the 64. The simplest way to do this involves the employment of a special tool called a metallic stationery binding system—or paper clip, as it's known over here.

To hot wire a 64 you have to contact the two pins labeled A and C on the cartridge expansion slot (as you look at it, they're on the bottom row, first on the right and the next but one along). The 64 will reset to the blue boot-up screen. If you have a 128, hold the Commodore key down so you can enter said POKE.

For instance, if you have that old *Brøderbund* title, *Stealth*, reset the machine, type POKE 30590,173, press Return, then type SYS 53055. You'll now have an infinite supply of *Stealth* craft at your disposal. (NOTE: Brave 64 owners who dare to try this at home do so at their own risk. Don't blame us if you hit the wrong pin and blow a fuse!)

Steve Jarratt is the editor of Commodore Format, the best-selling 64-specific magazine in the U.K. (and probably all of Europe). He can be reached in care of his magazine at Future Publishing, 30 Monmouth Street, Bath, Avon BA1 2BW, England. □

**After ten years,
the 64 is
still one of the
best-selling
8-bit computers in
Europe**

MACHINE LANGUAGE

Jim Butterfield

PROGRAMS, CONSTANTS, VARIABLES

Programs consist of code; constant values or strings; and the variables that count, add, subtract, buffer, or whatever. The first two parts rarely change.

Generally, you'll find that program code comes first, then constants, and finally variables. Programs and constants are usually close to each other. If they are widely separated, you would need either two separate loads or a lot of "dead bytes" between the two. Some programmers leave a small amount of space between the program code and the area set aside for constants to fit in late program changes (or patches).

Variables can sit anywhere in memory. There's no reason to put them in any particular place, as long as variables are kept far from code and constants. The contents of this area are not loaded from disk. Since you won't know what's in the variable space when the program starts, it's important to initialize such variables by putting data in before you take data out.

Most programmers try not to mix constant values and program code. Keeping them separate makes it easier to disassemble code. When constants are mixed in with code, the disassembler tries to read the constants as if they were instructions. Also, since program branches can reach only a limited distance, keeping all your code together can make your program more efficient.

Though these are not fixed and unbreakable rules, organizing your program is in your best interest. Like all generalities, there are exceptions, but it's usually the case that neat

programmers are troubled by fewer bugs than their spaghetti-code cousins.

We'll write a simple program here to illustrate this kind of organization. Program ECHO will print a title, accept a line of input, and then print the line back three times.

A quick first run indicates that the code will stretch from about \$2000 to \$2045. Let's leave a little space and put our constant values starting at address hex 2050. In this case, we have only the title, *ECHO!*, and the repeat signal ("ECHO:"). Including the following Return characters, that's only a dozen bytes.

As I mentioned, finding a location for the variables is much less critical. Although you have the whole of memory to choose from, it's common to pick a nearby location for variables. Perhaps your program or subroutine will share the computer with other code, in which case it's a good idea to keep the whole action (code, constants, and variables) within a bounded area.

In this case, we have a Y-Save variable—one byte—and the input buffer which will hold the message to be echoed. I've picked nearby locations \$2060 and \$2068 to hold these. We might make a mental note that the input buffer area is, say, 80 characters long. That would make it reach from \$2068 to \$20B7. But since we have no other variables, we won't need to count too carefully.

Here's the code:

```
2000 A2 00 LDX #$00
2002 BD 50 20 LDA $2050,X
2005 20 D2 FF JSR $FFD2
2008 E8 INX
2009 E0 06 CPX #$06
200B D0 F5 BNE $2002
200D A0 00 LDY #$00
200F 8C 60 20 STY $2060
2012 20 CF FF JSR $FFCF
2015 AC 60 20 LDY $2060
```

```
2018 99 68 20 STA $2068,Y
201B C8 INY
201C C9 0D CMP #$0D
201E D0 EF BNE $200F
2020 20 D2 FF JSR $FFD2
2023 A2 00 LDX #$00
2025 BD 56 20 LDA $2056,X
2028 20 D2 FF JSR $FFD2
202B E8 INX
202C E0 06 CPX #$06
202E D0 F5 BNE $2025
2030 A2 00 LDX #$00
2032 A0 00 LDY #$00
2034 B9 68 20 LDA $2068,Y
2037 20 D2 FF JSR $FFD2
203A C8 INY
203B C9 0D CMP #$0D
203D D0 F5 BNE $2034
203F E8 INX
2040 E0 03 CPX #$03
2042 D0 EE BNE $2032
2044 60 RTS
```

The program needs to be followed by the constants. In this case, the two strings used by the program. There's a little empty space before our constants appear. Remember that these are DATA values: don't try to assemble them!

```
2050 45 43 48 4F 21 0D 45 43
2058 48 4F 3A 0D
```

Here's the BASIC version:

```
100 DATA 162,0,189,80,32,32,
210,255,232,224,6,208,245
110 DATA 160,0,140,96,32,32,
207,255,172,96,32
120 DATA 153,104,32,200,201,13,
208,239,32,210,255,162,0
130 DATA 189,86,32,32,210,
255,232,224,6,208,245
140 DATA 162,0,160,0,185,
104,32,32,210,255,200
150 DATA 201,13,208,245,232,
224,3,208,238,96
160 DATA 0,0,0,0,0,0,0,0,0,0
170 DATA 69,67,72,79,33,13,
69,67,72,79,58,13
200 FOR J=8192 TO 8283
210 READ X:T=T+X
220 POKE J,X
230 NEXT J
240 IF T<>10324 THEN STOP
300 SYS 8192
```

**Neat
programmers
usually put
program code
first in
memory, followed
by constants,
then variables.**

Steve Vander Ark

ATTENTION, GEOS SHOPPERS

All right, let's talk seriously. When it comes to Christmas, we don't put things like dictionaries or underwear on our lists, right? What we really want is computer stuff—*GEOS* stuff, if possible.

But that's not always easy. You can't send people out to the mall to the *GEOS* store to fill your stocking with *geoGoodies*. Most really good software coming out for *GEOS* is from independent programmers who sell their work themselves or upload it as shareware to places like QuantumLink. Unless your family is unusually computer-literate, they won't have the foggiest idea how to find *GEOS* items. It's easier for them to buy you violet socks or musical reindeer ties.

Don't despair. There actually is such a thing as a *geoStore*, and while it's not at the mall, it's about as user friendly as you could want. It's a mail-order outfit run by a talented artist named Susan Lamb.

She realized that many *GEOS* users don't have access to the new and exciting software that independent programmers are producing, so she decided to bridge that gap. At the same time, she offered her own clip art. If you haven't seen Lamb Art & Design clip art before, you owe yourself a look; the quality will blow you away.

Lamb got into *GEOS* early, beta testing for Berkeley and demonstrating what *geoPaint* could do. She spent some time as the editor of *geoWorld* magazine, editing and writing many how-to articles. She's now among the more knowledgeable users of the system's graphics programs.

To share some of this expertise, she's working on a book that deals with *geoPaint* and

geoPublish. When she was asked to produce some artwork for the new *GeoWorks Ensemble*, she acquired an IBM computer; now she's rapidly becoming addicted to *geoDraw*, which is included in *Ensemble*. More than a drawing program, its text-handling capabilities place it in the category of *geoPublish* but take advantage of the added speed and memory capabilities of the IBM machines.

So, has Susan Lamb abandoned Commodore *GEOS* for Big Bluer pastures? Not at all. If anything, her IBM gives her a new resource for Commodore *GEOS* graphics. The wide variety of scanners and digitizers available at a reasonable cost for the IBM help her to create graphics which she ports to Commodore *GEOS*. Using all of these tools, the *geoStore* offers not only clip art and page templates but also personal clip art—artwork created to order, including original art, photos, hand lettering, logos, and so on.

Besides Lamb's excellent graphics, *geoStore's* catalog includes some of the best products and services from elsewhere in the *GEOS* community. RAM expansion upgrades are advertised at good prices from Melvin Montgomery, (CMDR FIXER on Q-Link). Other *GEOS* art is featured in the *geoStore* catalog, including cartoons by Dale Beach and *GeoWorks Ensemble* clip art by Jay Degn. Some of the more exciting *GEOS* software coming out from the independent programmers is also available, including *geoPrint*, a *Print Shop*-style application, and scads of user disks filled with public domain's best.

The *geoStore* catalog is the perfect thing to leave lying around under the noses of those who will be buying you Christmas presents. To get a copy, write to *geoStore*, 3575

East County 18th Street, Yuma, AZ 85365.

All the great Christmas presents aren't public domain or shareware, of course. There are a number of commercial products which no *GEOS* aficionado should be without. All of these are available through mail-order firms that advertise in this and other magazines; many might still be stocked at places like Electronics Boutique as well. (We'll get your family into the mall yet!) Here's a list of some of my favorites *GEOS* goodies.

Maverick is a must for any *GEOS* user. The *GEOS* bootmaker routine allows you to make your own boot disks for any kind of drive. And if you've ever fallen victim to Berkeley's copy protection trap with a wrong answer during installation thereby losing the use of an application forever, *Maverick's* ability to strip the protection from files will be an answer to your prayer. Added bonuses are a fast file copier and a sector editor designed to read *GEOS* disks as well as Commodore-formatted disks.

Graphics Bundle is a collection of programs from Free Spirit now available for one amazingly low price through Solutions Unlimited. Commodore graphics come in a wide variety of formats, of course, and it takes a little manipulation to get them into the *GEOS* environment. The software in this package gives you the tools to do the necessary conversions and a program called *Graphix Link* to port them into *GEOS*. The programs run in native 64 mode, not *GEOS*, so larger projects could require excessive mode-switching unless you plan ahead a little bit.

Send your *GEOS* questions to Steve Vander Ark, in care of this magazine. He can also be reached on QuantumLink. His handle is SteveV14. □

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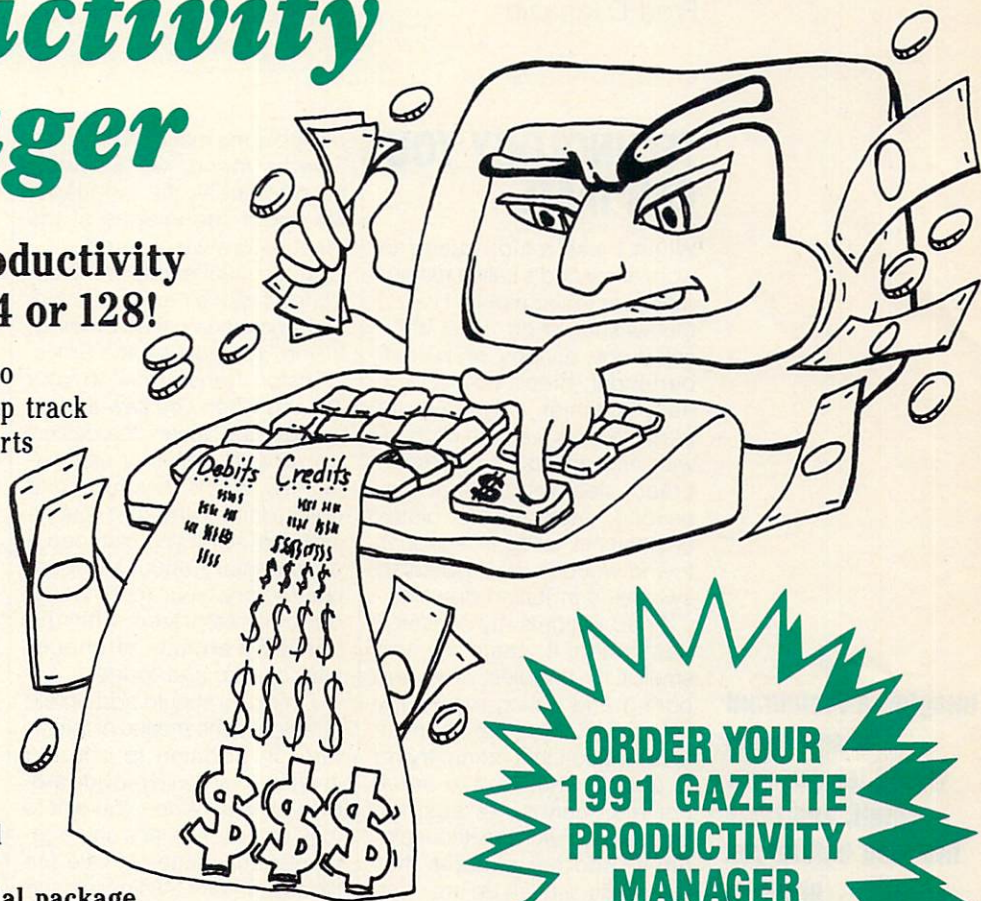
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D'IVERSIONS

Fred D'Ignazio

TECHNOLOGY YOU CAN TASTE

When I was a kid, I used to work at my dad's Italian restaurant near Philadelphia. I was a dishwasher, short-order chef, salad boy, busboy, prep chef, bartender, bread boy, and finally cashier. My favorite place to work was the kitchen, with its baskets of hot garlic bread, steaming cups of minestrone, pasta fagioli, plates of manicotti, lasagna, spaghetti, and wooden bowls of salad swimming in Italian dressing.

Food delights my senses. I can touch it, taste it, and smell it. I'm happiest when preparing and eating meals. My unhappiest times are when my face is stuck in a menu, trying to decide what food to order. For me, menus are abstract places full of words without pictures. And the pictures that the words conjure up are often confusing, fuzzy, and wrong.

What I'd like to see is a new kind of menu—a multimedia menu with digital sounds, pictures, and movies. The menu would be a computer touchscreen, with tiny meal icons and their accompanying names. You could place your finger over an icon, and the meal window would expand to fill the screen.

You could see animations that would rotate in three-dimensional space, photographs and drawings, and full-motion videos of your meal's being created. There would even be stereo sound of its being prepared and cooked.

What I'm talking about is a full-blown WYSIWYG menu: What You See on the menu Is What You Gobble when your meal arrives. A meal with no unpleasant surprises.

This would be a boon for us lowbrows who find ourselves in Chinese, Italian, Greek, or French restaurants unable to

decipher the menu. With a multimedia menu, we wouldn't have to speak the language; we could see images of the meal before we ordered.

In the 1950s kids were entranced with a new technological innovation called Smell-O-Vision. You hooked the Smell-O-Vision transformer to your TV, and when you saw a movie about the ocean, the device would waft smells of salt water, fish, clams, seagulls, and drying driftwood across your living room. Or if you watched a documentary about a chocolate factory, your room would become saturated with the heavenly aromas of chocolate, cocoa, and fudge.

I think we should add Smell-O-Vision to the menus of the future. In addition to offering images, they could provide aromas as well. When you ask to look at a meal—let's say eggplant parmigiana—a little fan on the Smell-O-Vision device would blow the scent of the meal your way. As you see colorful animated images of your meal, you could sample its delightful aromas as well.

After multimedia menus and Smell-O-Vision menus became old hat, it would be time to introduce yet another innovation, virtual reality menus. When customers sit down in a restaurant, they could open a drawer in their table and take out a pair of menu "reading glasses," which would be tiny stereoscopic computer monitors, and a "Touch-N-Feel" power glove. They could slip on the glove and the glasses and immediately see a door with the word *kitchen* above it. Customers would be in a virtual reality restaurant!

They could point at the door and feel themselves floating into the kitchen. They could fly up and down aisles in the virtual kitchen and point at the meals being prepared. If they point at a meal, it

zooms to life-size. Customers could pick up the plate, rotate it, smell it, and even touch it for freshness and texture.

For the ultimately picky customer, even the glove and the glasses may not be enough. For these people restaurants would offer a third sensor—a small wad of plastic that has the consistency of chewing gum. Actually the "gum" would be a cleverly disguised disposable composite of timed-release particles. Controlled by the computer, it would release a taste that matched the food item that the customer was previewing.

The gum would also conceal an ingeniously sensitive strain gauge, a device used to measure the pressure of the customer's teeth as he or she chewed on the plastic sensor. If the customer chewed a virtual slab of steak, the gum would become rigid and take on the consistency of steak; if the customer ate tender flakes of broiled flounder, the gum would simulate the softness of fresh fish.

After customers sampled several items by previewing their virtual counterparts, they could place an order by signaling the virtual cashier in the virtual kitchen. Voilà! Within minutes a real meal would be on its way to the customer's real table and real tummy.

The whole system could become so advanced that virtual meals might replace real meals. Dining out could become so virtually realistic that preparing real food would become unnecessary.

People who have tight budgets would appreciate this innovation. Virtual meals would be cheap! Also, a virtual meal that featured 12 courses of the most sinful yet scrumptious delights would be calorie free. Dieters and weight-loss maniacs would flock to restaurants that feature "lite" virtual cuisine. □

Imagine a restaurant whose menu would let you see, smell, and taste the food before you ordered.

BEGINNER BASIC

Larry Cotton

TRIM A TREE WITH RND

Happy holidays! We'll continue our investigation of random numbers and RND this month by writing a short program that keeps the seasonal spirit.

The 64's screen (or the 128's in the 64 mode) consists of 40 vertical columns by 25 horizontal rows. Each column or row is one character wide and one character tall. Therefore, there are 1000 (40 x 25) locations for characters on the screen. Carefully enter the following in immediate mode and then press Return:

```
POKE1024,42:POKE1024+54272,1
```

You should now see a white asterisk pop into the upper left corner of your television or monitor screen. Now try this:

```
POKE2023,42:POKE2023+54272,1
```

This should light up an asterisk in the lower right corner of the screen. Memory registers 1024 and 2023 correspond to the first and last locations on the screen.

The second POKE ensures that the character gets a color—in this case white. For each screen memory register from 1024 to 2023, there is a corresponding color memory register (from 55296 to 56295) which controls the color of the character at that particular location. Both the memory register and its corresponding color memory register are offset by 54272.

The characters that can be poked to the screen have the same appearance as the ones which can be printed but may use different codes. For instance, to print a white asterisk on the screen requires PRINT CHR\$(5) CHR\$(42) or POKE1024,42: POKE1024+54272,1.

To get a green inverted T symbol to appear in the same spot, however, one would have to use either PRINT CHR\$(30) CHR\$(177) or POKE 1024,113: POKE 1024+54272,5. (Note that when printing characters on a screen, the color must come first; the order doesn't matter when poking characters.)

Screen Display Codes and CHR\$(ASCII) codes for the 64 and 128 are published in separate appendices in the appropriate *User's Guide* or *Programmer's Reference Guide*. Another appendix contains screen and color memory register charts.

Now, let's begin the program. We'll illustrate how RND is useful in creating a graphic display—a twinkling Christmas tree. I will concentrate my explanations in this lesson on lines that pertain to the RND statement or to screen codes.

```
10 DIML(121)
20 PRINTCHR$(147)
30 POKE53280,0:POKE53281,0
40 C=54272:CH=42:Y=1
50 FORT=0T014:READL
60 FORJ=0T0T:L=L+1:GOSUB150
70 NEXT:NEXT
```

Notice the 42 in line 40; that's our screen code for the asterisk. The color is the variable Y. We've set up two nested FOR-NEXT loops to read in the screen memory registers. Let's skip ahead to the data lines and the subroutine:

```
130 DATA 1203,1242,1282,1321,
1361,1400,1440,1479,1519,1558,
1598,1637,1677,1716
140 DATA 1756,1804
```

The above memory registers correspond to the screen locations of the Christmas tree's left edge. The rest of the tree is drawn by poking locations offset from these.

If you want to poke some

other picture to the screen, you can plot screen positions on a chart like the ones shown in the *Guide's* Screen and Color Memory Map Appendices. Trial and error often serve as well.

```
150 POKEL,CH:POKEL+C,Y
160 K=K+1:L(K)=L
170 RETURN
```

Line 150 pokes an asterisk CH to screen location L and color memory register L + C (C is the color offset 54272) in color Y. At the same time, we fill a one-dimensional array L(1) to L(120) with all the memory registers which are used to draw the tree. You'll see why in a minute. Now, let's go back to the program.

One more character, a green inverted T symbol (the Christmas tree stand), needs to be poked to the screen.

```
80 READL:CH=113:Y=5:GOSUB150
```

Run the program at this point. You should see a white asterisk-studded Christmas tree perched on a rather small stand. Now, let's make the lights twinkle. Here's where RND comes in.

```
90 K=INT(120*RND(1))+1
100 CO=INT(14*RND(1))+1
110 POKEL(K)+C,CO
120 GOT090
```

We want to paint the asterisks with randomly chosen colors. Lines 90 and 100 pick random numbers from 1 to 120 and from 1 to 14 respectively. The first is the index to the array we loaded in line 160; the second is the color itself. Line 110 pokes the random screen location with random color. Line 120 causes the program to loop indefinitely, giving the tree the appearance of being filled with dozens of colored twinkling lights.

Merry Christmas! ☐

Poke random numbers to your TV or monitor screen to create a colorful holiday decoration.

PROGRAMMER'S PAGE

Randy Thompson

MULTILINGUAL COMPUTERS

Ask several Commodore 64 and 128 programmers what computer language they use the most, and you're likely to get only two distinct answers: BASIC and machine language. Broaden your poll to include Amiga, Macintosh, and MS-DOS programmers, and suddenly the range of answers fills a page.

Much of the Amiga's operating system was written in C. Combine this with the fact that there are two excellent C compilers available for that computer, and it's not too surprising to discover that most Amiga hackers prefer to work in C.

While the Amiga favors C, the Macintosh prefers Pascal. The Macintosh's Toolbox (a set of routines similar to the 64's ROM Kernal) was originally written in Pascal. As a result, Pascal would probably lead your Macintosh poll, with C and then assembly language following closely behind.

BASIC still has a strong grip on MS-DOS machines. It would undoubtedly top the IBM PC programming poll. And even though the number of available languages is quite large on MS-DOS computers, C would place a strong second. Pascal and machine language would come in third, with FORTRAN, COBOL, and a slew of other ancient dialects filling the list.

If you don't mind adding another page to your poll, you might take authoring languages as an acceptable answer. Authoring languages differ from traditional programming languages (you get more done through mouse clicks than you do with keystrokes), but the results can be quite similar. And it's authoring programs like *HyperCard* and *AmigaVision* that are to blame for

BASIC's decline in popularity on the Macintosh and Amiga, especially now that Amiga Basic won't run on newer Amigas and *AmigaVision* ships free with each Amiga sold.

Learning a new computer language can be fun and exciting—and you don't need to buy a new computer to do it. Abacus sells 64 and 128 versions of COBOL and C, a 64-only version of FORTRAN, and a 128-only version of Pascal. (All of these can be ordered from the mail-order company Software Support International.) While somewhat limited, these versions are a way to experiment with some of the languages that dominate much of the computing world.

C is the hottest computer language right now, and it's one of my personal favorites. It has several BASIC-like commands, but its structure is different. For example, take a simple FOR loop that prints the numbers from 1 to 10:

```
for ( i=1; i<11; i++ )
  {printf( "The number is %d\n",
    i );}
```

All arguments in a FOR command must be enclosed in parentheses. You may also note the lack of a NEXT instruction. The end of the FOR loop is denoted by the final curly brace. The first curly brace defines the start of the loop.

Within the parentheses you'll find three items, each separated by a semicolon. The first is an instruction that you want the computer to execute before it enters the loop for the first time. In this case, we assign the value 1 to the variable *i*. The second item specifies a condition that must remain true in order for the loop to repeat (*i* must be less than 11). The loop ends when this test condition proves false. The third item in parentheses is an instruction

that the computer executes after every pass through the loop. While we could have used a more familiar looking *i=i+1* instruction, the command *i++* is shorter and does the same thing. Of course, *i+=1* would also work.

The print command for C is `printf`. It looks strange but it's flexible. It's a supercharged PRINT USING command. In our FOR loop, the `%d` specifies that we want to print a decimal number at that location in the print string. The value we want to print follows the print string. The `\n` is `printf`'s code for a carriage return. To leave it out would be like adding a semicolon to the end of a PRINT string in BASIC.

Pascal is much more like BASIC than C. For example, a FOR loop in Pascal would look like this:

```
for i:=1 to 10 do begin
  writeln('The number is ', i);
end;
```

In Pascal, you precede an equal sign with a colon when assigning a value to a variable. The only time you drop the colon is when you test a variable's value, as in `if i=10`. The loop instructions are braced by the statements `begin` and `end`. And instead of a PRINT command, Pascal uses `writeln`. To print something without forcing a carriage return, use the shorter version, `write`. The optional `ln` stands for linefeed. Both Pascal and C use the semicolon to mark the end of an instruction.

If you'd like to experiment with a new language, stop by your library or bookstore and pick up a book on the topic.

Due to a printing error, the listing for Flood in last month's "Programmer's Page" was omitted. You can find it in this issue on page G-38. □

Learning a new computer language can be fun—and you don't need to buy a new computer to do it.

128 CONFIGURATION AID

Bruce M. Bowden

A major concern of 128 programmers, particularly when writing machine language routines, is how to configure the various memory banking arrangements. Wrong banking can leave critical RAM or ROM routines unavailable. The 128 has a configuration register within its memory management unit for doing banking. This program, *128 Configuration Aid*, makes calculating the configuration register value quick and easy.

Banking on the 128

The 128 uses two 64K RAM areas, a 28K BASIC interpreter, a 4K machine language monitor, a 4K screen editor, an 8K Kernal, 4K of character patterns, and another 4K for hardware chip registers. In addition, the 128 can also support 64K of cartridge ROM and another 128K of expanded memory. Although the 128 is capable of dealing with 372K of address space, the 8502 microprocessor can directly access only 64K at a time. How does the 128 do it?

The answer is banking. This means that only portions (up to 64K) of the entire arrangement are available to the microprocessor at any one time. The actual portions seen by the 8502 are coded by the value which resides in the configuration register at address 65280 (\$FF00). The value in this register has a specific pattern of eight bits, with different bits corresponding to special features of the configuration.

Bit 0 decides whether the input/output (I/O) block, RAM, or ROM will be in place from 53248 to 57343 (\$D000-\$DFFF). Bit 1 decides whether low BASIC ROM or RAM resides at 16384-32767 (\$4000-\$7FFF). Bits 2 and 3 determine whether BASIC and ML monitor ROM, internal cartridge ROM, or external cartridge ROM or RAM appears at memory locations 32768-49151 (\$8000-\$BFFF).

Bits 4 and 5 determine whether Kernal and character ROM, internal cartridge ROM, external cartridge ROM, or RAM appears in the range 49152-65535 (\$C000-\$FFFF). Bits 6 and 7 determine which RAM block is in use, ranging in number from 0 to 3.

The program will calculate the combination of bits required for the kind of arrangement you need and present the result in decimal, hexadecimal, and binary notation. This number can then be poked into the configuration register found at 65280 (\$FF00).

Typing It In

Written entirely in BASIC, *128 Configuration Aid* should be entered with *The Automatic Proofreader*. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program to disk before you run it.

Calculate Configuration

The program runs in either 40- or 80-column mode. You'll first be asked if you want the output sent to your printer. Press Y or N according to your preference. You'll then be presented with the option of either calculating the configuration register value based on the most suitable banking arrangement or displaying the banking arrangement based upon a specific configuration register value. For purposes of demonstration, let's choose the first option by pressing the A key.

Let's say we want to run a machine language program which resides in RAM 1 and uses the Kernal routines and I/O, but not BASIC or the character set. The first query is where to get RAM. Unless your system setup has had some very special custom work done to it, options C and D are meaningless, so let's select B for RAM 1.

Next we need to decide how the region from 49152 to 65535 (\$C000 to \$FFFF) is banked. This is where Kernal ROM resides, so we need to press A to choose system ROM.

We must next make a choice of how to use the address space from 32768 to 49151 (\$8000 to \$BFFF). Because we don't need BASIC, which is choice A on the current screen, three choices remain. Let's just go with RAM, by pressing key D.

Similarly, the range 16384-32767 (\$4000-\$7FFF), excluding BASIC, leaves B as our choice on the next screen. Press the B key.

Finally, at addresses 53248-57343 (\$D000-\$DFFF), we need to keep I/O in place, so select option A.

The report shows that, in order to

achieve the configuration we want, a decimal value of 78 (1001110 in binary or 4E in hexadecimal) must be placed in the configuration register found at 65280 (\$FF00).

Display Configuration

Let's check out the other option. Run the program again, and this time choose option B. This will display the configuration which results from a specific value. If you enter 78, you should see the configuration just selected.

For another example, suppose we input a value of 234. We'd discover that we're using the high part of expansion RAM and the entire address space of external cartridge ROM, that BASIC isn't engaged, and that the character ROM is knocked out. This arrangement corresponds to using the command BANK 11 from BASIC 7.0.

If you program in machine language, give *128 Configuration Aid* a try. It greatly simplifies the task of managing the 128's possibilities.

128 CONFIGURATION AID

```
GD 10 REM COPYRIGHT 1991 - COMPUTE PUBLICATIONS INTL LTD - ALL RIGHTS RESERVED
PB 20 COLOR 6,1:FAST:PRINT CHR$(14)CHR$(147)CHR$(17)CHR$(17):RESTORE 120:FOR X=1 TO 5:READ NB(X):NEXT:DIM BE(15,2)
MM 30 FOR X=1 TO 4:READ BYTES(X):NEXT:FOR X=1 TO 5:FOR Y=1 TO NB(X)+1:READ BMB$(X,Y):NEXT:NEXT:FOR X=0 TO 15:READ BE(X,1):READ BE(X,2):NEXT
QH 40 PR=50:M$="THE COMMODORE {SPACE}128 CONFIGURATION AID":GOSUB 540
QR 50 M$="COPYRIGHT 1991":GOSUB 540:M$="COMPUTE PUBLICATIONS INTERNATIONAL, LTD.":GOSUB 540
FJ 60 M$="ALL RIGHTS RESERVED":GOSUB 540:PRINT:PRINT
SC 70 PRINT:PRINT:M$="USE COMMODORE PRINTER ROUTINE? (Y OR N)":GOSUB 540
PC 80 GETKEY M$:PRINT CHR$(147)CHR$(17)CHR$(17):IF M$="Y" THEN PR=33:OPEN 3,4,7
PH 90 M$="PLEASE SELECT FROM THE OPTIONS BELOW":GOSUB {SPACE}550:PRINT:PRINT:M$="(A) CALCULATE CONFIGURATION REGISTER VALUE":GOSUB 550
```

PROGRAMS

```

XG 100 M$="(B) DISPLAY CONFIGURATION FROM CONFIGURATION REGISTER VALUE":GOSUB 550:BIT$="" :GOSUB 300 :X=VAL(BIT$)+1:BIT$="":ON X GOTO 220,390
PH 110 :
CB 120 DATA 4,4,4,2,2,"00","01","10","11","$0000 TO $FFFF","RAM 0 (NORMALLY [SPACE]USED FOR PROGRAMS)"
PX 130 DATA "RAM 1 (NORMALLY USED FOR BASIC VARIABLE [SPACE]STORAGE)","FUTURE EXPANSION RAM LOW","FUTURE EXPANSION RAM HIGH"
HR 140 DATA"$C000 TO $FFFF","SYSTEM ROM","HIGH INTERNAL (USER EPROM) ROM","HIGH EXTERNAL (CARTRIDGE) ROM","EXPOSED RAM"
BF 150 DATA"$8000 TO $BFFF","SYSTEM ROM","MID INTERNAL (USER EPROM) ROM","MID EXTERNAL (CARTRIDGE) [SPACE]ROM","EXPOSED RAM"
HC 160 DATA"$4000 TO $7FFF","SYSTEM ROM","EXPOSED RAM"
FB 170 DATA"$D000 TO $DFFF","I/O DEVICES","CHARACTER [SPACE]GENERATOR ROM OR RAM"
CG 180 DATA 0,63,1,127,2,191,3,255,4,22,5,86,6,150,7,214,8,42,9,106,10,170,11,234,12,6,13,10,14,1,15,0
PR 190 :
RJ 200 REM CALCULATE CONFIGURATION REGISTER VALUE
QR 210 :
EX 220 PRINT CHR$(147)CHR$(17)CHR$(17)CHR$(17)
MR 230 FOR XX=1 TO 5:M$="PLEASE INDICATE YOUR CHOICES BELOW":GOSUB 540:PRINT:M$="THE SPACE FROM "+BMB$(XX,1)+" WILL CONTAIN":GOSUB 540:PRINT
EM 240 FOR YY=1 TO NB(XX):M$=CHR$(YY+192)+" "+BMB$(XX,YY+1):GOSUB 540:NEXT:PRINT:PRINT
QX 250 M$="WHICH WILL IT BE?":GOSUB 540:IF NB(XX)=4 THEN GOSUB 310:ELSE GOSUB 300
CK 260 NEXT:M$="THE VALUE TO BE PLACED IN THE":GOSUB {SPACE}540:M$="MEMORY MANAGEMENT UNIT CONFIGURATION REGISTER (MMU CR) IS":GOSUB 540:PRINT:PRINT
HS 270 DC=0:M$="BINARY VALUE = "+BIT$:GOSUB 540:FOR X=0 TO 7:DC=DC+INT(VAL(MID$(BIT$,8-X,1))*2^X+.5):NEXT:PRINT:M$="DECIMAL VALUE = "+STR$(DC):GOSUB 540:PRINT
DP 280 M$="HEXADEXIMAL VALUE = "+HEX$(DC):GOSUB 540:GOTO480
RD 290 :
RS 300 C$="B":GOSUB 330:BIT$=BIT$+RIGHT$(STR$(XZ),1):GOTO 320
QP 310 C$="D":GOSUB 330:XZ=XZ+1:BIT$=BIT$+BYTES$(XZ)
JJ 320 PRINT CHR$(147)CHR$(17)CHR$(17)CHR$(17):RETURN
BS 330 GETKEY A$:IFA$<"A" OR A$>C$ THEN 330:ELSE XZ=ASC(A$)-65
CP 340 IF PR=33 THEN M$="*****":M$=M$+"{2 SPACES}"+"A$+"{2 SPACES}"+M$:GOSUB 540
PQ 350 RETURN
QH 360 :
FA 370 REM CONFIGURATION FROM [SPACE]REGISTER VALUE
EK 380 :
XG 390 PRINT CHR$(147)CHR$(17):M$="PLEASE ENTER THE VALUE HELD IN THE CONFIGURATION REGISTER":GOSUB 540
CB 400 M$="(USE A "+CHR$(34)+"$"+CHR$(34)+" IN FRONT [SPACE]OF A HEXIDECIMAL ENTRY.)"
RJ 410 GOSUB 540:PRINT:PRINT:INPUT A$:PRINT CHR$(147)CHR$(17):M$="USING THE [SPACE]VALUE "+A$:GOSUB 540:PRINT
DR 420 IF LEFT$(A$,1)="$" THEN DC=DEC(RIGHT$(A$,LEN(A$)-1)):ELSE DC=VAL(A$)
RH 430 DM=DC:BIT$="":DO UNTIL {SPACE}DM=0:DL=INT(DM/2):A$=STR$(2*(DM/2-DL)):BIT$=RIGHT$(A$,LEN(A$)-1)+BIT$:DM=DL:LOOP
DG 440 ZR$="00000000":IF LEN(BIT$)>8 THEN BIT$=RIGHT$(BIT$,8):ELSE IF LEN(BIT$)<8 THEN BIT$=LEFT$(ZR$,8-LEN(BIT$))+BIT$
RG 450 FOR XX=1 TO 5 STEP 2:YX=(1+XX)/2:A$=MID$(BIT$,XX,2):YY=1:DO UNTIL BYTES$(YY)=A$:YY=YY+1:LOOP:M$="THE SPACE FROM "+BMB$(YX,1)+"":GOSUB 540
DQ 460 M$=BMB$(YX,YY+1):GOSUB {SPACE}540:PRINT:NEXT:FOR XX=7 TO 8:YX=XX-3:A$=MID$(BIT$,XX,1):YY=VAL(A$)+1:M$="THE SPACE FROM "+BMB$(YX,1)+"":GOSUB 540
BK 470 M$=BMB$(YX,YY+1):GOSUB {SPACE}540:PRINT:NEXT
JM 480 FOR X=0 TO 15:IF DC=BE(X,2) THEN M$="THIS CORRESPONDS TO BANK"+STR$(BE(X,1)):GOSUB 540
QG 490 NEXT:PRINT CHR$(27)+"G"+CHR$(7)
GX 500 IF PR=33 THEN PRINT#3:CLOSE3
AF 510 END
RB 520 :
SC 530 REM MESSAGE CENTERING ROUTINE
CF 540 IF PR=33 THEN LN=80:MY$=M$:GOSUB 590:PRINT#3,M$:M$=MY$
GM 550 IF PEEK(215)=0 THEN BEGIN
JC 560 LN=40:SLOW:GOSUB 600:M$=MY$:GOSUB 590:PRINTM$
FE 570 IF MZ$<>" " THEN M$=MZ$:GOSUB 590:PRINTM$:RETURN
RK 580 BEND:ELSE LN=80:GOSUB 590:PRINTM$:RETURN
XJ 590 Y=INT((LN-LEN(M$))/2):FOR X=1 TO Y:M$=" "+M$:NEXT:RETURN
XG 600 IF LEN(M$)<40 THEN MY$=M$:MZ$=" ":RETURN
XQ 610 X=36
EQ 620 IF MID$(M$,X,1)=" " THEN MY$=LEFT$(M$,X-1):MZ$=RIGHT$(M$,LEN(M$)-X):RETURN:ELSE X=X-1:GOTO620
FR 630 IF M$="" THEN RETURN:ELSE PRINTM$:RETURN

```

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DESDEMONA

Matt Morgan

Desdemona, also known as Othello or Reversi, is a popular strategy board game that uses black and white markers or disks. Its rules are simple, but its many possibilities of play make it challenging and complex. This sophisticated version features sound effects, sprites, and redefined multicolor characters.

Desdemona is written in BASIC. To avoid typing mistakes, use *The Automatic Proofreader* to type it in. See "Typing Aids" elsewhere in this section. When you've finished, save the program to disk before you run it.

Black and White

When you run *Desdemona*, the title screen appears, and then the program asks for the number of players—0, 1, and 2 are accepted values. Entering a 0 causes the computer to play itself; this mode is useful when you're learning the rules of the game and want to see a demonstration.

The main screen shows an 8 x 8 game board with four playing pieces (two black disks and two white ones) arranged symmetrically at the center. If you are playing against the computer (one-player mode), you have the white pieces and the 64 plays black.

Players alternate turns placing pieces on the board until every square is filled or neither player can make a move. If you cannot make a legal move, you must pass your turn to your opponent. Press P to do so.

The object of *Desdemona* is to have more pieces on the board at the end of the game than your opponent does. Each player has a box on the screen that shows the number of pieces he or she currently has in play. White's box is on the left; black's is on the right. A flashing check mark in one of the boxes shows whose turn it is.

When it's your turn, a blue square appears on one of the board's squares. To make a move, use the joystick in port 1 (port 2 for player 2) to move the square to the spot where you wish to place a piece and then press the fire button. If the move is illegal, the computer will buzz, and you will have to select another square. You may quit the game at any time by pressing Q.

To make a legal move, you must place your piece so that one or more of your opponent's pieces lie in a straight line between your new piece and another of your pieces. When you enclose your opponent's pieces, the computer will beep, and the enclosed pieces will change to your color. You may enclose pieces in any direction (up, down, left, right, or diagonally), and you can make multiple enclosures with one play. Scores can change dramatically with careful play. You may want to watch the computer play itself a few times to get the hang of it.

At the end of the game, the winner is announced, and you are asked if you want to play again.

Strategy

The computer makes a good opponent, but an experienced player can beat it rather easily. Why? Because the computer uses no strategy; it just chooses the move that will get the most pieces. The best move is not necessarily the one that wins the most pieces.

A good *Desdemona* player goes after the corner squares because they can't be changed. Corner pieces are the most valuable spots on the board. Edge squares are next in importance. They can only be changed in one direction, and they are unchangeable if connected by a row of your pieces to a corner square that you occupy.

DESDEMONA

```
PK 10 POKE56,140:CLR:DIMGB(9,9
),DX(7),DY(7),P(7)
KF 20 DEF FN PS(C)=55221+3*X+1
20*Y
CS 30 DEF FN XS(X)=61+X*24
HS 40 DEF FN YS(Y)=31+Y*24
PP 50 POKE53281,3:POKE53280,6
ER 60 POKE53280,6:PRINTCHR$(14
2)"{CLR}{WHT}{4 DOWN}";
EK 65 PRINTTAB(5)"{A}CCI
EA 70 PRINTTAB(5)"B{K}B
{8 SPACES}B
RB 80 PRINTTAB(5)"B{K}BUCIUCI
UCBUUCIUIUCIUIUCI
MX 90 PRINTTAB(5)"B{K}BBCKJCI
B BBCKBBB BBBB B
AJ 95 PRINTTAB(5)"{Z}CCKJCKJCK
JCKJCKBBBJCKBBJCK
MJ 110 PRINTTAB(12)"{BLU}{T}
{Y}{U}{RVS}{I}{O}{Y}
{6 U}{Y}{P}{O}{I}{OFF}
{U}{Y}{T}"
RP 120 PRINTTAB(19)"{DOWN}
{RED}BY MATT MORGAN
{3 DOWN}"
MA 125 INPUT"{UP}
{10 SHIFT-SPACE}HOW MAN
Y PLAYERS{2 SPACES}1
{3 LEFT}";AS:IFAS>"2"OR
AS<"0"THEN 125
DX 130 POKE53270,PEEK(53270)OR
16:POKE53282,7:POKE5328
3,9:C=-1:GOSUB 850
QA 150 PL=VAL(AS)
AB 180 POKE53265,11:PRINT"
{CLR}";:FOR=1TO25:A=35
839+40*Y:POKEA,160:POKE
A+19456,6:NEXT
AA 190 PRINTTAB(7)"{8}{OFF}{A}
**{R}**{R}**{R}**{R}**
{R}**{R}**{R}**{S}":FOR
T=1TO8:FORU=1TO2
PA 200 PRINTTAB(7)"-{2 SPACES}
-{2 SPACES}-(2 SPACES)-
{2 SPACES}-(2 SPACES)-
```

```
{2 SPACES}-(2 SPACES)-
{2 SPACES}-":NEXT
KX 210 PRINTTAB(7)"{Q}**++++**
++++**++++**{W}";:IF
T<>8THENPRINT
PB 220 NEXT:PRINT"{UP}":PRINT
AB(7)"{Z}**{E}**{E}**
{E}**{E}**{E}**{E}**{E}
**{X}{HOME}"
DK 230 LS="{DOWN}{7 LEFT}":PRI
NTWSS"{2 LEFT}{2 UP}
{OFF}#{RVS}{5 SPACES}
{OFF}%"LS"{RVS} WHITE "
LS"{7 SPACES}"LS"{OFF}$
{RVS}{5 SPACES}{OFF}&"
KC 240 PRINTBSS"{2 LEFT}{2 UP}
{OFF}#{RVS}{5 SPACES}
{OFF}%"LS"{RVS} BLACK "
LS"{7 SPACES}"LS"{OFF}$
{RVS}{5 SPACES}{OFF}&":
POKE36203,122
AC 250 POKE36235,122:WS=0:BS=0
:X=4:Y=4:C=1:GOSUB670:Y
=5:C=0:GOSUB670
SG 260 X=5:C=1:GOSUB670:Y=4:C=
0:GOSUB670:PT=1:POKE532
65,27:SX=1:SY=1
CR 270 PRINTWSSWS"{LEFT} "BSSB
S"{LEFT}":T=WS+BS:IF P
T=1 THENPRINTWSS"{2 UP}
{RIGHT}";:GOTO290
CH 280 PRINTBSS"{2 UP}{RIGHT}"
;
RA 290 IFT=640RT=WSORT=BSORFP=
20RNT=2THEN560
GF 300 POKE647,PT:POKE204,0:IF
(PT=0ANDPL=1)ORPL=0THEN
POKEV+21,0:GOSUB490:GOT
0450
BM 310 POKEV+21,1:J=56321:IFPT
=0ANDPL=2THENJ=J-1
XH 320 GOTO420
KR 330 IF(PEEK(J)AND16)=0THEN4
30
QD 340 AS="":GETAS:IFAS="P"THE
NPF=1:GOSUB490:IFLLTHEN
440
RH 350 IFAS="P"THEN450
XG 360 IFAS="Q"THENPOKEV+21,0:
PRINT:FQ=1:GOTO470
HF 370 O=15-(PEEK(J)AND15):IFO
=0THEN330
JG 380 IFO=1ANDSY>1THENSY=SY-1
PF 390 IFO=2ANDSY<8THENSY=SY+1
QJ 400 IFO=4ANDSX>1THENSX=SX-1
GF 410 IFO=8ANDSX<8THENSX=SX+1
GQ 420 POKEV,FN XS(SX):POKEV+1
,FN YS(SY):GOTO330
HH 430 X=SX:Y=SY:GOSUB740:IFLL
THEN450
HR 440 POKESS+1,7:POKESS+4,33:
FORQ=1TO500:NEXT:POKES
+4,0:GOTO330
KJ 450 POKESS+1,99:POKESS+4,17
:FORQ=1TO99:NEXT:POKES
+4,0
EA 460 IFAS<>"P"THENNT=0:GOSUB
820
```

PROGRAMS

```

SK 470 PT=1-PT:POKE204,1:POKE3
6203,122:POKE36235,122:
IFFQTHENFQ=0:GOTO620
ED 480 GOTO270
MA 490 BM=0:BX=0:BY=0:QP=2-PT:
A=9:FORX=1TO8:FORY=1TO8
:IFGB(X,Y)<>QPTHEN540
BQ 500 Z=X:R=Y:FORQ=.TO7:X=Z+D
X(Q):Y=R+DY(Q):IFGB(X,Y
)ORX=AORY=AORX=.ORY=.TH
EN530
SJ 510 GOSUB740:IFTT>BMOR(TT=B
MANDRND(1)>.5)THENBM=TT
:BX=X:BY=Y
CA 520 IFLANDPFTHENQ=A:Z=A:R=
A:PF=.
HK 530 NEXT:X=Z:Y=R
GD 540 NEXT:NEXT:IFBM=0THENA$=
"P":LL=0:NT=NT+1:RETURN
KQ 550 A$="":X=BX:Y=BY:GOSUB74
0:RETURN
XM 560 POKEV+21,0:WN=1:IFBS>WS
THENWN=0
CH 570 IFBS=WSTHENWN=2
ER 580 ON WN+1 GOSUB640 ,650,6
60
QA 590 PRINT"{10 DOWN}ANOTHER
{DOWN}{6 LEFT}GAME?
{DOWN}{5 LEFT}{Y/N}"
CC 600 GETAS:IFA$<>"N"ANDA$<>"
Y"THEN600
XE 610 IFA$="N"THENSYS64738
GH 620 POKE49,PEEK(47):POKE50,
PEEK(48):DIMGB(9,9),DX(
7),DY(7),P(7)
JE 630 POKE65,DL:POKE66,DH:FOR
A=0TO7:READDX(A),DY(A):
NEXT:GOTO10
DG 640 PRINT"{HOME}{OFF}"TAB(3
3)"{2 DOWN}{BLK}BLACK
{2 DOWN}{5 LEFT}WINS!":
PRINTTAB(32);:RETURN
MS 650 PRINT"{HOME}{OFF}
{2 DOWN}{WHT}{RIGHT}WHI
TE{2 DOWN}{5 LEFT}WINS!
":RETURN
MA 660 PRINT"{HOME}{OFF}
{2 DOWN}{RED}{3 RIGHT}A
{2 DOWN}{2 LEFT}TIE{UP}
{TAB(32)}A{2 DOWN}
{2 LEFT}TIE":RETURN
JQ 670 A=FN PS(C):B=GB(X,Y)-1:
POKEA,C:POKEA+1,C:POKEA
+40,C:POKEA+41,C:A=A-19
456
BB 680 POKEA,35:POKEA+1,37:POK
EA+41,38:POKEA+40,36:GB
(X,Y)=C+1
DS 690 IFB=1THENWS=WS-1
FF 700 IFB=0THENBS=BS-1
GB 710 IFC=1THENWS=WS+1:GOTO73
0
QS 720 BS=BS+1
BF 730 RETURN
PE 740 TT=0:LL=0:IFGB(X,Y)THEN
RETURN
QC 750 P=PT+1:O=2:IFPTTHENO=PT
FQ 760 FORL=0TO7:P(L)=0:IFGB(X

```

```

+DX(L),Y+DY(L))<>OTHEN8
10
JB 770 TX=X+DX(L):TY=Y+DY(L):C
O=0
RP 780 CO=CO+1:TX=TX+DX(L):TY=
TY+DY(L):IFGB(TX,TY)=0T
HEN810
FQ 790 IFGB(TX,TY)=PTHENLL=1:P
(L)=CO:TT=TT+CO:GOTO810
AP 800 GOTO780
KJ 810 NEXT:RETURN
CH 820 QX=X:QY=Y:C=PT:GOSUB670
:FORL=0TO7:IFP(L)=0THEN
840
SK 830 X=QX:Y=QY:FORT=1TOP(L):
X=X+DX(L):Y=Y+DY(L):GOS
UB670:NEXT
RS 840 NEXT:RETURN
JF 850 PRINT"{CLR}{N}{BLU}
{10 DOWN}"TAB(13)"PLEAS
E WAIT..."
AX 860 FOR X=0TO32:READ J:POKE
49152+X,J:NEXT:POKE5633
4,PEEK(56334)AND254
GF 870 POKE1,PEEK(1)AND251:SYS
49152:FORT=584TO607:POK
E40960+T,PEEK(53248+T):
NEXT
CB 880 FORT=68TO687:POKE40960
+T,PEEK(53248+T):NEXT:P
OKE1,PEEK(1)OR4
FH 890 POKE56334,PEEK(56334)OR
1:POKE56578,PEEK(56578)
OR3
MB 900 POKE648,140:PRINT"{CLR}
{BLU}{10 DOWN}"TAB(13)"
PLEASE WAIT..."
BA 910 POKE56576,(PEEK(56576)A
ND252)OR1:POKE53272,56
KQ 920 FOR T=28TO311:READA:PO
KE40960+T,A:NEXT:FORT=4
3011TO43070:POKET,255:N
EXT
QP 930 FORT=43008TO43010:POKET
,0:NEXT:DN$="{DOWN}":RT
$="{RIGHT}":FORT=1TO6:D
N$=DN$+DN$:NEXT
QC 940 WSS="{HOME}"+LEFT$(DN$,
11)+"{2 RIGHT}{RVS}
{WHT}":BS$="{HOME}"+LEF
T$(DN$,12)+"{6 LEFT}
{RVS}{BLK}"
JK 950 Q=FRE(0)+RND(-TI/37):FO
RT=41936TO41943:POKET,2
55:NEXT:V=53248:POKEV+3
9,14
AE 960 POKEV+27,1:POKE36856,16
0:DL=PEEK(65):DH=PEEK(6
6):FORA=0TO7
SJ 970 READDX(A),DY(A):NEXT:SS
=54272:FORT=SS+23:POK
ET,0:NEXT:POKESS+24,1
5
MJ 980 POKESS+5,15:POKESS+6,24
0:RETURN
BK 990 DATA 169,0,133,253,133,
251,169,216,133,252,169
,160,133,254,162,8,160,

```

```

0
EF 1000 DATA 177,251,145,253,1
36,208,249,230,252,230
,254,202,208,240,96,0,
3,15,31
BB 1010 DATA 63,127,127,255,25
5,127,127,63,31,15,3,0
,0,192,240,248,252,254
,254
GC 1020 DATA 255,255,254,254,2
52,248,240,192,0
DP 1030 DATA 0,-1,1,-1,1,0,1,1
,0,1,-1,1,-1,0,-1,-1

```

Matt Morgan attends college in Texas. His home is in New Plymouth, Idaho.

SCREEN DUMP 128

Bruce M. Bowden
Get a printout of your 128 text screens with this handy one-call utility. There aren't any fancy bells or whistles with this program. It does just one job, but *Screen Dump 128* works with both 80-column and 40-column screens. A simple SYS call is all it takes to activate.

Typing It In

Screen Dump 128 is written entirely in BASIC. To help avoid typing errors, use *The Automatic Proofreader* to enter it. See "Typing Aids" elsewhere in this section. Save a copy of the program before exiting *Proofreader*.

Dumping

Load and run *Screen Dump 128* as you would any BASIC program. The loader places machine code at address 4864 (\$1300). After the code is in place, you are then free to run any other BASIC program.

To obtain a copy of a directory or program listing, game results, or any text that appears on your screen, enter SYS 4864. This will dump the current 40- or 80-column screen to your Commodore-compatible printer.

SCREEN DUMP 128

```

GD 10 REM COPYRIGHT 1991 - COM
PUTE PUBLICATIONS INTL L
TD - ALL RIGHTS RESERVED
HE 20 REM "SCREEN DUMP LOADER
{SPACE}FOR THE COMMODORE
128"
PC 30 REM "THIS ROUTINE, ONCE
{SPACE}ACTIVATED, WILL D
UMP THE CURRENT"

```

```

RB 40 REM "SCREEN TO THE PRINT
ER (DEVICE 4). IT IS ACT
IVATED BY A SYS 4864."
SD 50 PRINTCHR$(147)CHR$(14)CHR
R$(17)CHR$(17)"SETTING U
P..."
EJ 60 RESTORE130:Y=DEC("1300")
:IF PEEK(215) THEN FAST
HE 70 READB$:IF B$="EOF" THEN
{SPACE}SLOW:PRINT"A SYS
{SPACE}4864 WILL RUN THE
SCREEN DUMP":END
QA 80 IF LEFT$(B$,1)<>"@" THEN
120
RF 90 A$=B$:N=0:FOR X=0 TO 15:
READ B$:POKEY+X,DEC(B$):
N=N+DEC(B$):NEXT
XH 100 READB$:IF N<>VAL(B$) TH
EN 120
KJ 110 Y=Y+16:GOTO70
AM 120 PRINT"THERE IS A DATA E
RROR IN THE LINE BEGINN
ING WITH ";A$:END
JD 130 DATA @1,A5,D7,F0,03,4C,
3E,13,4C,0F,13,00,00,00
,00,00,A0,1050
MG 140 DATA @2,00,84,FB,A9,04,
85,FC,A0,27,B1,FB,99,76
,14,88,10,2011
FK 150 DATA @3,F8,A0,28,20,AB,
13,18,A5,FB,69,28,85,FB
,90,02,E6,2015
HJ 160 DATA @4,FC,A5,FC,C9,07,
D0,E0,A5,FB,C9,E8,D0,DA
,60,A9,00,2849
MC 170 DATA @5,8D,0E,13,A2,0C,
20,76,13,85,FC,E8,20,76
,13,85,FB,1687
SQ 180 DATA @6,A9,00,8D,0D,13,
20,8E,13,A5,FF,AC,0D,13
,99,76,14,1450
JC 190 DATA @7,EE,0D,13,C8,C0,
50,D0,ED,20,AB,13,EE,0E
,13,AD,0E,1867
AE 200 DATA @8,13,C9,19,90,DB,
60,8E,00,D6,2C,00,D6,10
,FB,AD,01,1759
EF 210 DATA @9,D6,60,8E,00,D6,
2C,00,D6,10,FB,8D,01,D6
,60,A2,12,1823
QM 220 DATA @A,A5,FC,20,82,13,
A5,FB,E8,20,82,13,A2,1F
,20,76,13,1789
QE 230 DATA @B,85,FF,E6,FB,A5,
FB,D0,02,E6,FC,60,88,B9
,76,14,C9,2733
RS 240 DATA @C,20,D0,03,88,D0,
F6,C8,A9,FF,99,76,14,A2
,00,8E,0A,2062
XR 250 DATA @D,13,8E,0B,13,A9,
00,8D,0C,13,AE,0A,13,BD
,76,14,C9,1263
XQ 260 DATA @E,FF,D0,03,4C,35,
14,C9,80,90,0C,C9,FE,B0
,08,A0,BB,2086
JP 270 DATA @F,8C,0C,13,18,29,
7F,C9,22,D0,02,A9,27,C9
,20,B0,06,1431

```

```

GJ 280 DATA @G,18,69,40,4C,01,
14,C9,41,90,07,C9,7F,B0
,03,18,69,1343
DC 290 DATA @H,80,AC,0C,13,C0,
BB,D0,1E,AE,0B,13,8D,0B
,13,A9,12,1510
JR 300 DATA @I,9D,C7,14,E8,AD,
0B,13,9D,C7,14,E8,A9,92
,9D,C7,14,2110
HB 310 DATA @J,8E,0B,13,4C,2C,
14,AE,0B,13,9D,C7,14,EE
,0A,13,EE,1397
AM 320 DATA @K,0B,13,4C,C4,13,
AE,0B,13,9D,C7,14,A9,00
,8D,0A,13,1240
CF 330 DATA @L,A9,03,A2,04,A0,
07,20,BA,FF,A9,00,20,BD
,FF,A9,00,1792
JX 340 DATA @M,A2,00,20,68,FF,
20,C0,FF,A2,03,20,C9,FF
,AE,0A,13,1888
PF 350 DATA @N,BD,C7,14,C9,FF,
F0,06,20,D2,FF,E8,D0,F3
,A9,0D,20,2504
AC 360 DATA @O,D2,FF,20,CC,FF,
60,00,00,00,00,00,00,00
,00,00,00,1052
CH 370 DATA EOF

```

Bruce M. Bowden is a programmer at COMPUTE Publications. He lives in Greensboro, North Carolina.

CHECKER COMMAND

Michael Sedlezky

Checker Command is a solitaire strategy board game for the 64 that is similar to checkers. Instead of red and black disks as pieces, however, the program uses heavily-armed hoverjets. They are animated and have appropriate sound effects. This is not your grandfather's game. A joystick for port 2 is required.

Typing It In

Checker Command is written entirely in machine language, but loads and runs like a BASIC program. The program uses sprites, customized characters, and an interrupt timer. To enter it, use *MLX*, our machine language entry program; see "Typing Aids" elsewhere in this section. When *MLX* prompts, respond with the following values.

Starting address: 0801
Ending address: 1918

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

Playing the Game

Checker Command rules are similar to those used in checkers, but with a few twists. There are two levels of difficulty to allow for training and for playing against a serious opponent. You'll find play at the advanced level is intense because the computer's only objective is to win, and it seldom strays from that path of action.

To start the game, load the program and type RUN. When the title screen appears, press the space bar if you wish to play the easy level or press the joystick fire button for the advanced version. Both versions follow the same rules, but the computer doesn't try as hard to beat you on the easy level.

You command a fleet of 12 yellow hoverjets, and your mission is stop the enemy from breaching your defenses. You want to move forward, capturing as many pieces as you can, while blocking the enemy's determined advance.

Playing the game is simple. Just follow the onscreen commands, and make your moves with your joystick. Place the square highlighter on the piece you wish to move and press the fire button. This action will make your game piece come to life. If you change your mind and select another piece, just highlight the same square and press the fire button again. The onscreen command will turn green if the move is a legal one. The computer will not allow any illegal moves.

Once you have selected a piece to move, you must set its destination. Highlight the target square and press the fire button. Pieces move diagonally forward one square at a time. If you encounter an enemy piece with an empty space on its other side, you don't just jump it as you would in checkers; you engage the enemy jet in battle. The 64 handles the action for you.

Unlike checkers, *Checker Command* allows only one jump per turn. Jumps are mandatory, though. If one of your pieces has the opportunity to jump an opponent and you elect not to, you'll be penalized by having your jet destroyed.

After you make a move, the 64 takes over. You must sit and bite your nails as it tries to outwit you. The computer is good. It never misses an opportunity to have a good fight, but it

PROGRAMS

avoids a conflict whenever possible by sticking to its main objective. That objective is your bottom row.

Your pieces move up the screen until they reach the top row; then they may attack in the opposite direction. They may move back down the board until they reach the bottom row, and then they switch to up again. A piece that can move down has an indicator dot in its center.

There are five game-ending scenarios. First, you win if all the enemy jets are destroyed or boxed in and unable to move. Likewise, you lose if all your jets are destroyed or are unable to move. Finally, the last—and most frustrating—ending is when just one of the enemy jets slips by your defenses and reaches the bottom row of the check-board. This signifies a breach of your defenses and is the most humiliating way you can lose a game.

A timer is shown to see how long you can last against the master. An average game lasts between 10 and 15 minutes, but there is no time limit. The timer stops when the game ends. Lightly tap the fire button to restart the game if you wish to play again.

CHECKER COMAMND

```

0801:0C 08 01 00 9E 20 33 31 46
0809:33 37 00 00 00 00 00 80
0811:00 00 00 00 00 00 00 21
0819:00 00 00 18 00 00 3C 00 23
0821:00 18 00 00 00 00 00 37
0829:00 00 00 00 00 00 00 39
0831:00 00 00 00 00 00 00 41
0839:00 00 00 00 00 00 07 57
0841:00 00 00 00 00 00 00 51
0849:00 00 00 00 00 00 00 6A C3
0851:40 02 6E 60 02 AE A0 02 E3
0859:AE A0 02 AA A0 02 AA A0 D6
0861:01 AA 90 00 66 40 00 00 E2
0869:00 00 00 00 00 00 00 79
0871:00 00 00 00 00 00 00 81
0879:00 00 00 00 00 00 47 00 18
0881:00 00 00 00 00 00 00 91
0889:00 00 00 00 08 00 00 08 E1
0891:00 00 6E 40 02 6E 60 02 FF
0899:AA A0 02 AA A0 02 AA A0 15
08A1:02 AA A0 02 AA A0 00 6A D3
08A9:40 00 04 00 00 00 00 5A
08B1:00 00 00 00 00 00 00 00 C1
08B9:00 00 00 00 00 00 47 00 58
08C1:00 00 00 00 00 00 08 00 E1
08C9:00 08 00 00 08 00 00 2E 4A
08D1:00 00 2E 00 00 6E 40 02 E3
08D9:AE A0 02 AA A0 0A AA A8 7F
08E1:0A AA A8 0A AA A8 01 A6 F7
08E9:90 00 04 00 00 00 00 C2
08F1:00 00 00 00 00 00 00 02

```

```

08F9:00 00 00 00 00 47 00 98
0901:00 00 08 00 00 08 00 A3
0909:00 08 00 00 2E 00 00 2E BC
0911:00 00 6E 40 00 6E 40 00 2F
0919:6E 40 02 AA A0 02 AA A0 60
0921:0A AA A8 0A A6 A8 05 A6 21
0929:94 00 04 00 00 00 00 06
0931:00 00 00 00 00 00 00 43
0939:00 00 00 00 00 47 00 D9
0941:00 00 00 00 00 00 00 53
0949:00 00 00 00 00 00 00 5B
0951:08 00 00 20 00 06 F0 02 65
0959:9B E0 0A AF 80 1A AE 40 B7
0961:1A AA 40 02 6A 80 01 6A 15
0969:80 01 AA 80 00 2A 00 00 02
0971:0A 00 00 05 00 00 00 00 D8
0979:00 00 00 00 00 47 00 1A
0981:00 00 00 00 00 00 00 93
0989:00 00 00 06 00 00 06 80 88
0991:00 0A 80 00 0A 94 00 0A E2
0999:A8 00 0A AA 80 16 AF E8 90
09A1:16 AF E8 0A AA 80 0A A8 7C
09A9:00 0A 94 00 0A 80 00 06 29
09B1:00 00 06 00 00 00 00 84
09B9:00 00 00 00 00 47 00 5A
09C1:00 00 00 00 00 00 00 D3
09C9:00 05 00 00 09 00 00 29 8E
09D1:00 00 2A 00 00 AA 00 01 D4
09D9:AA 00 01 6A 00 02 6A 40 25
09E1:0A AE 40 0A AF 80 1A AB AC
09E9:C0 1A 5A E0 04 10 A0 00 DD
09F1:00 08 00 00 00 00 00 06
09F9:00 00 00 00 00 47 00 9A
0A01:00 00 00 00 00 00 00 15
0A09:00 00 00 00 00 00 00 1D
0A11:00 00 04 00 05 A6 94 0A 9B
0A19:A6 A8 0A AA A8 02 AA A0 D9
0A21:02 AA A0 02 6E 60 00 6E 78
0A29:40 00 6E 40 00 2E 00 00 E7
0A31:2E 00 00 08 00 00 08 00 EC
0A39:00 08 00 00 00 00 47 00 DD
0A41:00 00 00 00 00 00 00 55
0A49:00 00 00 00 50 00 00 60 40
0A51:00 00 68 00 00 A8 00 00 15
0A59:AA 40 00 69 40 01 A9 80 43
0A61:01 BA A0 02 FA A8 03 EA 44
0A69:A9 03 AA A9 0A 96 04 08 BD
0A71:10 00 00 00 00 00 00 8D
0A79:00 00 00 00 00 47 00 1C
0A81:00 00 00 00 00 00 00 95
0A89:00 00 00 00 90 00 00 02 E1
0A91:90 00 02 A0 00 16 A0 00 D1
0A99:2A A0 02 AA A0 2B FA 94 12
0AA1:2B FA 94 02 AA A0 2A BE
0AA9:A0 00 16 A0 00 02 A0 00 24
0AB1:02 90 00 00 90 00 00 00 6F
0AB9:00 00 00 00 00 47 00 5C
0AC1:00 00 00 00 00 00 00 00 D5
0AC9:00 00 08 00 00 0A 84 F6
0AD1:00 02 E9 A9 02 FA A9 02 8F
0AD9:BE A9 01 AE A8 00 6A 60 3D
0AE1:00 6A 50 00 2A 80 00 2A 18
0AE9:80 00 2A 00 00 2A 00 00 2C
0AF1:18 00 00 14 00 00 00 00 53
0AF9:00 00 00 00 00 47 00 9C
0B01:00 00 00 00 00 00 00 17
0B09:00 00 00 00 00 00 08 27
0B11:00 02 20 20 00 00 00 02 B0
0B19:3B 00 01 22 10 00 22 00 D3
0B21:08 A2 80 02 0E 00 01 20 A6

```

```

0B29:80 00 08 20 00 80 40 00 05
0B31:00 00 00 00 00 00 00 47
0B39:00 00 00 00 00 47 00 DD
0B41:00 00 00 00 00 20 80 18
0B49:00 00 08 02 08 00 00 A1
0B51:08 08 00 C0 04 10 62 00 9E
0B59:04 04 02 15 00 10 04 42 8E
0B61:00 10 20 08 00 00 00 02 02
0B69:00 20 2C 08 04 00 00 00 AD
0B71:80 00 08 08 60 00 00 00 4C
0B79:00 00 00 00 00 00 47 22 40
0B81:00 20 00 01 02 03 60 88 15
0B89:84 08 40 20 80 32 14 05 E7
0B91:00 80 41 12 01 14 00 90 F9
0B99:41 04 04 41 10 20 14 00 0F
0BA1:00 41 04 04 01 02 01 10 EA
0BA9:04 84 00 40 40 00 00 10 2B
0BB1:00 00 00 00 40 00 08 08 F5
0BB9:00 00 00 00 00 47 04 62
0BC1:00 60 80 44 02 00 00 10 64
0BC9:01 40 00 10 04 40 00 00 92
0BD1:00 04 00 10 00 00 00 10 F9
0BD9:28 04 04 00 00 00 00 00 85
0BE1:80 40 04 04 01 00 01 10 23
0BE9:04 04 00 40 80 00 00 10 1B
0BF1:00 00 00 40 40 00 00 00 0E
0BF9:00 00 02 00 20 00 47 00 DF
0C01:00 00 00 00 00 00 00 00 19
0C09:00 00 00 00 00 00 44 65
0C11:40 00 04 00 00 11 00 00 0E
0C19:04 00 00 40 40 00 00 00 41
0C21:00 00 00 00 00 00 00 39
0C29:00 00 00 00 00 00 00 41
0C31:00 00 00 00 00 00 00 49
0C39:00 00 00 00 00 47 00 DF
0C41:A9 FF 85 FE 85 FC 8D 15 1F
0C49:D0 A9 D2 85 FF A9 22 85 57
0C51:FD A0 00 8C 0E DC A9 33 C3
0C59:85 01 B1 FE 91 FC C6 FC A5
0C61:C6 FE D0 F6 C6 FD C6 FF E1
0C69:A5 FF C9 CF D0 EC A9 37 4F
0C71:85 01 A9 01 8D 0E DC A9 D9
0C79:18 8D 18 D0 A2 64 BD 1E 51
0C81:00 9D 07 21 CA D0 F7 A9 AD
0C89:93 20 D2 FF A9 0B 8D 20 82
0C91:D0 8D 21 D0 8D 35 CD 8D 11
0C99:36 CD A2 0F 8E 08 CD BD 73
0CA1:77 CD 9D 74 05 BD 87 0D 7E
0CA9:9D EC 05 A9 07 9D 74 D9 78
0CB1:9D EC D9 A9 00 9D 00 08 28
0CB9:8D 00 CD 8D 09 CD 8D 0B D0
0CC1:CD 8D 26 D0 CA 10 D8 AD EB
0CC9:00 DC 29 10 F0 0F 20 E4 28
0CD1:FF C9 20 D0 F2 A9 01 8D 3C
0CD9:54 CD 4C E6 0C A9 00 8D 1C
0CE1:54 CD 20 DA 0D 20 D5 0E EB
0CE9:A9 E5 8D 1C D0 A9 09 8D 90
0CF1:25 D0 20 EE 0D A2 06 BD 80
0CF9:77 D0 9D 21 04 BD 7F 0D F9
0D01:9D 49 04 A9 00 9D 60 CD 5C
0D09:9D 21 D8 9D 49 D8 CA 10 82
0D11:E6 20 9C 13 20 9A 0F 20 15
0D19:DA 0D 4C 41 0C AA 55 AA E1
0D21:55 AA 55 AA 55 AA 55 AA 90
0D29:55 AA 55 AA 55 AA 55 AA 98
0D31:55 AA 55 AA 55 AA 00 1F 6A
0D39:3F 3F 3F 3F 1F 00 00 F8 90
0D41:FC FC FC FC F8 00 00 1F 6F
0D49:3F 3F 3F 3F 1F 00 00 F8 A0
0D51:FC FC FC FC F8 00 00 1F 7F

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0D59:3F 3E 3E 3F 1F 00 00 F8 50 0F89:03 8D 71 CD 78 A9 C9 8D 23 11B9:00 CB CD 39 CD D0 10 AD 9B
0D61:FC 7C 7C FC F8 00 00 1F 5F 0F91:14 03 A9 0F 8D 15 03 58 BF 11C1:09 CD C9 01 F0 09 AD 00 2C
0D69:3F 3E 3E 3F 1F 00 00 F8 60 0F99:60 78 AD 70 CD 8D 14 03 92 11C9:CD 18 69 EE 8D 04 CC AD B8
0D71:FC 7C 7C FC F8 00 03 08 5E 0FA1:AD 71 CD 8D 15 03 58 60 4B 11D1:09 CD C9 FE F0 25 AD 00 8C
0D79:05 03 0B 05 12 20 03 0F AE 0FA9:00 02 04 06 09 0B 0D 0F C6 11D9:CD 18 69 F9 8D 01 CC 8D 4D
0D81:0D 0D 01 0E 04 20 02 19 24 0FB1:10 12 14 16 29 2B 2D 2F BF 11E1:09 CC AA BD 00 CB CD 39 F0
0D89:20 0D 09 0B 05 20 13 05 9C 0FB9:30 32 34 36 39 3B 3D 3F D6 11E9:CD D0 10 AD 09 CD C9 02 19
0D91:04 0C 05 1A 0B 19 00 00 AF 0FC1:FF 01 00 00 00 00 02 FE 23 11F1:F0 09 AD 00 CD 18 69 F2 19
0D99:08 0A 07 07 0F 0F 07 07 55 0FC9:CE 1A 10 F0 03 6C 70 CD 5F 11F9:8D 05 CC AD 09 CD C9 FF AB
0DA1:0F 0F A2 06 B9 F9 10 9D 2F 0FD1:A9 3C 8D 1A 10 EE 64 CD F9 1201:F0 2D AD 00 CD 18 69 07 47
0DA9:61 05 B9 0E 11 9D 89 05 E4 0FD9:A2 03 BD 61 CD 2D 16 10 F9 1209:C9 40 B0 23 8D 02 CC 8D 06
0DB1:A9 0F 9D 61 D9 9D 89 D9 60 0FE1:D0 08 A9 00 9D 61 CD FE AC 1211:0A CC AA BD 00 CB CD 39 A2
0DB9:88 CA 10 E8 60 A2 06 B9 AE 0FE9:60 CD CA 10 ED A0 01 B9 B3 1219:CD D0 14 AD 09 CD C9 01 C9
0DC1:23 11 9D 01 06 B9 4D 11 38 0FF1:61 CD 09 30 99 9A 04 A9 41 1221:F0 00 AD 00 CD 18 69 0E 66
0DC9:9D 29 06 AD 06 CD 9D 01 3C 0FF9:0F 99 A9 D8 99 9D D8 99 75 1229:C9 4D B0 03 8D 06 CC AD 54
0DD1:DA 9D 29 DA 88 CA 10 E7 0B 1001:9C D8 B9 63 CD 09 30 99 9F 1231:09 CD C9 FE F0 2D AD 00 0E
0DD9:60 AD 00 DC 29 10 D0 F9 82 1009:9D 04 88 10 E2 A9 3A 8D CA 1239:CD 18 69 09 C9 40 B0 23 DB
0DE1:AD 0D DC 29 10 F0 F9 CE 08 1011:9C 04 6C 70 CD 0A 0A 06 C5 1241:8D 03 CC 8D 0B CC AA BD FD
0DE9:01 CD D0 FB 60 A9 74 85 E9 1019:0A 01 20 EE 0D AE 0A CD 62 1249:00 CB CD 39 CD D0 14 AD 35
0DF1:FF A9 00 85 FE A2 17 A9 29 1021:BD 80 CA 85 FF BD C0 CA 35 1251:09 CD C9 02 F0 0D AD 00 DD
0DF9:02 8D 02 CF A9 21 8D 01 A3 1029:85 FE A2 02 A0 03 A9 23 C7 1259:CD 18 69 12 C9 40 B0 03 6C
0E01:CF A0 1F A9 03 8D 00 CF C9 1031:91 FE 88 10 F9 A5 FE 18 68 1261:8D 07 CC AD 4A CD D0 29 D6
0E09:AD 01 CF 91 FE CE 00 CF 52 1039:69 28 85 FE A5 FF 69 00 B8 1269:AD 1C CD D0 05 AD 26 CD 2B
0E11:10 D0 AD 01 CF 49 03 8D 75 1041:85 FF CA 10 E7 4C 45 0E 87 1271:F0 11 A9 FF 8D 00 CC 8D 1B
0E19:01 CF A9 03 8D 00 CF 88 A3 1049:20 06 10 A0 06 2D A3 0D 44 1279:01 CC 8D 04 CC 8D 05 CC B6
0E21:10 E6 CE 02 CF 10 D0 A9 7B 1051:A0 06 20 BE 0D AD 0C 2F 1281:4C 92 12 A9 FF 8D 02 CC 54
0E29:02 8D 02 CF AD 01 CF 49 41 1059:29 10 D0 10 AE 00 CD 8E CC 1289:8D 03 CC 8D 06 CC 8D 07 D
0E31:03 8D 01 CF A5 FE 18 69 12 1061:07 CD BD 00 CB C9 21 D0 C8 1291:CC 60 A9 3F 8D 31 CD A9 D3
0E39:28 85 FE A5 FF 69 00 85 30 1069:03 4C DA 0D 20 8A 10 AE 44 1299:00 8D 32 CD AE 31 CD BD D7
0E41:FF CA 10 BD A9 3F 8D 0F 62 1071:00 CD BD 00 CB C9 21 F0 75 12A1:00 CB CD 33 CD D0 5F 8E A4
0E49:CD AE 0F CD BD 80 CA 85 C1 1079:08 A9 0F 8D 06 CD 4C 87 4A 12A9:00 CD BD 80 CB 8D 1C CD 9B
0E51:FF BD C0 CA 85 FE BD 00 45 1081:10 A9 0D 8D 06 CD 4C 4C DA 12B1:20 8B 11 A0 07 B9 00 CC 0E
0E59:CB F0 29 C9 21 F0 0F BD 02 1089:10 AD 00 DC 8D 02 CD AD A8 12B9:30 28 8D 34 CD AA BD 00 89
0E61:80 CB F0 05 A9 2A 4C 7B 29 1091:00 CD AE 00 CD BD C0 CB AD 12C1:CB D0 1A A9 01 8D 32 CD 4E
0E69:0E A9 26 4C 7B 0E BD 80 90 1099:AA AD 02 CD 29 04 D0 0A 9C 12C9:AD 34 CD 8D 30 CD AD 00 78
0E71:CB F0 05 A9 28 4C 7B 0E 62 10A1:E0 FF F0 39 CE 00 CD 4C 42 12D1:CD 8D 40 CD 98 29 03 8D 22
0E79:A9 24 A0 29 91 FE 18 69 3C 10A9:DE 10 AD 02 CD 29 08 D0 07 12D9:42 CD 4C E3 12 A9 FF 99 2B
0E81:01 C8 91 FE CE 0F CD 10 D0 10B1:0A E0 FE F0 06 EE 00 CD B7 12E1:00 CC 88 10 D0 A2 03 BD 20
0E89:C0 A9 00 85 FE 85 FC A9 7A 10B9:4C DE 10 AD 02 CD C9 7E ED 12E9:04 CC 30 17 8D 41 CD AD 75
0E91:04 85 FD A9 74 85 FF A9 CE 10C1:D0 0B AD 00 CD E9 08 8D 76 12F1:31 CD 8D 3F CD A9 01 8D 6C
0E99:17 8D 10 CF A0 1F B1 FE 87 10C9:00 CD 4C DE 10 AD 02 CD DD 12F9:3E CD 8E 43 CD BD 08 CC 38
0EAL:91 FC 29 0F AA A5 FD 85 49 10D1:29 0D 0C 14 AD 00 CD 18 83 1301:8D 44 CD CA 10 E1 CE 31 C
0EA9:FA 18 69 D4 85 FD BD 97 FA 10D9:69 08 8D 00 CD AD 00 CD 55 1309:CD 10 91 60 A0 0D 20 BE 8A
0EB1:0D 91 FC A5 FA 85 FD 88 25 10E1:29 3F 8D 00 CD 20 1B 10 4D 1311:0D AD 00 DC 29 10 D0 4B 6D
0EB9:10 E4 A5 FE 18 69 28 85 F7 10E9:A9 14 8D 05 CD CE 04 CD 65 1319:AD 00 CD CD 12 CD F0 0A 60
0EC1:FE 85 FC A5 FD 69 00 85 D3 10F1:D0 FB CE 05 CD 0E F6 60 A3 1321:AD 06 CD C9 0D F0 03 4C 74
0EC9:FD 18 69 70 85 FF CE 10 F8 10F9:20 19 0F 15 12 20 20 0D 02 1329:0D 13 AD 00 CD C9 08 B0 A6
0ED1:CF 10 C9 60 A9 07 8D 18 B5 1101:19 20 14 15 12 0E 07 01 63 1331:05 A9 01 8D 1C CD C9 38 21
0ED9:CD A9 36 8D 16 CD A9 74 96 1109:0D 05 20 09 13 03 0F 0D 57 1339:90 05 A9 00 8D 1C CD AE 45
0EE1:85 FF A0 00 84 FE A9 1B 63 1111:0D 01 0E 04 14 0F 20 0D 26 1341:00 CD AD 1C CD 9D 80 CB 04
0EE9:8D 17 CD A2 07 AD 16 CD 5F 1119:0F 16 05 20 0F 16 05 12 D7 1349:A9 00 8D 1D CD AD 11 CD DC
0EF1:99 00 CA AD 17 CD 99 40 72 1121:20 20 13 05 0C 05 03 14 9C 1351:C9 04 90 05 A9 01 8D 1D 49
0EF9:CA 18 69 20 8D 17 CD A5 BA 1129:20 13 05 0C 05 03 14 20 FD 1359:CD A0 14 A9 0E 8D 06 CD 2C
0F01:FE 99 C0 CA 18 69 04 85 BD 1131:10 0C 05 01 13 05 20 20 1C 1361:4C BE 0D 20 8A 10 A2 07 E1
0F09:FE A5 FF 99 80 CA 69 00 AB 1139:20 19 0F 15 20 20 09 20 98 1369:BD 00 CC CD 00 CD F0 0B 09
0F11:85 FF A9 00 99 00 CB 99 25 1141:08 01 16 05 20 0A 15 0D 1B 1371:CA 10 F5 A9 0F 8D 06 CD E2
0F19:40 CB 99 80 CB 99 C0 CB 97 1149:10 09 0E 07 06 09 07 08 52 1379:4C 0D 13 8E 11 CD AD 11 80
0F21:C8 CA 10 C9 AD 16 CD 18 6E 1151:14 05 12 14 01 12 07 05 A5 1381:CD 29 03 AA BD 08 CC 8D 19
0F29:69 18 8D 16 CD A5 FE 18 30 1159:14 20 13 14 01 0E 04 02 7B 1389:1E CD AE 00 CD BD 00 CB 39
0F31:69 58 85 FE A5 FF 69 00 BA 1161:19 20 20 17 09 0E 20 20 6E 1391:D0 05 A9 0D 8D 06 CD 4C D3
0F39:85 FF CE 18 CD 10 A7 A2 16 1169:20 20 17 0F 0E 20 20 10 B8 1399:0D 13 00 A9 00 8D 26 CD F5
0F41:0B BD A9 0F A8 A9 25 99 4A 1171:05 0E 01 0C 14 19 20 7D 3D 13A1:8D 3E CD 8D 3B CD A9 01 16
0F49:00 CB A9 0F 99 40 CB BD A3 1179:11 4C 0D 13 AE 00 CD BD D8 13A9:8D 3D CD A9 21 8D 33 CD AD
0F51:B5 0F A8 A9 21 99 00 CB F8 1181:80 CB 8D 1C CD A9 00 9D FC 13B1:A9 25 8D 39 CD 20 93 12 63
0F59:A9 07 99 40 CB CA 10 E1 D0 1189:80 CB A2 07 A9 FF 9D 00 2C 13B9:AD 32 CD D0 03 4C 8B 14 7E
0F61:A2 07 BD C1 0F 9D C0 CB A2 1191:CC 9D 08 C8 8D 2D CD CA D6 13C1:AD 36 CD 30 F8 20 49 10 F3
0F69:9D C8 CB 9D D0 CB 9D D8 A5 1199:10 F2 AE 00 CD 8E 12 CD F0 13C9:20 23 16 20 EE 0D 20 99 13
0F71:CB 9D E0 CB 9D E8 CB 9D 7B 11A1:BD C0 CB 8D 09 CD C9 FF 38 13D1:16 20 77 11 AD 12 CD 2A
0F79:F0 9C 9D F8 CB CA 10 E2 D2 11A9:F0 25 AD 00 CD 18 69 F7 DC 13D9:00 CD D0 06 20 95 17 4C BF
0F81:AD 14 03 8D 70 CD AD 15 DF 11B1:8D 00 CC 8D 08 CC AA BD 93 13E1:C6 13 20 AD 14 AD 3E CD B0

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PROGRAMS

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13E9:F0 08 AD 3B CD D0 03 20 CB
13F1:7B 15 A0 0D 20 A3 0D A0 4A
13F9:14 A9 0E 8D 06 CD 20 BE 95
1401:0D A9 01 8D 26 CD A9 00 CE
1409:8D 3D CD 8D 3B CD 8D 3E 44
1411:CD A9 25 8D 33 CD A9 21 4D
1419:8D 39 CD 20 93 12 AD 32 84
1421:CD D0 03 4C 9B 14 AD 35 47
1429:CD 30 F8 AD 3E CD F0 2A 73
1431:8D 1D CD AD 43 CD 8D 11 79
1439:CD AD 3F CD 8D 00 CD 20 A0
1441:23 16 20 EE 0D 20 99 16 A5
1449:AD 41 CD 8D 00 CD AD 44 02
1451:CD 8D 1E CD 20 AD 14 4C 90
1459:81 14 4C BA 14 A9 00 8D 51
1461:1D CD AD 42 CD 8D 11 CD F9
1469:AD 40 CD 8D 00 CD 20 23 A5
1471:16 20 EE 0D 20 99 16 A5 9C
1479:30 CD 8D 00 CD 20 AD 14 3D
1481:AD 00 CD C9 38 B0 03 4C AD
1489:9C 13 A0 14 20 A3 0D A0 64
1491:22 A9 0A 8D 06 CD 20 BE B5
1499:0D 60 A0 14 20 A3 0D A0 FF
14A1:1B A9 0A 8D 06 CD 20 BE 42
14A9:0D 4C 9A 14 20 EC 17 20 03
14B1:EE 0D 20 65 17 20 EE 0D 13
14B9:60 AD 54 CD D0 48 A9 01 E0
14C1:8D 4A CD A9 3F 8D 50 CD 36
14C9:AE 50 CD BD 00 CB C9 25 DA
14D1:D0 2F 8E 00 CD 20 8B 11 17
14D9:A9 02 8D 42 CD AE 02 CC 27
14E1:8E 30 CD BD 00 CB F0 3B 3F
14E9:AE 50 CD 8E 00 CD 20 8B 23
14F1:11 A9 03 8D 42 CD AE 03 EF
14F9:CC 8E 30 CD BD 00 CB F0 85
1501:22 CE 50 CD 10 C2 A9 00 B5
1509:8D 4A CD 20 93 12 4C 5E 24
1511:14 AE 50 CD A9 25 9D 00 F4
1519:CB AD 42 CD C9 03 D0 C8 7E
1521:4C 02 15 AE 00 CD A9 00 0A
1529:9D 00 CB AD 30 CD 8D 00 4A
1531:CD 20 8B 11 AE 02 CC 30 14
1539:13 BD 00 CB F0 0E C9 25 91
1541:F0 0A AE 01 CC 30 05 BD 3B
1549:00 CB F0 C5 AE 03 CC 30 2C
1551:16 AE 03 CC BD 00 CB F0 D5
1559:0E C9 25 F0 0A AE 00 CC 88
1561:30 05 BD 00 CB F0 AA AE C2
1569:50 CD 8E 40 CD A9 25 9D 02
1571:00 CB A9 00 8D 4A CD 4C 41
1579:5E 14 20 0B 16 A9 41 8D F3
1581:0B D4 A9 12 8D 3E CD AE 6C
1589:3F CD BD 00 CB F0 03 8E 35
1591:00 CD AD 9A 0D 49 0D 8D C3
1599:9A 0D 8D 08 D4 8D 0A D4 4C
15A1:8D 06 CD A0 29 20 BE 0D 2C
15A9:20 1B 10 20 EE 0D CE 3E 36
15B1:CD D0 DF A9 40 8D 0B D4 B0
15B9:20 23 16 20 EE 0D 20 99 07
15C1:16 20 02 16 A9 FA 8D 0D 02
15C9:D4 8D 0C D4 A9 2C 8D F8 A2
15D1:07 8D F9 07 A9 30 8D 20 DB
15D9:CD A9 81 8D 0B D4 A9 00 5D
15E1:8D 17 D4 20 24 17 A9 01 07
15E9:8D 08 D4 A9 80 8D 0B D4 37
15F1:8D 04 D4 A9 00 8D 00 D0 20
15F9:8D 02 D0 AE 3D CD DE 35 84
1601:CD A2 04 20 8E 16 CA 10 B1
1609:FA 60 A2 06 BD 4E 17 9D 72
1611:07 D4 CA 10 F7 60 A2 06 DC

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1619:BD 4E 17 9D 00 D4 CA 10 6D
1621:F7 60 20 17 16 A9 13 8D E1
1629:17 D4 A9 1F 8D 18 D4 20 D3
1631:89 16 A9 41 8D 04 D4 AE C5
1639:00 CD 8E 45 CD BD 80 CB 31
1641:8D 47 CD BD 00 CB 8D 0D F2
1649:CD A9 21 8D F8 07 8D F9 BC
1651:07 BD 40 CB 8D 0E CD 8D 03
1659:27 D0 A9 00 9D 00 CB 9D A4
1661:40 CB 8D 28 D0 BD 00 CA 1D
1669:8D 01 D0 8D 03 D0 BD 40 A6
1671:CA 8D 00 D0 8D 02 D0 60 E9
1679:A9 05 8D 10 CD 4C 8E 16 41
1681:A9 0F 8D 10 CD 4C 8E 16 CB
1689:A9 46 8D 10 CD CE 0F CD 64
1691:D0 FB CE 10 CD D0 F6 60 FF
1699:20 89 16 EE F8 07 EE F9 A5
16A1:07 AD F8 07 C9 24 D0 F0 BD
16A9:A9 81 8D 04 D4 A2 04 A0 D6
16B1:03 20 89 16 C8 C8 8C 01 7D
16B9:D4 EE 03 D0 CE 01 D0 CA 60
16C1:10 EF 60 A9 02 8D 15 CD D6
16C9:20 81 16 CE 15 CD A9 0E 57
16D1:8D 01 D4 AD 01 D0 69 03 9B
16D9:CD 14 CD D0 01 60 AD 1B B8
16E1:CD C9 24 F0 09 EE 01 D0 D1
16E9:EE 03 D0 4C F5 16 CE 01 D3
16F1:D0 CE 03 D0 AD 23 CD C9 07
16F9:2A F0 14 EE 00 D0 EE 02 0C
1701:D0 AD 15 CD 10 C2 EE 00 EB
1709:D0 EE 02 D0 4C C4 16 CE 19
1711:00 D0 CE 02 D0 AD 15 CD A2
1719:10 AE CE 00 D0 CE 02 D0 6B
1721:4C C4 16 A9 04 8D 01 D4 31
1729:20 89 16 AD F8 07 CD 20 07
1731:CD F0 14 B0 09 EE F8 07 0D
1739:EE F9 07 4C 29 17 CE F8 3F
1741:07 CE F9 07 4C 29 17 A9 35
1749:0E 8D 01 D4 60 FF 04 FF 5A
1751:07 80 C1 FC 24 24 28 28 55
1759:2A 26 2A 26 2B 25 29 27 35
1761:27 29 25 2B AD 11 CD 29 3B
1769:03 AA BD 5D 17 8D 20 CD 4E
1771:20 24 17 BD 55 17 8D 1B B4
1779:CD BD 59 17 8D 23 CD AE DD
1781:00 CD 8E 46 CD BD 00 CA 89
1789:8D 14 CD BD 40 CA 8D 53 B4
1791:CD 20 C4 16 A9 24 8D 20 C1
1799:CD 20 24 17 A2 03 8E 01 EB
17A1:D4 20 89 16 CE 03 D0 EE E7
17A9:01 D0 AD 00 D0 CD 53 CD 74
17B1:F0 11 B0 09 EE 00 D0 EE 4B
17B9:02 D0 4C C4 17 CE 00 D0 B7
17C1:CE 02 D0 CA 10 DB A9 21 03
17C9:8D 20 CD 20 24 17 A9 80 D3
17D1:8D 04 D4 A9 00 8D 00 D0 04
17D9:8D 02 D0 AE 00 CD AD 0D F3
17E1:CD 9D 00 CB AD 0E CD 9D F9
17E9:40 CB 60 AD 1D CD D0 01 D4
17F1:60 8D 3B CD AD 11 CD 29 6E
17F9:03 AA BD 5D 17 8D 1F CD DC
1801:BD 61 17 8D 21 CD A9 13 CA
1809:8D 17 D4 20 0B 16 A9 21 87
1811:8D 0B D4 8D FA 07 8D FC 4A
1819:07 AE 1E CD BD 40 CB 8D 2D
1821:29 D0 BD 00 CA E9 03 8D 63
1829:05 D0 8D 09 D0 BD 40 CA 1B
1831:8D 04 D0 8D 08 D0 A9 00 F2
1839:8D 2B D0 9D D0 CB 20 EE 4D
1841:0D 20 89 16 AD FA 07 8D 87

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1849:0A D4 C9 25 F0 0F EE FA DB
1851:07 EE FC 07 CE 05 D0 EE EB
1859:09 D0 4C 42 18 20 89 16 5A
1861:AD FA 07 CD 21 CD F0 09 10
1869:EE FA 07 EE FC 07 4C 5E 9A
1871:18 AD 1F CD 8D 20 CD 20 82
1879:24 17 A9 FC 8D 0D D4 A9 7A
1881:80 8D 0B D4 20 89 16 A9 01
1889:81 8D 0B D4 A9 11 8D 17 50
1891:D4 A9 01 8D 2A D0 8D 21 60
1899:CD A9 20 8D FB 07 AD 01 50
18A1:D0 69 02 8D 07 D0 AD 00 84
18A9:D0 8D 06 D0 20 79 16 EE 75
18B1:21 CD AD 21 CD 8D 08 D4 37
18B9:AD 07 D0 CD 05 D0 F0 21 E7
18C1:B0 06 EE 07 D0 4C CC 18 83
18C9:CE 07 D0 AD 06 D0 CD 04 2B
18D1:D0 F0 D9 B0 06 EE 06 D0 B5
18D9:4C AD 18 CE 06 D0 4C AD 45
18E1:18 A9 01 8D 08 D4 A9 80 E8
18E9:8D 0B D4 A9 00 8D 06 D0 EB
18F1:8D 08 D0 A9 2C 8D FA 07 34
18F9:20 89 16 AD FA 07 C9 30 F1
1901:F0 06 EE FA 07 4C F9 18 30
1909:A9 00 8D 04 D0 AE 26 CD 5D
1911:DE 35 CD 60 00 00 00 00 BF

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Michael Sedlezky, the author of *HoverJet* (October 1991), lives in Mississauga, Ontario, Canada.

COUNTRY CAB

Alain Tremblay

The people in a remote countryside community are looking for a cabdriver. The job has a certain appeal, and you decide to apply for it. Unfortunately, there is another contender for the position, so the residents must find a way to determine which of you to hire. They decide to put both of you to a test, with the job going to the most reliable cabdriver.

In this one- or two-player game, the first player to reach 500 gas points and attain a rating of A wins the game. You are also penniless and must earn enough money to pay for the local cabdriver's license.

Entering the Program

Country Cab is written entirely in machine language. To type it in, use *MLX*, our machine language entry program. See "Typing Aids" elsewhere in this section. When *MLX* prompts, respond with the following values.

Starting address: 0801

Ending address: 1CBO

The screen is divided into two halves,

a half for each cab. Each player can drive his or her car freely along roads and country lanes. The halves are separated by two lines of text. These lines provide players with useful information about their respective ratings, gas points earned, and fare status.

Only part of the countryside is visible at a time, and it's very easy to drive off the road. No harm will come unless you run into a fence or a tree at high speed. You may bog down, however. Unlike in real traffic, collisions have no effect at all.

One joystick is required to control each car. To accelerate, move the stick forward. Move the stick right or left to turn, and pull it back to brake. To shift into reverse gear, bring your car to a complete stop and press the fire button. Repeat the process to shift the cab back into forward gear.

From time to time, potential fares will appear on the road. A fare's presence is indicated by an onscreen hand. Its thumb points in the direction in which you're likely to find the waiting fare. The fare itself will appear on your screen as a flashing green character. To pick up a fare, stop your car close to the flashing character. The fare will point you toward his or her destination. The exact spot on the road is marked by an X, which flashes on your screen as you drive by. If another customer appears, feel free to stop. You can pick up as many as two fares at a time. Just as you would with human passengers, you'll have to humor you fares to win their esteem. Some will tell you to drive slower; others faster. Do as they say if you want your rating to improve and earn the job as driver.

They also pay, and you need gas points to win the game. Drive according to your fare's indications and check his or her mood. Infuriated fares exasperated by a driver's lack of compliance will leave without paying. Some fares are special. Watch out for a monster that eats cabdrivers who make him angry. A prison escapee is a generous fellow, but giving him a ride is unlawful. Picking him up could get you in trouble with the sheriff. There's also a robber who may change your fortune for the worse. In most cases, though, it's best to do exactly as you are told.

Edit Your Maps

Also included is an optional editor that allows you to edit, save, and load previously saved maps so you can change the game's layout.

Map Editor is written entirely in machine language. Use *MLX* again to enter it. When *MLX* prompts you, respond with the following values.

Starting address: 2000

Ending address: 2247

Remember to save a copy of the program before you exit *MLX*.

To use *Map Editor*, load *Country Cab* without running it; then load *Map Editor* with the .8,1 extension. Then type SYS 8192 and press Return.

The screen will clear, and you will then see a much reduced and approximate representation of the actual map found in the game.

The map is composed of 12 x 21 "tiles." Each tile is composed of several characters to make up roads, trees, and so on. On the editor's screen, each tile is represented by a single character which roughly depicts its corresponding tile in the game. There are 21 such characters. The only character which may be difficult to decipher is the Commodore club character (ASCII 120 or Screen Code 88). This figure represents a forest tile.

Edit from the keyboard. Each tile character has a corresponding letter listed at the top of the screen. A cursor helps you to see where your next selection will be entered. The Home, Del, Return, and cursor keys work the same as in BASIC except that the cursor is restricted to the 12 x 21 area. You can use the space bar instead of the G key to enter blanks. Press f3 to load a saved map and f5 to save the one you are currently editing. In both cases you will be asked for a filename. After the load or save, you may resume editing.

To play the game, press f7. Be sure you have saved it first, or your editing will be lost. Once a game has started, you cannot return to the editor.

Any saved map can only be played after it has been loaded by the map editor. You cannot substitute your own map for the original one found in the game. That would require the game being rewritten and compiled.

COUNTRY CAB

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0801:0B 08 0A 00 9E 32 30 36 2E
0809:32 00 00 00 00 20 D3 11 6B
0811:20 9B 14 20 DD 15 20 8B AB
0819:0F A2 40 A9 00 95 37 9D 5E
0821:F0 3F 9D D0 CF BD FA 11 B6
0829:9D 00 D4 CA 10 ED 20 A4 6C
0831:0E 20 84 10 20 13 12 A2 F5
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PROGRAMS

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12A9:C9 13 56 0E B0 F3 B5 64 48 14D9:34 BD 40 32 9D 00 35 E8 F6 1709:46 71 CE 46 71 CF 04 46 0E
12B1:C9 FE D0 07 F6 64 A0 12 A1 14E1:D0 F1 A9 09 85 05 20 5E 93 1711:71 CF 05 46 71 CF 06 46 0E
12B9:4C BE 13 A6 0D 10 77 A6 BE 14E9:15 A2 3C A9 03 85 02 B1 4B 1719:71 CF 07 46 71 CF 0A 41 59
12C1:03 C0 04 D0 05 AC 12 D0 F4 14F1:22 84 04 48 8A A8 68 91 AA 1721:CF 0B 41 B0 F0 0B 45 0F 7A
12C9:10 59 A4 02 D0 06 B4 63 6C 14F9:24 B1 22 A4 04 91 24 E8 C6 1729:0A 4D 50 F0 09 4E 50 F0 DB
12D1:D6 63 D0 2A A6 04 B5 4C F3 1501:C8 C6 02 D0 EA 8A 38 E9 C6 1731:08 4F 04 50 F0 07 4B F0 E7
12D9:A8 15 0F 95 0F 98 20 E3 D1 1509:06 AA 10 DF C6 05 D0 D6 A3 1739:48 4F 48 4B F0 54 5F 3C F0

```

PROGRAMS

1741:4B F0 54 5F 0C AF 30 4B 9C	1971:03 83 80 04 84 80 07 7D 08	1BA1:9A 61 64 73 00 73 9C 04 4C
1749:F0 54 5F 07 41 CF 08 41 FB	1979:00 0C 0B 00 0B 0A 00 10 A0	1BA9:73 A9 40 A2 20 39 07 7C A6
1751:CF 09 41 CF 0A 41 CF 0B CE	1981:F6 00 08 8C 00 07 84 00 1E	1BB1:D5 A7 47 9D 97 11 29 D9 AC
1759:41 B0 F0 0B 45 0F 0A 4D EA	1989:00 78 FB 0A C0 00 03 20 26	1BB9:42 94 33 52 99 CD DF FF 85
1761:50 46 7F 06 4E 50 46 7F 59	1991:00 04 10 00 08 08 00 7F A6	1BC1:FF FF 6C 9A 41 D2 71 A7 0F
1769:05 4F 04 50 46 7F 04 4F FA	1999:04 00 50 82 00 88 42 01 A7	1BC9:9D A7 A9 49 A2 91 08 22 10
1771:05 50 46 7E 4F 06 50 46 60	19A1:74 44 06 42 48 08 81 50 B9	1BD1:67 79 A2 90 00 00 44 00 FF
1779:7D 4F 07 50 46 74 F0 08 0E	19A9:1F 82 60 28 45 80 44 39 88	1BD9:04 99 99 98 88 04 40 33 3D
1781:50 46 7F 09 50 46 F0 0A 71	19B1:00 42 26 00 25 28 00 18 1B	1BE1:37 44 82 55 55 54 63 37 64
1789:50 4F 0B 50 B1 C4 1C D4 C7	19B9:D0 00 08 60 00 04 80 00 6C	1BE9:44 3A 42 37 01 44 03 37 E2
1791:1C E4 CE 4C E4 CE 4C E4 85	19C1:03 FB 0E 30 00 00 C8 00 CA	1BF1:00 23 34 43 44 43 63 33 D4
1799:CE 4C E4 CE 4C E4 BE 4C 8B	19C9:17 04 00 1F 04 00 08 C2 2F	1BF9:3A 47 37 00 23 00 34 40 C7
17A1:E4 CE 4C E4 CE 4C E4 CE 0E	19D1:03 3C 42 1C C2 21 7D 03 37	1C01:33 37 44 03 33 37 44 34 8C
17A9:4C E4 CE 4C 4C 4C 3C 43 B7	19D9:21 93 01 4E 88 87 B0 88 D2	1C09:03 40 3A 42 30 43 23 00 13
17B1:BF 3C 4B F0 30 4F 0C AB C9	19E1:F8 C0 54 A7 00 63 38 00 C3	1C11:34 43 00 34 03 74 03 04 6B
17B9:F0 0B 43 F0 0A 43 CF 09 A0	19E9:21 C0 00 16 00 00 08 FB 4A	1C19:30 30 03 44 30 43 44 23 54
17C1:43 CF 08 43 CF 07 43 BF B9	19F1:1C 02 00 7F FF FE 8E 8B 4F	1C21:33 A4 43 03 00 34 43 40 4C
17C9:0B 52 F0 0A 52 9F 09 52 46	19F9:83 89 FC 41 89 02 21 F9 94	1C29:34 44 23 A4 44 75 23 3A B3
17D1:98 F0 08 52 98 4F 07 52 11	1A01:02 21 89 02 21 89 FC 41 3A	1C31:44 34 43 74 40 30 00 48 53
17D9:98 D4 F0 06 52 98 E4 F0 B7	1A09:8E 8B 83 7F FF FE FB 1A DD	1C39:14 00 04 03 04 23 33 33 72
17E1:05 52 98 F0 04 48 04 52 01	1A11:AA 00 02 AA 00 02 AA 00 E2	1C41:38 89 33 24 46 33 A4 00 E8
17E9:98 F0 05 4E 52 98 F0 06 03	1A19:02 AA 00 02 FE 00 02 FE 14	1C49:00 04 04 00 00 00 00 04 07
17F1:4D 52 98 F0 07 45 29 8F AC	1A21:00 03 C3 80 03 AB 80 03 61	1C51:44 00 2E BD EA 3C CA 95 C0
17F9:08 42 98 F0 09 4B 00 00 54	1A29:AB 80 03 AB 80 03 AB 80 56	1C59:6C DB D6 BA 49 BB 3F 7D 7A
1801:00 55 1D 15 15 05 05 01 43	1A31:02 EE 00 02 FE 00 02 FE 3D	1C61:BD B2 BF 02 E5 2D B2 D7 5E
1809:01 40 40 50 50 D4 54 54 A9	1A39:00 02 AA 00 02 AA 00 02 FF	1C69:64 F1 6D 27 AB BF ED 7F 28
1811:55 01 01 05 05 15 1D 15 68	1A41:AA 00 00 AA FB 0C 2A 00 D9	1C71:5D A9 2F DE E3 D5 FF 9D AA
1819:55 55 54 54 54 50 5D 40 DD	1A49:00 2A A0 00 2A A0 00 2A 1A	1C79:DB E9 4F AF 67 90 79 65 DA
1821:40 57 55 55 55 75 55 55 C7	1A51:A0 00 3F A0 00 FF 80 00 C8	1C81:55 2D 29 AD 4B 51 3F FE CC
1829:55 18 18 18 7E 3C 18 18 D9	1A59:C3 80 00 AB 80 03 AB 80 32	1C89:ED 5B 7B D5 F3 81 E3 84 4E
1831:00 A5 A5 A9 A9 9A 5A 56 DC	1A61:03 AB 00 03 AB 00 00 CF 5F	1C91:1E 22 06 D9 1F 9B 78 A1 B9
1839:D6 75 55 55 5D 55 55 95 B2	1A69:00 03 FF 00 0A FE 00 0A B4	1C99:E2 D8 DF 9E C6 FC D1 C7 F4
1841:95 5A 5A 6A 6A A6 A5 95 93	1A71:A8 00 0A A8 00 00 A8 FB 13	1CA1:E5 84 36 24 7C B9 9F 7F 80
1849:97 55 55 D5 5D 55 55 56 E3	1A79:10 80 00 02 A0 00 0A A0 AF	1CA9:F3 EB FE 20 00 00 00 00 B8
1851:76 55 75 55 AA AA 65 67 48	1A81:00 00 A8 00 3F A8 00 FF 67	
1859:55 59 59 D9 59 59 79 59 CF	1A89:E8 00 CB E8 03 EB E0 0F D2	
1861:59 57 AD 5B DF F7 7F 56 B3	1A91:AA E0 0C AB C0 2F AB 00 A9	
1869:FD 7F B5 FD DF 7D EB EF CB	1A99:2B EF 00 2B F8 00 2A F0 1F	
1871:F5 57 F5 55 D5 55 75 D5 4B	1AA1:00 0A B0 00 0A 80 00 02 C2	
1879:D5 57 7F 7F 5D 55 75 55 D2	1AA9:80 FB 13 20 00 00 A8 00 D2	
1881:55 77 FD FF D9 56 75 55 62	1AB1:00 A8 00 3F 28 00 C3 E8 B5	
1889:55 57 55 D5 D5 75 55 55 C6	1AB9:03 28 EA 03 A8 EA CA AA FB	
1891:55 00 40 44 55 05 05 04 85	1ACL:E0 AF A8 80 AF 0F 00 2B 54	
1899:15 00 44 44 10 04 44 44 AE	1AC9:FE 0B 28 C0 00 2A 00 00 37	
18A1:00 C0 00 00 F0 00 00 78 02	1AD1:08 FB 24 A3 FF A8 AF 03 CC	
18A9:00 C0 1E 01 80 0F 03 80 A4	1AD9:EA AF AB EA 0F AB EA AF 40	
18B1:07 83 00 0B E7 70 1D DF 50	1AE1:AB EA AF 03 EA A3 FF A8 5B	
18B9:00 2E BF 00 77 7F 00 3A 61	1AE9:FB 16 FB 00 06 2A 09 D4 A2	
18C1:FE 00 D9 FE 00 E7 FC 00 36	1AF1:0B 2D 0D 74 12 D9 42 20 7C	
18C9:5F FA 00 3F F7 00 1F FF 5A	1AF9:B9 70 66 E0 97 99 CF D1 96	
18D1:80 07 FF C0 00 FF C0 00 91	1B01:A2 2C 00 14 22 D1 CD A4 6D	
18D9:3F 80 00 1E 00 00 0C FB BF	1B09:2D 60 B0 4E 6D 60 A2 D3 EE	
18E1:04 C0 00 01 80 00 03 80 DE	1B11:79 D0 D8 09 AC 4D 4E 06 FE	
18E9:03 83 00 0B A7 00 1D DF 84	1B19:07 CD 09 2D A4 2D B0 C9 3F	
18F1:00 2E BF 00 77 7F 00 3A 99	1B21:08 A4 15 ED 07 D2 62 93 E1	
18F9:FE 00 D9 FE 00 E7 FC 00 6E	1B29:27 1C E0 B4 0A D0 D9 43 EB	
1901:5F FA 00 3F F7 00 1F FF 93	1B31:4A E0 29 42 2D 77 FD 1A 6B	
1909:80 07 FF C0 00 FF C0 00 CA	1B39:22 C0 4D 32 26 D9 AF 07 70	
1911:3F 80 00 1E 00 00 0C FB F8	1B41:32 09 67 BD 27 B7 FD 86 36	
1919:0B 01 FF 00 03 01 80 02 30	1B49:20 92 02 94 B2 D3 09 A2 57	
1921:00 80 02 00 80 02 7C 00 39	1B51:9F D8 62 09 20 B4 29 2D BD	
1929:02 82 80 03 01 80 07 7D D2	1B59:09 2D C7 AD 37 47 3F 00 88	
1931:80 02 C6 80 03 83 80 02 2E	1B61:92 DC 7A D1 90 DC D7 9D C9	
1939:82 80 02 82 80 03 7D 80 C0	1B69:B4 0A F0 42 68 47 3D 29 C2	
1941:02 82 80 03 01 80 03 FF 65	1B71:10 82 29 D7 7B F0 A4 2D 09	
1949:80 02 10 80 02 10 80 01 98	1B79:67 79 A2 9D 37 29 D0 67 57	
1951:FF FB 09 1F 00 00 20 E0 B6	1B81:5E 0B 7A 9D 10 92 29 D4 05	
1959:00 40 10 00 40 18 00 BE BE	1B89:9D 7C 29 09 A0 9A D0 30 64	
1961:10 01 C1 10 01 40 A0 01 60	1B91:47 F0 C7 AE 92 DA 42 DB EB	
1969:3C A0 03 C2 40 02 83 40 BF	1B99:47 72 9E 08 62 09 22 03 E2	

MAP EDITOR

2000:A9 2C 8D 14 08 8D 30 16 FF
2008:20 DD 15 A9 80 8D 8A 02 5E
2010:20 CB 20 A9 0C 8D 21 D0 9B
2018:8D 20 D0 20 74 21 20 E4 90
2020:FF A4 D3 AA D0 0F A5 A2 5F
2028:29 10 F0 0F 86 A2 B1 D1 04
2030:49 80 4C 39 20 B1 D1 29 E6
2038:7F 91 D1 8A C9 86 F0 66 30
2040:C9 87 F0 6D C9 88 D0 0B 59
2048:A2 00 1E CF 29 E8 D0 FA 24
2050:4C 0E 08 C9 93 D0 05 20 E1
2058:CB 20 D0 1B C9 91 F0 14 DC
2060:C9 9D F0 10 C9 55 B0 0F 20
2068:C9 20 90 08 D0 02 A9 47 51
2070:29 1F 09 40 20 D2 FF 38 B6
2078:20 F0 FF E0 05 B0 02 A2 A4
2080:05 E0 11 90 02 A2 10 C0 22
2088:0B B0 02 A0 0B 98 29 1F F0
2090:A8 18 20 F0 FF 20 0D 21 F9
2098:B1 22 29 F0 9D CF 29 20 F5
20A0:1F 21 D0 F4 F0 22 20 34 A6
20A8:21 A9 00 20 D5 FF 4C C5 F2
20B0:20 20 34 21 A9 CF 85 22 5B
20B8:A9 29 85 23 A2 CB A0 2A AA
20C0:A9 22 20 D8 FF 20 CB 20 28
20C8:4C 1E 20 A9 93 20 D2 FF 18
20D0:A9 90 20 D2 FF A2 00 A0 66
20D8:00 8A 99 28 04 09 40 99 CF
20E0:00 04 C8 C8 C0 51 B0 09 7D
20E8:E8 E0 14 D0 EC A0 51 D0 C2
20F0:E8 A2 00 8A 9D 00 8D 9D 33
20F8:00 D9 9D 00 DA E8 D0 F4 74

```
2100:20 0D 21 BD CF 29 91 22 FD
2108:20 1F 21 D0 F6 A2 00 A0 36
2110:0B A9 C8 85 22 A9 04 85 F8
2118:23 A9 1E 8D 18 D0 60 C8 80
2120:C0 20 90 0C A5 22 69 27 4D
2128:85 22 90 02 E6 23 A0 0B F7
2130:E8 E0 FC 60 A9 15 8D 18 99
2138:D0 A2 14 A0 00 18 20 F0 A9
2140:FF A2 00 BD 6A 21 20 D2 F1
2148:FF E8 E0 0A D0 F5 A0 00 21
2150:20 CF FF 99 00 90 C8 C9 CD
2158:0D D0 F5 98 A2 00 A0 90 84
2160:20 BD FF A2 08 A0 FF 4C 5B
2168:BA FF 46 49 4C 45 4E 41 BA
2170:4D 45 3F 3A 78 A9 33 85 8C
2178:01 A2 00 BD 00 D0 9D 00 3E
2180:3A BD 00 D1 9D 00 39 BD 89
2188:9B 21 9D 00 38 49 FF 9D 19
2190:00 3C E8 D0 E6 A9 37 85 DD
2198:01 58 60 FB F6 EC D8 B0 0B
21A0:60 C0 80 18 18 66 66 18 14
21A8:18 3C 00 01 03 07 0F 77
21B0:0F 0F 0F 0F 0F 0F 0F 0F F2
21B8:07 03 01 80 C0 60 B0 D8 29
21C0:EC F6 FB 00 00 00 1F D5
21C8:3F 7F FF FF 7F 3F 1F 00 C1
21D0:00 00 00 00 00 00 00 00 13
21D8:00 00 00 FF FF FF FF 1B
21E0:FF FF FF 00 00 00 00 FF 23
21E8:FF FF FF 00 00 00 00 FF 2B
21F0:00 FF FF 0F 0F 0F 0F 06
21F8:0F 0F 0F 0F 0F 0F 0F 95
2200:F0 F0 F0 00 00 00 00 F8 10
2208:FC FE FF DF 6F 37 1B 0D 24
2210:06 03 01 80 C0 E0 F0 F0 9C
2218:F0 F0 F0 F0 F0 F0 F0 F0 5C
2220:E0 C0 80 FF FF FF FF 15
2228:00 00 00 FF FF 00 FF 00 6C
2230:00 00 00 FF FE FC F8 00 52
2238:00 00 00 01 03 06 0D 1B F1
2240:37 6F DF 00 00 00 00 F7
```

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JANUS

Bruce M. Bowden

A 128 with a 1571 or 1581 can load programs much faster than a 64 or a 128 in 64 mode. With this utility, you can take advantage of the 128's speed to load 64 BASIC programs.

Janus is named for the Roman god with two faces to emphasize the fact that it uses both 64 and 128 modes to load a 64 program. There are a couple of advantages for operating this way. First, the 128 can load programs very quickly from a 1571 or 1581 disk drive. Second, you can save a BASIC program and make it available to others so that they needn't be concerned about whether or not their 128 is in the proper mode when they try to run it.

Getting Started

Janus is written entirely in BASIC. To avoid typing errors, enter the program with *The Automatic Proofreader*. See "Typing Aids" elsewhere in this section. When you've finished typing *Janus*, be sure to save a copy of the program to disk before running it.

How to Use Janus

Remember that the *Janus* loader must be loaded and run with your computer in 128 mode. The loader will then set up the machine code and prompt you for a 64 BASIC program name. Should the program being loaded exceed 90 blocks, *Janus* will abort with a message advising you that the program is too large for it to handle.

After the 64 program has been successfully loaded, a message will appear saying that the new loader file may now be saved. Save this new loader in the conventional manner, either by entering SAVE "filename", 8 or DSAVE "filename". The new file can be loaded into a 64 or 128 and run.

You'll notice a big difference when you load the new file in 128 mode. It will take advantage of the 1571's higher speed for loading; then the 128 will switch automatically to 64 mode when the program runs. If you load the program into a 128 in 80-column mode, you'll be advised to switch to the 40-column screen and press a key.

JANUS

```
GD 10 REM COPYRIGHT 1991 - COM
    PUTE PUBLICATIONS INTL L
    TD - ALL RIGHTS RESERVED
JA 100 REM "JANUS, A COMMODORE
    64 BASIC PROGRAM LOADE
    R FOR LOADING FROM BOTH
    "
QP 110 REM "THE COMMODORE 64 A
    ND 128 MODES."
RJ 140 PRINTCHR$(147)CHR$(14)C
    HR$(17)CHR$(17)"SETTING
    UP..."
PE 150 RESTORE220:Y=DEC("1300"
    ):IF PEEK(215) THEN FAS
    T
QD 160 READB$:IF B$="EOF" THEN
    SLOW:SYS DEC("1300")
JS 170 IF LEFT$(B$,1)<>"E" AN
    D LEFT$(B$,1)<>"@" THEN
    210
FH 180 A$=B$:N=0:FOR X=0 TO 15
    :READ B$:POKEY=X,DEC(B$
    ):N=N+DEC(B$):NEXT
```

```
JS 190 READB$:IF N<>VAL(B$) TH
    EN 210
QB 200 Y=Y+16:GOTO160
XR 210 PRINT"THERE IS A DATA E
    ROR IN THE LINE BEGINN
    ING WITH ";A$:END
HD 220 DATA @1,20,7D,FF,0E,0D,
    0D,70,4C,41,43,45,20,54
    ,48,45,20,1130
EJ 230 DATA @2,44,49,53,4B,20,
    54,4F,20,42,45,20,55,53
    ,45,44,20,1030
JG 240 DATA @3,49,4E,54,4F,20,
    54,48,45,20,44,49,53,4B
    ,20,44,52,1084
RM 250 DATA @4,49,56,45,0D,41,
    4E,44,20,45,4E,54,45,52
    ,20,54,48,1054
QB 260 DATA @5,45,20,63,4F,4D,
    4D,4F,44,4F,52,45,20,36
    ,34,20,50,1060
HG 270 DATA @6,52,4F,47,52,41,
    4D,20,66,69,6C,65,20,6E
    ,61,6D,65,1353
CH 280 DATA @7,2E,0D,0D,00,20,
    7E,13,4C,E7,13,00,00,00
    ,00,00,00,575
PQ 290 DATA @8,00,00,00,00,00,
    00,00,00,00,00,00,00,00
    ,00,A9,00,169
SK 300 DATA @9,8D,FD,03,8D,20,
    D0,8D,21,D0,20,7D,FF,1C
    ,5F,9D,9A,2006
GX 310 DATA @A,00,20,E4,FF,F0,
    FB,8D,FE,03,20,D1,13,90
    ,16,AE,FD,2257
PC 320 DATA @B,03,9D,6A,13,EE,
    FD,03,20,D2,FF,AE,FD,03
    ,E0,11,D0,2155
DG 330 DATA @C,D8,4C,C2,13,C9,
    0D,D0,01,60,C9,14,D0,D4
    ,AD,FD,03,2094
SM 340 DATA @D,F0,C7,CE,FD,03,
    20,7D,FF,9D,20,20,9D,9D
    ,00,4C,89,2061
SJ 350 DATA @E,13,8D,FE,03,18,
    C9,20,90,09,E9,5B,B0,05
    ,AD,FE,03,1762
KK 360 DATA @F,38,60,AD,FE,03,
    18,60,A9,6A,85,FB,A9,13
    ,85,FC,A9,2103
PA 370 DATA @G,0F,A2,08,A0,00,
    20,BA,FF,AD,FD,03,A6,FB
    ,A4,FC,20,2112
RB 380 DATA @H,BD,FF,A9,00,A2,
    01,A0,20,20,D5,FF,8C,11
    ,12,8C,D0,1991
FF 390 DATA @I,15,8E,10,12,8E,
    CF,15,AD,11,12,85,FC,C9
    ,80,B0,03,1668
QC 400 DATA @J,4C,77,14,20,7D,
    FF,0D,0D,74,48,45,20,62
    ,61,73,69,1357
FP 410 DATA @K,63,20,50,52,4F,
    47,52,41,4D,20,49,53,20
    ,54,4F,4F,1129
PC 420 DATA @L,20,4C,4F,4E,47,
    20,46,4F,52,20,54,48,45
```

PROGRAMS

```

,20,4C,4F,1043
FA 430 DATA @M,41,44,45,52,2E,
0D,70,4C,45,41,53,45,20,
,41,43,43,1048
JE 440 DATA @N,45,50,54,20,4D,
59,20,41,50,4F,4C,4F,47
,49,45,53,1138
MJ 450 DATA @O,2E,0D,0D,00,4C,
09,40,A9,14,85,FC,A9,1C
,85,FE,A9,1548
XM 460 DATA @P,CC,85,FB,A9,01,
85,FD,A2,16,A0,9D,20,72
,16,A9,00,1982
XM 470 DATA @Q,8D,00,FF,20,7D,
FF,0E,0D,0D,79,4F,55,20
,4D,41,59,1396
BK 480 DATA @R,20,4E,4F,57,20,
53,41,56,45,20,54,48,45
,20,50,52,1062
XA 490 DATA @S,4F,47,52,41,4D,
20,49,4E,20,54,48,45,20
,4E,4F,52,1085
MF 500 DATA @T,4D,41,4C,20,57,
41,59,0D,00,4C,09,40,18
,1C,0A,00,715
EQ 510 DATA @U,8B,20,C2,28,36,
32,29,B2,32,38,20,A7,20
,9E,37,32,1328
KS 520 DATA @V,30,34,00,22,1C,
14,00,9E,32,32,34,39,00
,00,00,A9,718
DP 530 DATA @W,0E,8D,00,FF,A9,
20,8D,06,1D,A9,80,85,FE
,A0,00,84,1763
XF 540 DATA @X,FD,A9,1C,85,FC,
A9,E8,85,FB,A2,1D,A0,D2
,20,A7,1D,2409
BP 550 DATA @Y,A5,D7,F0,78,20,
7D,FF,1C,0E,0D,0D,74,48
,49,53,20,1596
GK 560 DATA @Z,49,53,20,54,48,
45,20,38,30,2D,43,4F,4C
,55,4D,4E,1056
GK 570 DATA @1,20,53,43,52,45
,45,4E,20,53,45,54,54,4
9,4E,47,2E,1100
CH 580 DATA @2,2E,2E,0D,57,48
,45,4E,20,59,4F,55,20,4
8,41,56,45,1020
CH 590 DATA @3,20,41,20,34,30
,2D,43,4F,4C,55,4D,4E,2
0,53,43,52,1000
PH 600 DATA @4,45,45,4E,20,55
,50,2C,0D,50,52,45,53,5
3,20,41,4E,1042
ME 610 DATA @5,59,20,4B,45,59
,20,54,4F,20,43,4F,4E,5
4,49,4E,55,1125
KH 620 DATA @6,45,2E,0D,00,20
,5F,FF,20,E4,FF,F0,FB,A
9,00,8D,00,1826
EM 630 DATA @7,FF,4C,4D,FF,A9
,0C,8D,06,09,A9,80,85,F
E,A0,00,84,1976
XP 640 DATA @8,FD,A9,08,85,FC
,A9,E8,85,FB,A2,09,A0,D
2,20,A7,09,2349
JG 650 DATA @9,4C,E2,FC,09,80
,18,80,C3,C2,CD,38,30,A
9,AE,8D,00,2025
SA 660 DATA @A,80,8D,02,80,A9
,A7,8D,01,80,8D,03,80,4
C,1F,80,00,1512
SF 670 DATA @B,00,00,A2,FF,78
,9A,D8,A2,00,8E,16,D0,2
0,A3,FD,20,1921
QR 680 DATA @C,50,FD,20,15,FD
{1}20,5B,FF,58,20,53,E4
,20,BF,E3,A9,2067
FJ 690 DATA @D,00,8D,20,D0,8D
,21{1}D0,A9,5E,85,FB,A9
,80,85,FC,A9,2261
HP 700 DATA @E,C0,85,FE,A9,00
,85,FD,A2,80,A0,EA,20,B
F,80,4C,00,2245
GF 710 DATA @F,C0,20,42,A6,AD
,1D,80,AA,38,E9,18,8D,1
D,80,18,AC,1763
AE 720 DATA @G,1C,80,AD,1E,80
,85,FC,A9,01,85,FB,85,F
D,A9,08,85,2122
KM 730 DATA @H,FE,20,61,C0,A9
,00,8D,00,08,A9,08,85,2
C,A9,01,85,1550
SB 740 DATA @I,2B,AD,1D,80,85
,2E,85,30,85,32,AD,1C,8
0,85,2D,85,1556
QR 750 DATA @J,2F,85,31,A4,2E
,20,08,A4,A9,93,20,D2,F
F,A9,0E,8D,1780
BC 760 DATA @K,86,02,A9,A0,8D
,84,02,85,34,85,38,20,3
3,A5,58,4C,1526
CF 770 DATA @L,AE,A7,8E,FE,03
,8C,FD,03,A0,00,B1,FB,9
1,FD,A5,FC,2539
FB 780 DATA @M,CD,FE,03,D0,08
,A5,FB,CD,FD,03,D0,01,6
0,E6,FB,D0,2549
PR 790 DATA @N,02,E6,FC,E6,FD
,D0,E3,E6,FE,A9,00,F0,D
D,EA,EA,EA,3218
FB 800 DATA EOF

```

Bruce M. Bowden is a talent with many faces at *COMPUTE* magazine. □

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 copies of both of these handy programs. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope.

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

BUG-SWATTER

In November's "Programmer's Page," Randy Thompson featured a short program called *Flood* that had been submitted by Geza Lucz. Due to a printing error, the listing was omitted from the column. That listing is printed below.

The object of the game is to build flood walls that will contain a spreading body of water (represented by asterisks). Move with the cursor keys and press Return wherever you want to build a section of wall. Your score is determined by how quickly and effectively you can accomplish this task. □

FLOOD

```

FM 100 POKE 53281,14:PRINT CHR
$(147):POKE 53281,6
KF 110 DIM A(2000),B(299)
BS 120 B(1)=1:B(2)=-1:B(3)=40:
B(4)=-40
KC 130 B(29)=1:B(157)=-1:B(145
)=-40:B(17)=40
GQ 140 FOR I=0 TO 39
FG 150 POKE 1024+I,42:POKE1984
+I,42
DH 160 POKE 1024+INT(I/1.6)*40
,42
MB 170 POKE 1063+INT(I/1.6)*40
,42
MR 180 NEXT
CK 190 FOR W=1 TO 2
SD 200 A(W)=INT(RND(1)*999)+10
24
AH 210 IF PEEK(A(W))<>32 THEN
{SPACE}200
DG 220 POKE A(W),42
DX 230 NEXT
XE 240 B=2:A=1:R=32
JQ 250 H=1447:POKEH,102
GP 260 L=0
ER 270 FOR I=A TO B
JJ 280 FOR J=1 TO 4
DX 290 IF PEEK(A(I)+B(J))<>32
{SPACE}THEN 310
GP 300 L=L+1:A(B+L)=A(I)+B(J):
POKEA(B+L),42
BE 310 NEXT
FH 320 GOSUB 370
KG 330 NEXT
QB 340 A=B:B=B+L
MP 350 IF L=0 THEN PRINT"{CLR}
CONGRATULATIONS. YOUR S
CORE IS" 874-B:END
PP 360 GOTO 260
QH 370 GET RS:RS=RS+" "
PA 380 IF ASC(R$)=13 THEN R=91
AQ 390 IF PEEK(H+B(ASC(R$)))<>
32 THEN RETURN
ED 400 POKE H,R
QM 410 H=H+B(ASC(R$))
RD 420 R=PEEK(H):POKE H,102
RB 430 RETURN

```


THE AUTOMATIC PROOFREADER

Philip I. Nelson

The Automatic Proofreader helps you type in program listings for the 128 and 64 and prevents nearly every kind of typing mistake.

Type in *Proofreader* exactly as listed. Because the program can't check itself, type carefully to avoid mistakes. Don't omit any lines, even if they contain unusual commands. After you've finished, save a copy before running it.

Next, type RUN and press Return. After the program displays the message *Proofreader Active*, you're ready to type in a BASIC program.

Every time you finish typing a line and press Return, *Proofreader* displays a two-letter checksum in the upper left corner of the screen. Compare this result with the two-letter checksum printed to the left of the line in the program listing. If the letters match, the line probably was typed correctly. If not, check for your mistake and correct the line.

Proofreader ignores spaces not enclosed in quotation marks, so you can omit or add spaces between keywords and still see a matching checksum. Spaces inside quotes are almost always significant, so the program pays attention to them.

Proofreader does not accept keyword abbreviations (for example, ? instead of PRINT). If you use abbreviations, you can still check the line by listing it, moving the cursor back to the line, and pressing Return.

If you're using *Proofreader* on the 128, do not perform any GRAPHIC commands while *Proofreader* is active. When you perform a command like GRAPHIC 1, the computer moves everything at the start of BASIC program space—including the *Proofreader*—to another memory area, causing *Proofreader* to crash. The same thing happens if you run any program with a GRAPHIC command while *Proofreader* is in memory.

Though *Proofreader* doesn't interfere with other BASIC operations, it's a good idea to disable it before running another program. To disable it, turn the computer off and then on. A gentler method is to SYS to the computer's built-in reset routine (65341 for the 128, 64738 for the 64).

```
AS 0 CLR
KK 10 VE=PEEK(772)+256*PEEK(77
3):LO=43:HI=44:PRINT "
```

```
{CLR}{WHT}AUTOMATIC PROO
FREADER FOR ";
EB 20 IF VE=42364 THEN PRINT "
64"
AA 30 IF VE=17165 THEN LO=45:H
I=46:GRAPHIC CLR:PRINT"1
28"
KK 40 SA=(PEEK(LO)+256*PEEK(HI
))+6:FOR J=SA TO SA+166:
READ B:POKE J,B:CH=CH+B:
NEXT
QF 50 IF CH<>20570 THEN PRINT
{SPACE}"**ERROR* CHECK TY
PING IN DATA STATEMENTS"
:END
PD 60 FOR J=1 TO 5:READ RF,LF,
HF:RS=SA+RF:HB=INT(RS/25
6):LB=RS-(256*HB)
XB 70 CH=CH+RF+LF+HF:POKE SA+L
F,LF:POKE SA+HF,HB:NEXT
SB 80 IF CH<>22054 THEN PRINT
{SPACE}"**ERROR* RELOAD P
ROGRAM AND CHECK FINAL L
INE":END
PH 90 IF VE=17165 THEN POKE SA
+14,22:POKE SA+18,23:POK
ESA+29,224:POKESA+139,22
4
JS 100 POKE SA+149,PEEK(772):P
OKE SA+150,PEEK(773):PR
INT"{CLR}PROOFREADER AC
TIVE"
FA 110 SYS SA:POKE HI,PEEK(HI)
+1:POKE (PEEK(LO)+256*P
EEK(HI))-1,0:NEW
PS 120 DATA120,169,73,141,4,3,
169,3,141,5,3,88,96,165
,20,133,167
PS 130 DATA165,21,133,168,169,
0,141,0,255,162,31,181,
199,157,227
XS 140 DATA3,202,16,248,169,19
,32,210,255,169,18,32,2
10,255,160
JC 150 DATA0,132,180,132,176,1
36,230,180,200,185,0,2,
240,46,201
XJ 160 DATA34,208,8,72,165,176
,73,255,133,176,104,72,
201,32,208
GM 170 DATA7,165,176,208,3,104
,208,226,104,166,180,24
,165,167
KH 180 DATA121,0,2,133,167,165
,168,105,0,133,168,202,
208,239,240
RM 190 DATA202,165,167,69,168,
72,41,15,168,185,211,3,
32,210,255
BR 200 DATA104,74,74,74,74,168
,185,211,3,32,210,255,1
62,31,189
RM 210 DATA227,3,149,199,202,1
6,248,169,146,32,210,25
5,76,86,137
HJ 220 DATA65,66,67,68,69,70,7
1,72,74,75,77,80,81,82,
83,88
XR 230 DATA 13,2,7,167,31,32,1
51,116,117,151,128,129,
167,136,137
```

ONLY ON DISK

In addition to the type-in programs found in each issue of the magazine, *Gazette Disk* offers bonus programs and original 64 and 128 artwork. Here are this month's bonuses.

The Raven

Daniel Lightner
Sidney, MT

Enter this machine language adventure game, and you'll find yourself in a three-dimensional maze that's filled with valuable treasure. The object is to locate the treasure and return it to a special storage area. The only obstacles are the puzzles that you'll have to solve and a number of deadly creatures blocking your path.

You are not alone, though. A friendly Hobbit named Harvey will help you find your way through the maze.

Trig 128

James Moore
Cleveland, OK

Use this handy 128 program to help you solve any triangle, not just right triangles. The program calculates sides to four decimal places and angles to the nearest second. The program will also help you determine the area of a triangle if you know an angle and the length of its two sides or if you know the length of three sides.

This program can be a real help to trigonometry students—but that's not all. *Trig 128* can also be used to find the distance between any two Cartesian coordinates.

Christmas Tunes

Don Radler
Cape Coral, FL

Enjoy these traditional Christmas songs and carols that have been collected by Don Radler. They can be played on the enclosed music program.

Gazette Gallery

Picture of the Month
"Rage"
By Jeff Boyle
Bethlehem, PA

"'Twas the Night"
"Santa's Best"
By Robert Woodall
Rural Hall, NC

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	

REVIEWS

Get the scoop on *Champions*, sneak a peek at *Harvard Draw*, and delve into a host of other commentaries.

CHAMPIONS

Long the most enjoyable set of superhero role-playing rules for paper-and-pencil gamers, *Champions* makes the transition to the PC with notable grace. The tried and true, logical gaming system provides the foundation for a virtual world where paranormal people fly, generate lightning, and hurl Volkswagens at one another. While this sounds like a 1970s Marvel comic, Hero Games delivers anything but straight silliness.

Assume for a moment that you could fly and that you have a personal, internally powered force field that's good against most attacks short of nuclear ones. Does that make you invincible? Hardly—you'll face your share of super villains and personal crises, and don't forget that even comic book heroes sometimes marry and max out their VISA cards.

Such annoyances will clamor for attention. In exchange for taking on these obligations or "hunted" as they're known in *Champions*, you receive a certain number of points that you use to buy powers or to improve your personal statistics. You also gain points for successfully completing missions.

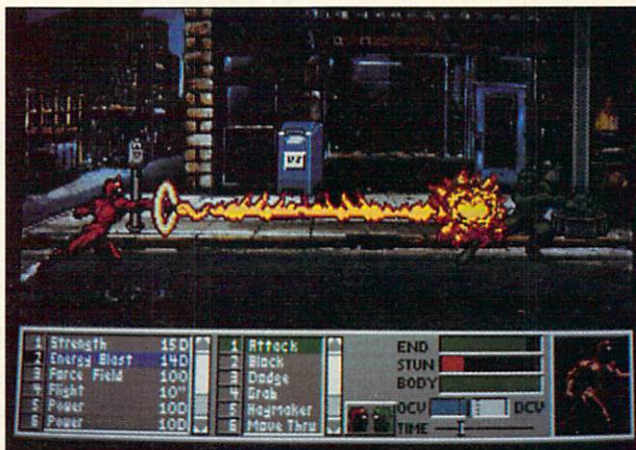
Progress is realistically slow but rewarding, and you'll spend hours poring over your character's statistics. *Champions* devotees have often argued that designing a character is more fun than combat, but thanks to myriad powers and special effects to choose from, neither aspect of the game suffers.

Combat takes place on-screen and the energy blasts fly with comic book flair, leaping from your chosen sources of power to strike your opponents. The special effects you see are those chosen dur-

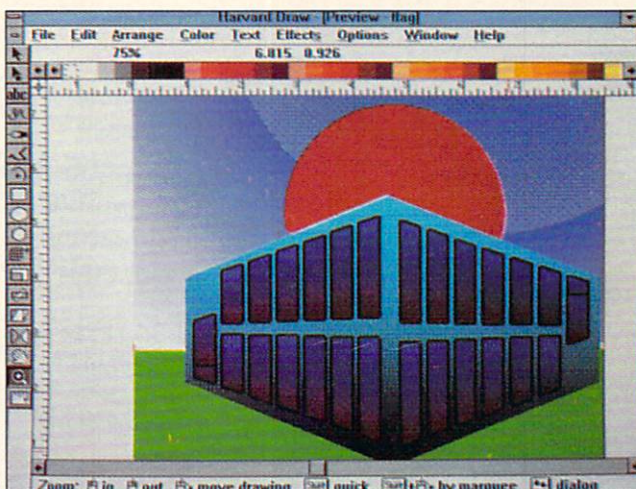
ing the design phase of play, and this detail engenders a feeling of control not common to most role-playing games.

Here, too, is where the computer version of the game re-

On top of the arcade sequences and the superb character design modules, you'll find a storyline that has you talking with police officers, clocking in at a day job, and



Though not all *Champions* has to offer, electrifying combat encounters will earn this RPG many fans.



Harvard Draw, the newest contender in the illustration-design arena, has an icon-driven toolbox.

ally shines: no more tedious combat arbitration by a ponderous, fallible, and human game master. All the necessary charts come built into the software, and the machine handles the dice rolls. As a result, action takes place at high speed; you have only to choose your targets.

patrolling the city looking for bad guys. Future modules will provide alternate scenarios to the first.

Champions has it all—character development, megavillain slug outs, and plenty of Day-Glo union suits to parade around in. Evildoers beware; this superpowered RPG hits

the streets before Christmas.

DAVID SEARS

Scheduled Release: December 1991

IBM PC and compatibles with 286 or faster microprocessor; 640K RAM; VGA; hard drive recommended; mouse recommended—\$49.99

HERO SOFTWARE
Distributed by Konami
900 Deerfield Pkwy.
Buffalo Grove, IL 60089
(708) 215-5100

Circle Reader Service Number 326

HARVARD DRAW

Not content with dominating the DOS charting and presentation market with its venerable *Harvard Graphics*, Software Publishing enters the illustration-design arena with a *Windows* program slated to go head to head with *CorelDRAW!*, *Micrografx Designer*, and *Arts & Letters*. The name of the contender is *Harvard Draw*, and it's loaded with exceptional features that would put it in the final round of any competition. The only question is whether there's room in the ring for yet another new face.

In the beta release seen at COMPUTE this fall, the product lacked some of the more interesting effects of *CorelDRAW!* such as extruding and perspective, but it had layers like *Designer*. It could make circular copies (generating multiple copies in a circle, rotating each so that they face a common axis) and rectangular copies (producing copies in perfectly placed columns and rows).

An onscreen help line provides the options associated with each icon as it's selected. (For example, clicking on the oval icon reveals a line that tells you to press Shift to generate the oval from the center rather than the corner of its selection rectangle and to press Ctrl to constrain the oval to a true circle.)

WORLD OF COMMODORE

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This is a nice feature for beginners that can easily be turned off when you become familiar with the special options. The program also provides an onscreen palette.

The *Harvard Draw* auto-trace is as friendly as *Micrografx Designer's* and very fast. It borrowed that tiresome "sands through the hourglass" mouse cursor from *Core!DRAW!* for use while the program is busy.

One of the innovations in this product is the scripting language, which allows you to write and edit drawings with a text editor. Simply copy the text file into the *Windows Clipboard* from a text editor while *Harvard Draw* is running, and the commands you've specified will be carried out. The commands read a little bit like remedial PostScript: `opendraw`; `set fillnone`; `set outlinecmyk 0,0,0,100`; and so forth.

Harvard Draw also features a form of envelope editing that allows you to fit text to more than one curve, group, combine, cut holes, paste copies of an object to a path, blend shapes and colors, perform shaped gradient fills (like a rectangle, a 12-pointed star, and several others), mix color on a CMYK or an RGB model, fill an open path, automatically generate regular polygons, choose from a 16-level undo, get context-sensitive help, and more.

The most exciting news is that a new team of programmers is working in the area of design software, which means that new ideas will come even faster and the competition will be even more fierce. Although *Harvard Draw* seems to lack a few of the features that make the big three (*Core!*, *Micrografx*, or *Arts & Letters*) distinct, it will probably answer the design needs of most of

the people looking into this kind of software. If I were shopping for a design package, I wouldn't settle on one of the big three until I had seen *Harvard Draw* in action.

ROBERT BIXBY

Scheduled Release: November 1991

IBM PC and compatibles, 2MB RAM, *Windows 3.0*—\$595

SOFTWARE PUBLISHING
3165 Kifer Rd.
Santa Clara, CA 95051
(408) 986-8000

Circle Reader Service Number 327

prosperity through your benevolent rule. Either approach teaches that castle building isn't the least bit romantic.

As surveyor, you'll find a suitable castle site soon enough, but your duties as overseer require considerably more perseverance. You'll hire and fire diggers, carpenters, carters, masons, and other laborers. From this pool of personnel, you assign crews to wall sections, towers, and gates. Keep an eye on the treasury, or your

er, is the tutorial on how to construct a castle; it takes the form of a lengthy dialog, and tends to obscure some necessary facts. Much better would be an optional list of itemized dos and don'ts that would have players laying cornerstones much sooner.

The king's encounters with his subjects require you to choose from a very limited number of options. Players are likely to grimace in frustration when obvious actions aren't listed as choices.

With their jerky animation and lack of detail, combat sequences leave much to be desired. As a castle simulator, though, *Castles* does an admirable job of presenting your growing stone edifice in three-dimensional color. Accompanying music echoes your industriousness, but as with most short, repetitive soundtracks, the *Castles* theme eventually wears thin.

Castles falls short of being a true Middle Age construction set, however, dealing with nothing more than castles themselves. Villages don't spring up around your fortress, and if you choose to sponsor a combat tourney, you won't see a bit of the action. In short, educational value is primarily limited to the pages of the manual.

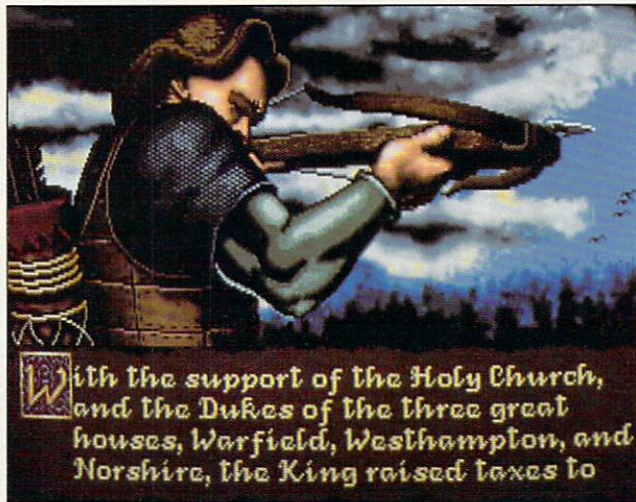
Still, those who dream of watching sunsets from towering parapets will play *Castles* often enough to warrant the purchase price. Raise high your banners, Lords and Ladies; *Castles* can make monarchs of us all.

DAVID SEARS

IBM PC and compatibles; 555K RAM; CGA, VGA, or Tandy 16-color; supports Ad Lib, Roland, and Sound Blaster—\$59.95

INTERPLAY
3710 S. Susan St., Ste. 100
Santa Ana, CA 92704
(714) 549-2411

Circle Reader Service Number 328



As the monarch in *Castles*, it's up to you to learn the politics and policies of building a castle in the Middle Ages.

CASTLES

The age of castles passed centuries ago, but their mystery and romance remain. In the hearts of fantasy role-players everywhere, there lingers the urge to show medieval peasantry what separates the lords from the vassals. Stone fortresses and armies, of course, make all the difference, and Interplay's *Castles* sets the stage for some memorable days of monarchy.

As king and architect, surveyor and overseer, you determine the course of history. Make the mistakes of an aloof leader or usher in an age of

underlings will leave the site when the coffers run dry.

Rampaging ogres or berserk Celts raid often. In order to protect your work in progress, you'll need infantry and archers, but to attract them in sufficient numbers, you'll need to design a castle of a certain size. Balance all these factors with the political quandaries facing you as king, and *Castles* emerges as quite a complex game.

The manual provides considerable historical perspective along with brief sketches of the personalities you're likely to encounter during your noble reign. Confusing, howev-



The greatest hero for the Hyborean Age was a fierce barbarian born of the harsh northlands,

CONAN THE CIMMERIAN

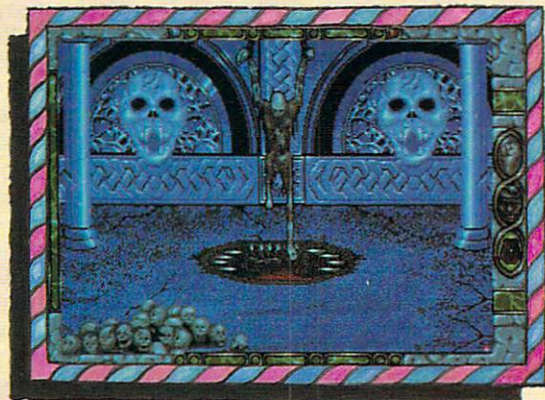
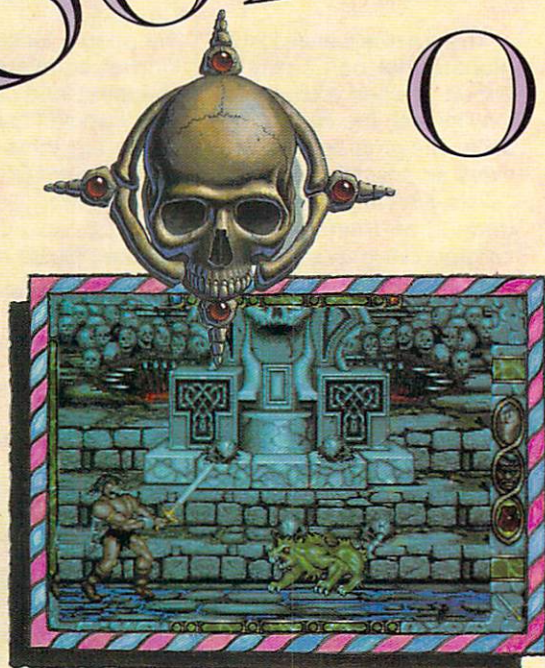
You have heard the tales of Conan's adventures. Only now will you have the opportunity to live the life of this fierce barbarian from the land of Hyborea.

Our odyssey begins with murder most foul. When Conan's village is massacred by the ravening hordes of Thoth Amon, high priest of the vile cult of Set, Conan vows to avenge the death of his family and friends.

In your search for vengeance, you as Conan, will explore Hyborea to seek out its hidden secrets and learn of its powers. Visit over 200 locations – taverns and inns, crypts and dungeons, temples and tombs, lavish homes and poor hovels – to learn the mysteries of Hyborea's sorceries to help Conan overcome its many natural and supernatural perils.

Only with luck, courage and constant struggle will Conan have the chance to force a reckoning with the powerful Thoth Amon.

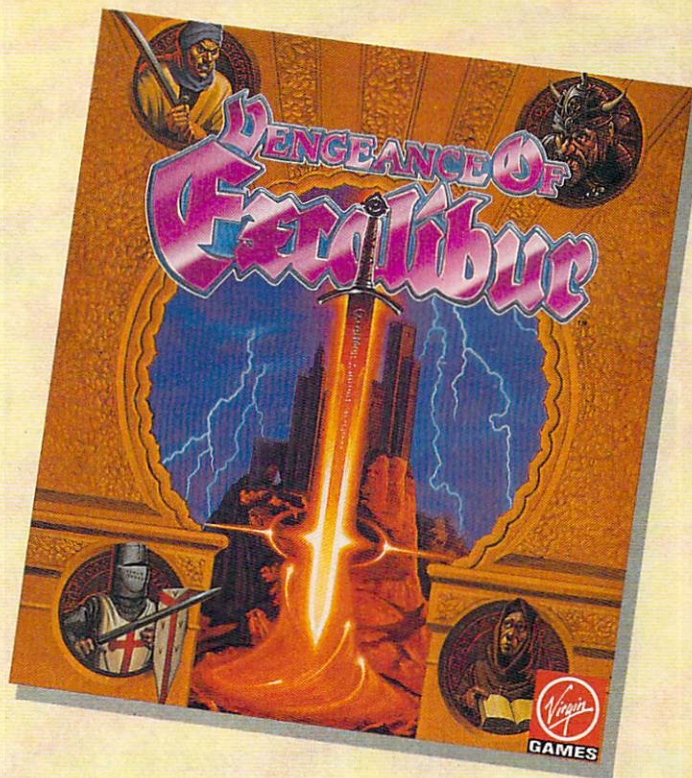
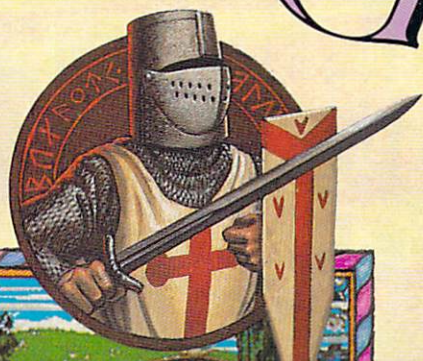
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Virgin Games, Inc. 18061 Fitch Ave., Irvine, California 92714

THING LD



In Spirit of Excalibur, the Knights of the Round Table fought to defend medieval Britain from the evil sorceress, Morgan Le Fay. Morgan, dabbling in dark arts beyond even her ability to control, had summoned a great Lord of Demons, the Shadowmaster.

With Morgan's death, the Shadowmaster was freed to work his evil will against the unprepared folk of Britain. Striking in the night, he imprisoned the King with a spell, stole the greatest treasures of the realm and kidnapped Nineve, the court enchantress. With the loss of the sword Excalibur and the newly recovered Holy Grail, Britain begins to sicken and die. The Shadowmaster must be stopped!

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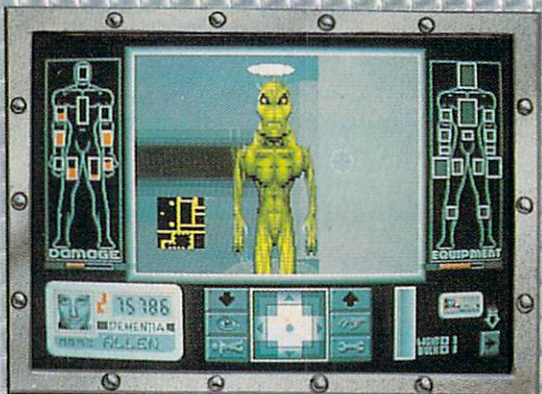
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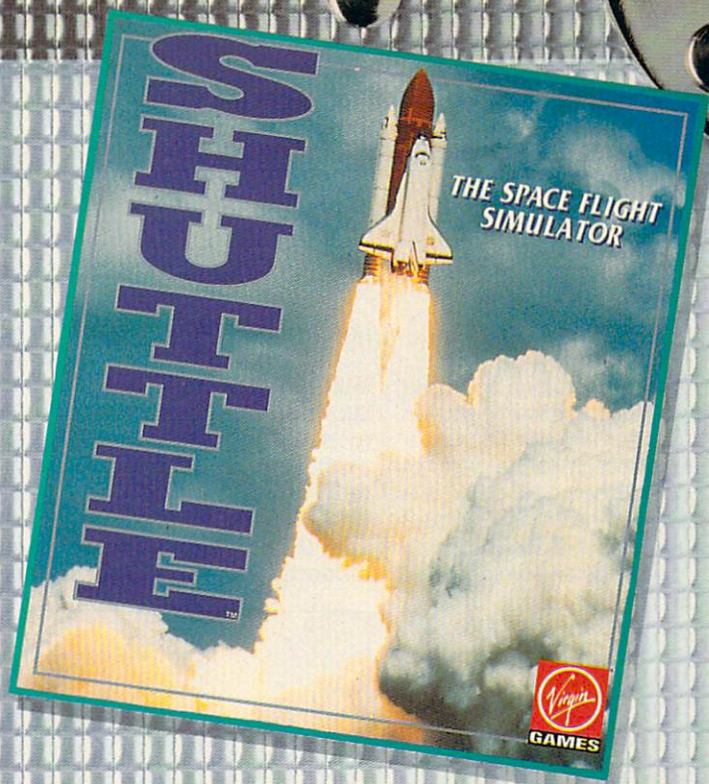
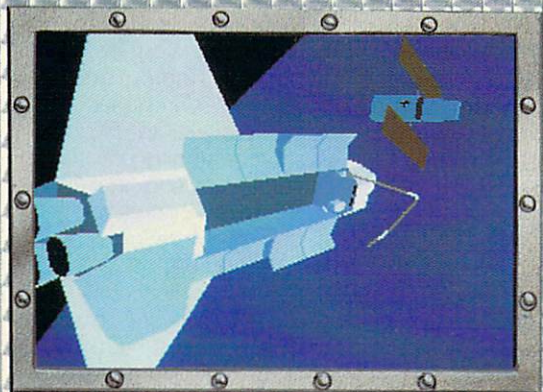
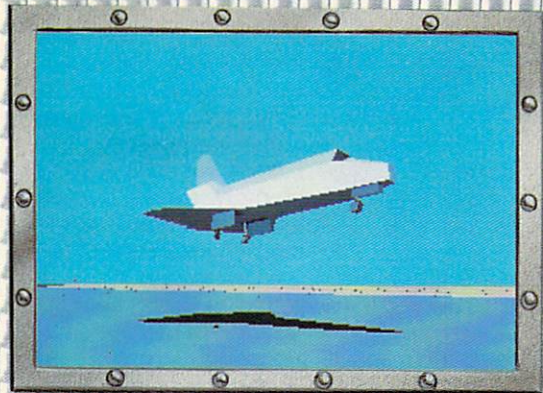
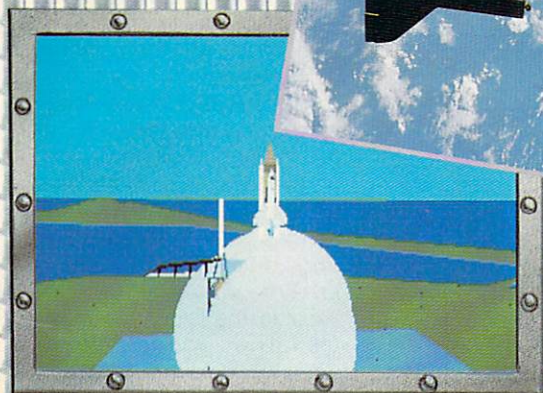
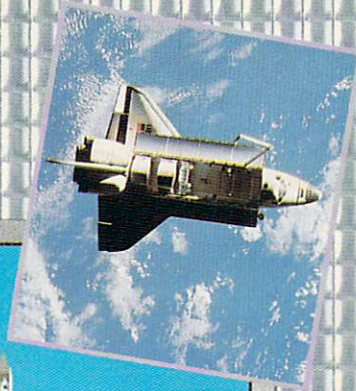
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HP 95LX

Want something compact that does more than a pocket organizer? Hewlett-Packard's pint-sized gift to the world of computing, the HP 95LX, is a palmtop that runs DOS 3.2 and *Lotus 1-2-3* in ROM.

This machine weighs in at just 11 ounces, is slightly smaller than most paperback books, and fits easily in a coat pocket. Hewlett-Packard and Lotus Development merged a PC XT-class computer with a host of everyday applications and utilities to make the 95LX a real winner.

As a computer, this machine excels compared to talented but standard electronic pocket organizers like the Casio BOSS and Sharp Wizard. For starters, the 95LX runs DOS rather than a proprietary operating system. It has more than a glimmer of memory with 512K of RAM on board and RAM cards that can supply 128K (\$199.95) and 512K (\$399.95) of additional memory. As flash memory technology develops, 1MB and greater memory expanders will be available.

Furthermore, Hewlett-Packard seems to have solved the battery problem with a CMOS power scheme that uses only two AA batteries and can power the diminutive machine for up to six weeks.

If that isn't enough, the 95LX boasts a host of powerful software applications—all resident on a 1MB ROM chip. The lead application, of course, is *Lotus 1-2-3*, version 2.2, accompanied by a full-fledged personal information manager (not a scaled-down version of *Lotus Agenda*).

Also included are a communications application module, a file manager, a word processor, and a calculator. This makes the 95LX the most powerful Hewlett-Packard hand-

held calculator to date!

You can move data internally between the HP calculator, *Lotus 1-2-3*, the memo module, and the database. In addition, the 95LX uses infrared technology when you want to communicate with another 95LX. A number of long-distance telecommunications

tion tool that lets you zoom in to magnify a graph up to four times its initial size.

Most annoying, the 95LX keyboard runs on the small side. While no palmtop can hope to offer full touch-typing capabilities, this size does limit your access to full PC computing power. Spend a



No longer science fiction, the PC-compatible palmtop arrives, courtesy of Hewlett-Packard.

tools are being developed for this palmtop.

The 95LX is not without blemishes, however. Stacked next to some of the desktop organizers on the market, at \$699, it dwarfs others with its price. As a grownup computer in the body of a pocket calculator, though, it packs a heck of a wallop when you consider its functionality. Hewlett-Packard will have to overcome the objections of the penny wise by pushing this point home.

Other objections may not be so easy to address. Limited by its tiny screen size, the 95LX runs into some compatibility problems with certain DOS software. Since its screen offers only MDA (monochrome) graphics resolution, graphics suffer. However, the graphing module for *Lotus 1-2-3* has a magnifica-

few days with the machine, though, and hunt-and-peck entry should get the job done.

As for memory, even at 512K, no hefty *Lotus* spreadsheet will fit comfortably. Of course, the 95LX isn't meant to replace your desktop machine; it's a complement to its hulking desktop cousins.

Overall, this palmtop's assets clearly outweigh its shortcomings. Given the competition and ease of use integral to this Hewlett-Packard bantam prodigy, it's hard not to look at this miniature XT and wonder, "Why didn't someone do this before?"

PETER FRANCIS

HP 95LX—\$699

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Corvallis, OR 97330
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Circle Reader Service Number 329

EXPRESS PUBLISHER

Because of their high cost and hefty hardware requirements, many desktop publishing packages seem impractical to average users. PowerUp Software's *Express Publisher 2.0* may change that. Geared toward the non-professional desktop publisher, *Express Publisher* nevertheless compares favorably to the leading DTP programs, and it costs less, too.

PowerUp Software has added many new features to this upgrade of its popular entry-level program. The most noticeable, the TextEffects module, allows you to perform advanced text manipulations such as forcing text to fill a polygon, bend along a curve, run along an angled line, or grow or shrink from one character to the next. The TextEffects module also controls the text's justification, kerning, and character spacing.

Express Publisher doesn't skimp on typefaces. Version 2.0 includes five new "instantly scalable" typefaces, bringing the total to eight. You can scale the fonts on the fly in one-point increments from 6 to 144 points.

On-the-fly scaling eliminates the tedium of finding and loading each size and style of font you plan to use the way you do with bitmapped fonts, and it makes all sizes and styles continuously available. *Express Publisher* can also use standard LaserJet fonts, including HP soft fonts, Bitstream fonts, Micrologic MoreFonts, and AGFA Compugraphic's Express Fonts collections.

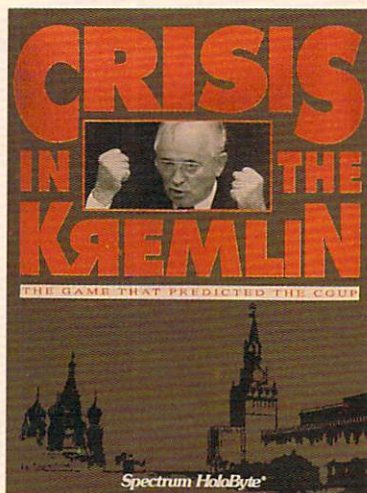
Express Publisher excels in its handling of high-resolution graphics. It supports all of the most popular graphics formats, including CGM,



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Circle Reader Service Number 167

TIFF, PCX, EPS, GIF, ART, IMG, and more. The software includes a clip art library and provides many advanced features, such as cropping graphics and scaling them either manually or by fixed percentage.

With its emphasis on novice DTP users, *Express Publisher* succeeds in ease of use. Using a standard point-and-click interface, a true WYSIWYG display, and a newly expanded online help system and tutorial, this program gets the beginner up and running as quickly as possible. The design makes it easier for occasional users to remember how to operate the software after not using it for awhile. Especially valuable, the help system reduces to a bare minimum the need to refer to the manual.

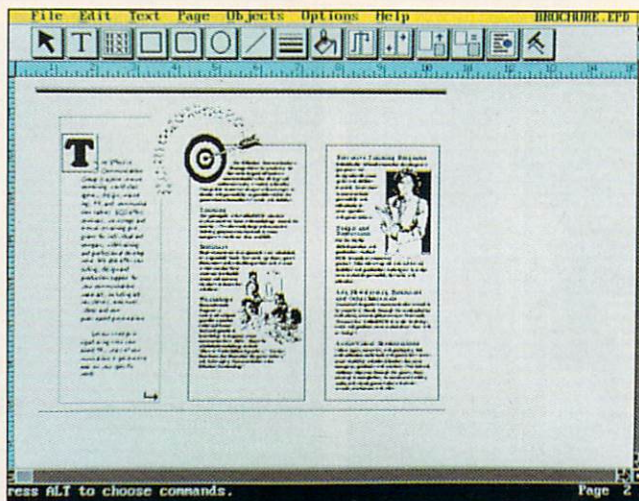
After reading the promotional literature that accompanied my review copy of the program, I decided to put its ease-of-use claims to the test. Just over two hours of trial and error later, I had successfully installed the program and produced a sharp, two-page, newsletter-style document with a logo and with text wrapped around an irregularly shaped graphic image—without once opening the manual. Beginners should have no problem learning to use this program.

Express Publisher contains many features designed to make page layout easier. First, a true WYSIWYG display accurately depicts the appearance of the printed page, eliminating much of the guesswork involved in correctly placing design elements. Second, editable zoom-in and zoom-out modes give you a view of either the entire page at once or a small portion of it in detail. Third, the alignment tools allow you to align an object either rela-

tive to another object or to a predefined grid. This helps keep your rows and columns straight. Finally, the program supports the design and printing of pages in both standard and landscape perspectives.

matic table of contents and index generation. Considering the modest requirements of the intended audience, however, such limitations shouldn't be too confining.

All in all, *Express Publish-*



Geared toward novice DTP users, *Express Publisher* is easy to use.

Express Publisher contains numerous additional features, making it one of the most powerful entry-level DTP packages on the market. These features include support for PostScript printers, automatic hyphenation, automatic screen refresh and text rewrap, the ability to save any part of a document as a PCX image, and the ability to fax a document directly from memory using the Intel Connection coprocessor.

Like any software, *Express Publisher* has its limitations. Most notable of these is its 32-page-per-document limit, essentially restricting *Express Publisher's* use to making short brochures and manuals. To produce a longer document, you would have to divide it into several files—a complicated process at best.

Express Publisher also lacks some of the advanced features of its more expensive cousins, such as auto-

er offers very good value for the money. Simple to learn, easy to use, and packed with features, this friendly program imparts more power than most users will ever need. For those who have only an occasional need for a desktop publishing package but value professional results, *Express Publisher* promises outstanding service.

RICHARD RAPP

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MARTIAN DREAMS

In 1893, American astronomer Percival Lowell set out to answer a question that has

plagued mankind for centuries: Is there life on Mars?

That year, at the Columbian Exposition, he unveiled plans for a manned mission to Mars and the colossal Space Cannon which made the journey possible. But bad luck was in the air. The cannon discharged a day early, sending many of the greatest minds of the nineteenth century hurtling on a one-way trip to the red planet.

Now, two years after the disaster, you will lead a second mission in hopes of finding the stranded party—or what remains of them—and returning them safely to Earth.

So begins the latest offering from Richard "Lord British" Garriott and Origin Systems, *Ultima Worlds of Adventure 2—Martian Dreams*.

Blending history, fantasy, and mystery, along with the Lord British knack for designing knock-out adventure games, *Martian Dreams* presents a scenario guaranteed to challenge and amuse even the most jaded players. Additionally, the tried-and-true role-playing system—developed and refined throughout the *Ultima* series—warmly welcomes newcomers to computer role-playing adventures with its eminent playability.

The Mars you explore differs greatly from the one we know today. This Mars is a living planet, although one in decline. Due to its low gravity, it loses the equivalent of 60,000 gallons of water a day from its atmosphere in the form of hydrogen and oxygen gas. This makes survival difficult, though not yet impossible.

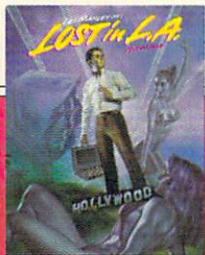
Life on Mars also differs from what you might expect. The creatures you find are strange blends of plant and animal, ranging from the size of a mouse to the size of a dinosaur. While these creatures' shapes and physical abilities

Les Manley in:
Lost in L.A.

"SHE STOOD NAKED,"

HER WET BODY BATHED IN BEVERLY

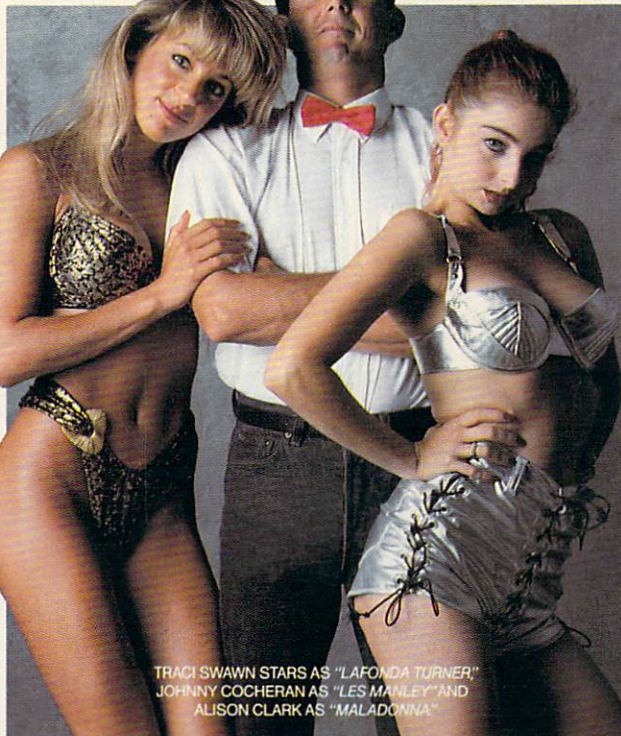
HILLS MOONLIGHT. THE STRANGER CREPT
OUT FROM THE SHADOWS TOWARDS THE POOL. LIKE



THE STARLETS WHO HAD VAN-
ISHED BEFORE HER, SHE WAS
OBLIVIOUS TO HIS MENACING

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SCREAM WAS NOT
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vary widely, they usually possess nasty temperaments.

You won't spend the whole time wandering through the harsh wilderness of the planet's surface, however. Your search for the stranded party—which includes such notables as Buffalo Bill Cody, Andrew Carnegie, George Washington Carver, and Thomas Edison—will lead you through magnificent cities and underground complexes constructed during the heyday of Martian civilization.

Along the way, you'll encounter many puzzles, tricks, and traps to overcome, including the riddle of the hallucination-inducing Martian dream machines.

Your rescue party also contains many historical figures who will accompany you on your travels. One of these is the father of modern psychoanalysis himself, Sigmund Freud, who plays a significant role in the process of creating your character when you begin the game. In this process, Freud con-

ducts a short interview, which includes dashes of Oedipal-complex psychobabble. Your answers to his questions determine your character's attributes.

To players familiar with previous games in the Ultima series, *Martian Dreams*' technical capabilities should come as no surprise. Its appealing graphics are rendered in 256-color mode, and its soundtrack supports all of the most popular sound boards.

While these features may not be revolutionary, that shouldn't be seen as negative. The game chooses to focus on an intriguing storyline rather than a few gee-whiz effects. The game's only real drawback is its hefty hardware requirements. For instance, if you store the game's files in their compacted format, they take up about 3.5MB on your hard drive. In expanded form, they swell to 5.5MB. Also, while the documentation claims that a 10-MHz machine will suffice, the pace seemed a bit slow even

on a 16-MHz 386SX.

A clever tale of nineteenth century space travel depicted in classic Ultima style—that sums up *Martian Dreams*. If you can meet the strict hardware requirements, do yourself a favor and spend this year's vacation on Mars.

RICHARD RAPP

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ORIGIN SYSTEMS

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CUMULUS GLC

The Cumulus GLC arrived in a box so big, I immediately felt I was getting my money's worth. After trying out this well-equipped desktop machine, I've decided it does indeed offer a lot of value.

This computer is a sturdy, medium-sized desktop with nice lines. Opening the case

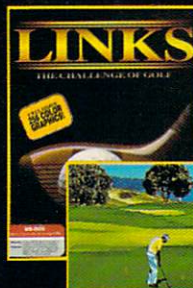
was simple: I took out four screws and popped the top. It came the way I like to see machines configured—standard with 4MB of SIMM (Single In-line Memory Module) memory, easily upgradable to 32MB on the board.

While I'm not a design engineer, I couldn't help but wonder if the motherboard design (two boards stacked closely on top of each other) would tend to overheat. The microprocessor, an Intel 33-MHz DX type, ran all test software with no problems. Four 16-bit expansion slots leave plenty of room for your favorite expansion cards.

While the handy integrated fax/modem/answering board did take up one slot, the remaining three should cover most of your add-on needs. The 40MB Conner hard drive checked in at 23 milliseconds read-access time, according to *SpinRite II*. I recommend a larger drive since, with today's hefty software, you can outgrow a 40MB hard drive pretty quickly. You should al-

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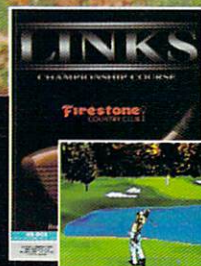
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so be aware that, because of the hardware configuration, this computer will probably require repair by Cumulus in the event of a breakdown.

Setup is easy. There were two setup guides (a standard "covers all" guide and a mouse setup guide), both to the point. The Cumulus GLC comes with software already installed. Plug in the monitor, throw the conveniently located power switch, and welcome your Cumulus home.

Controls for the Cumulus are very accessible; all are located conveniently in the front of the computer. The Reset and Turbo switches reside next to each other.

The standard VGA 640 x 480 monitor can support 256 colors if you take advantage of an optional memory upgrade. At .39, the dot pitch leaves room for improvement, and I recommend ordering a .28 pitch monitor from Cumulus. To support super VGA with all available colors, you'll have to purchase a Cumulus video memory upgrade,

which isn't user-installable.

The Cumulus also comes bundled with *Windows 3.0* and *Microsoft Works 2.0*. First-time computer buyers

running an application.

As for the Voice Data Fax (VDF), I skipped most of the documentation and worked directly with the software to



The rugged Cumulus GLC makes a good machine for both beginners and longtime PC users alike.

deserve more than C:> upon booting their machine. With *Windows* and *Microsoft Works* installed, you just turn on the computer, point the mouse, click it, and you're

access the board's powerful features, which says a lot about how well the software was written. The intermediate user shouldn't have any trouble figuring out how the VDF

board works. It sends and receives most commonly used graphic formats easily with very good resolution.

Technical support doesn't offer a toll-free number. However, if all lines are busy, a representative will take your number and call you back. Trying to find the Cumulus support number is easier than with most other computer makers; the telephone number was inside the front cover of every Cumulus setup manual.

PEER PLAUT

Cumulus GLC with 4MB RAM, 40MB hard drive, color VGA monitor—\$3,245

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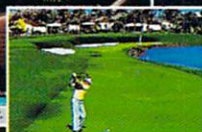
DESIGNASAURUS VERSION II

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you'll think you're there.



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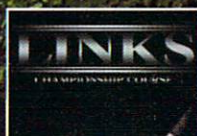
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Austin, TX

at fending off enemies, it's also fairly fleet of foot. I know, because I created it.

What do I do with my anky? Send it to prehistoric times where it must struggle for survival. Sometimes I have it look for gigantodon geneprints that Dr. Max von Fusion scattered among 16 prehistoric worlds. If I don't bring them all back, the Foundation won't be able to continue its work.

This is *Designasaurus II*, a clever program that lets you create a dinosaur and explore prehistoric worlds or play an adventure game.

The VGA graphics are quite vivid. Trees and cactuses have realistic shadows. Arctic dragonflies flit and flutter about harmlessly. Abandoned nests may hold a clutch of eggs, have broken shells beside them, or be mysteriously empty. Bones and skulls litter the ground—an ominous sign.

Britannica consulted two paleontologists when designing the program, and everything appears in the appropriate time period. Everything except your dinosaur, that is; it can go everywhere.

To design your creation, select the forearms, head, body, and tail from any of ten existing dinosaurs—make an outrageous combination if you dare! Say you're feeling a bit conservative? Just select a premade dinosaur that actually lived.

Next, pick a geological period and climate. Each period offers a choice of two or three climates from a list of seven: desert, volcanic, oceans/lakes, mountains, plains/valleys, arctic, and varietal (some of everything).

In a prehistoric world, you have a godlike perspective. You control your dinosaur with the keyboard or joystick and monitor its vital statistics

by viewing three minicomputer screens on the right side of your main screen.

Put the world on hold and move through options on one of the tiny screens; you'll even see "your" finger pressing the buttons.

Now, explore! *Designasaurus*'s adventure mode, iden-

while mashing the fire button; the directions neglect to mention this. Also, an option to restart with the same dinosaur in the same world without having to teleport back and forth seemed like an illogical omission to me.

The *Designasaurus II* box states that the game is intend-



Designasaurus II lets you create a dinosaur and explore prehistoric worlds or play an adventure game.

tical to exploring except that you don't choose the period, requires you to retrieve geneprints. You still must struggle to eat, drink, fend off enemies, and defend friendly dinosaurs' genes.

I would locate a corner at the end of the world (as far left and south as there are graphics, for instance) and cover the terrain systematically. Eventually I would locate a blue geneprint square. Locating the teleporter to return my dinosaur to the lab, though, proved to be the hardest part of the game.

Do I have any complaints about the software? Just a few, and at best, they're marginal. Contrary to what the manual says, sound can't be toggled off, and it grows tiresome in the lab.

To configure the joystick, you must press and hold it

ed for players between the ages of 7 and 14, but unless your young children are good with manuals, they'll need help playing initially. And I enjoyed the program tremendously—although I'm far above the age limit.

Frantically searching for water to save my anky, I thoroughly enjoyed the thousands of tiny details I found along the way. *Designasaurus II* engages saurians of all ages, and you'll play well into the next geological era.

KAREN LEE SIEPAK

IBM PC and compatibles; 512K RAM; EGA, VGA, or Tandy 16-color; 9-pin printer required to print certificates; joystick recommended—\$39.95

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THE ULTIMATE COMPUTER SOFTWARE BUYER'S GUIDE

Everyone enjoys making a great computer deal that stretches your hard-earned dollars even further. With its new product, *The Ultimate Computer Software Buyer's Guide*, Lilac Akiko may help you find a bargain on your next software purchase, and it will definitely make the search less strenuous.

The Guide contains information on almost 600 programs and 35 mail-order vendors. Mail-order companies aren't saddled with a traditional retail store's overhead costs, so they can offer prices substantially lower than those at most local computer centers. A quick search of the database allows you to compare prices, shipping charges, payment methods, and several other factors to find the best overall deal on the software you want.

Because software prices change constantly, Lilac Akiko updates *The Guide's* information monthly. It distributes *The Guide* by subscription, which assures you of always having the most current data. Both 6- and 12-month subscriptions are available, or you can purchase a single trial issue. And *The Guide* is growing. Upcoming issues will contain information on more than 1000 programs and 40 vendors.

The Guide's design makes it very easy to use. Its character-mode interface uses pop-up menus to input user selections and text windows to display product and vendor information. You can locate product information by entering the name of a specific program or by search-

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on your quest.



ing all the programs in one of *The Guide's* 16 categories.

This package has only one flaw; it needs a database of product features. Currently, you have no way to compare features to find the program that best suits you. This ability would make *The Guide* truly indispensable rather than just useful. Still, for those of you who know what you want but need some help finding the best deal, *The Ultimate Computer Software Buyer's Guide* can be a valuable tool.

RICHARD RAPP

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DEMONIAK

In today's world of full-color graphic adventure games, an old-fashioned text game appears out of place. It would seem more at home in a museum next to a dinosaur dis-

play than on the new releases shelf at your local computer store. But Palace Software's *Demoniak* proves that text adventures aren't quite ready to follow those reptilian giants into oblivion.

Created by British author Alan Grant, who has worked on such popular comic books as *Batman*, *The Punisher*, and *Judge Dredd*, *Demoniak* takes you on an interplanetary quest filled with humor and plenty of science fiction high adventure. Your mission sends you in search of a way to close a gateway into our universe, thereby foiling the planned invasion by the Hoards of *Demoniak*.

And just who is *Demoniak*, you ask? Simply put, *Demoniak* embodies evil, and he wants to destroy the good parts of our universe. Fortunately, your quest isn't alone.

Your motley group of adventurers includes Sondra Houdini, radical feminist and world-class psychic; Madlok, a powerful sorcerer and suspected serial killer; Flame, a pyrokinetic and frustrated superheroine; and Doctor Cortex, super-

genius and possible cause of the imminent invasion.

Proteus, the world's first living spaceship, provides your transportation. Most of the time, you play the role of Johnny Sirius, a human-alien halfbreed and the star of the world's most popular television show, "Man Alone."

British-based Palace Software spawned this engaging epic via its new Pure Fiction adventure game system. Whereas most text adventures present you with a set story line, this system simulates a world which the player can freely explore.

Independent, artificially intelligent characters populate the world, constantly interacting with each other and with you. They all have unique personalities, and their attitudes change according to the game's events. Even the members of your own party maintain their independence, refusing to slavishly follow your orders. In fact, they won't listen to you much at all until you have earned their trust.

Another of the Pure Fiction system's unique features allows you to switch characters anytime you want. In something like the adventure game world's version of possession, you literally jump from one character to another, seeing the world through the new character's eyes and retaining any and all of his special abilities.

This definitely adds a new strategic dimension to the game, forcing you to decide not only where to go and what to do, but also who it is most advantageous to be. The only characters I've found that you can't become are Proteus and *Demoniak*.

The two main drawbacks of text adventures have always been their heavy dependence on keyboard input and their limited parsers.

Due to *Demoniak's* traditional keyboard interface, you can't count on much relief from finger fatigue. For the nontouch-typists among us, such adventure games always present difficulty. When it comes to parsers, however, *Demoniak* illustrates just how far computers have come toward understanding standard English.

Demoniak understands a relatively large vocabulary and handles complex and even recursive sentences. You won't often find yourself rewording and retyping your commands; it usually understands you the first time.

Despite the heavy typing requirement, *Demoniak* still earns top marks, especially with those who lament the passing of the keyboard as the input device of choice.

Here the strong cast of characters, witty story line, and intriguing new features combine to create an entertaining game in a genre many had written off as dead. *Demoniak* proves there's still some life in those old bones.

RICHARD RAPP

IBM PC and compatibles; 640K RAM; CGA, EGA, MCGA, VGA, Hercules, or Tandy 16-color; supports Roland MT-32 and Ad Lib sound—\$49.95

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THE BUGS BUNNY CARTOON WORKSHOP

Cartoon favorites Bugs Bunny, Elmer Fudd, Tweety, Sylvester, Daffy Duck, and others come to life on the computer screen in *The Bugs Bunny Cartoon Workshop*.

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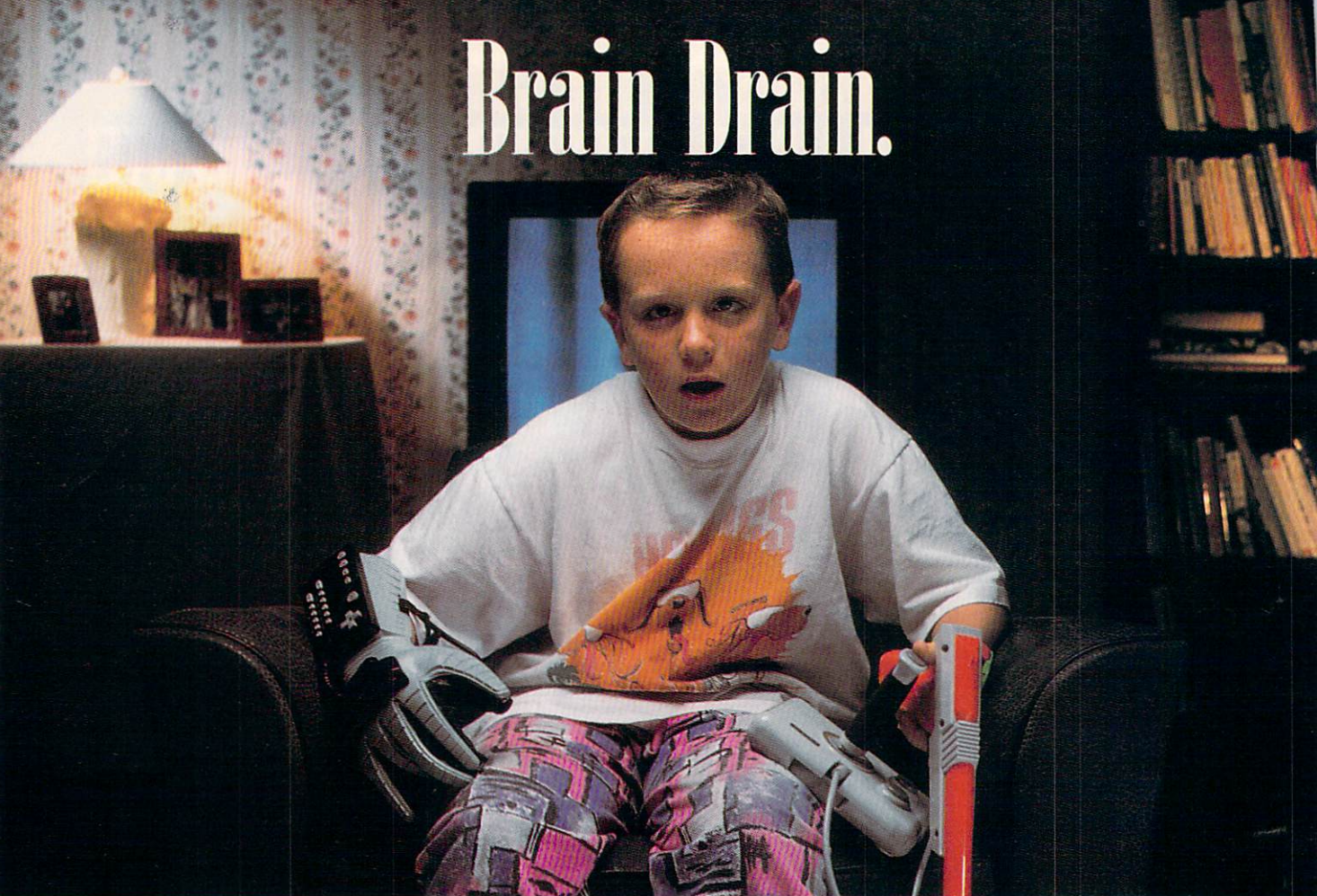
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Brain Drain.



This animation construction set has both Junior and Master modes, so even young children can create their own cartoons. A point-and-click icon-based interface along with a library of animated actors, props, settings, and sound effects simplifies cartoon construction.

Several ready-made Junior and Master mode cartoons are available for use as study aids or cartoon-creation jumping-off points.

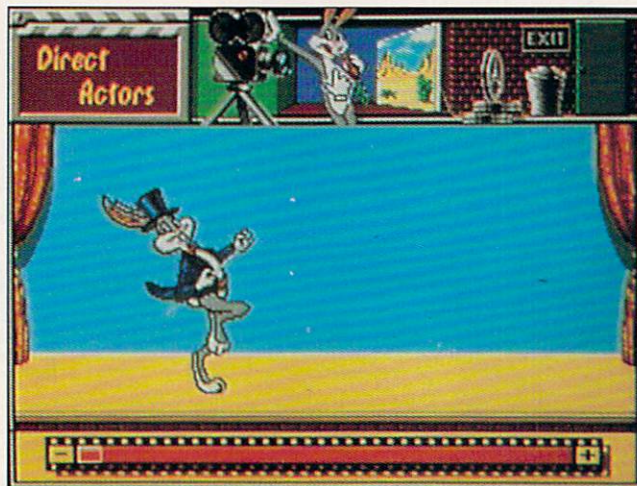
Cartoon Workshop runs from floppies or a hard disk. An installation program automatically copies all the necessary files to a hard drive partition you specify.

Although program tools can be activated from the keyboard, you'll find it easier to position characters and props on-screen with the click and drag of a mouse. With keyboard input, you must select icons and perform activities via menus or toolboxes.

Cartoon Workshop has an intuitive interface. At the top of the Main Workshop screen

you see a menu bar with several icons representing activities or submenus you activate with the click of the mouse. If you move the pointer to a

ed into computer memory. Once begun, the animation repeats until you stop it. Click on the icon of Bugs Bunny and activate the Direct Ac-



Orchestrate new Road Runner and Wile E. Coyote desert chases with The Bugs Bunny Cartoon Workshop.

specific icon, a brief description identifies it. You can access context-sensitive online help from each submenu.

Select the movie camera icon to show a cartoon load-

tors menu to place a new actor or prop in the picture.

Animators can have up to eight actors or props on-screen simultaneously. Actors come with a style book,

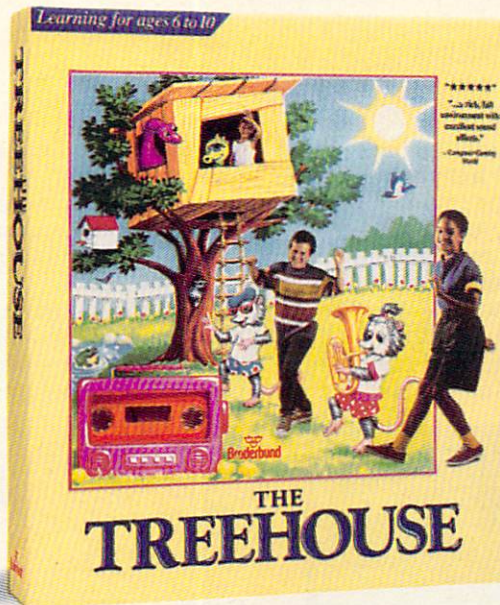
or repertoire, of animated actions you direct them to perform. You can also add a number of props, many of them animated (balloon up, balloon pop, bird cage, exploding bomb, dust ball, and others), to a scene.

An artist's palette lets cartoonists paint objects using 16 colors. Other tools allow you to flip an actor horizontally or vertically or reposition the actor onscreen. Unfortunately, every time you make a selection from the Direct Actors (or any other) submenu, the program annoyingly returns you to the Main Workshop screen. You must reselect a particular icon for each edit or modification you want to make to a cartoon frame.

Animators build cartoons in the central portion of the Main Workshop screen. They select items (action, stages, and characters), frame transition effects, audio clips, and animation speeds and durations from special list boxes. For example, choose the stage icon from the Main Work-

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20 COM

shop screen and you can select a background for the current action or scene. Three stage options (mountains, desert, and snow) simulate animated movement when they appear onscreen. This is a handy illusion if you have an actor running or walking.

A Film Slider (filmstrip icon) at the bottom of the screen makes it possible to move through the cartoon (forward or backward) one frame at a time. You can save individual picture frames to disk as LBM files (*DeluxePaint* compatible) or print them. Cartoon files automatically save in a FILMS subdirectory of the *Cartoon Workshop* directory with either a CM1 (Master mode) or CJ1 (Junior mode) extension.

A special archive feature called Demo Version allows you to save a runtime version of your cartoon so that it can be viewed by individuals who don't own a copy of *Cartoon Workshop*. You'll need a blank, formatted disk with 200K of available free space. Unfortunately, Demo

only works with disks placed in drive A, meaning you won't be able to take advantage of the extra space available on 3½-inch floppies if they insert in drive B.

Cartoonists who design their animations in Junior mode (the program default) have limited customizing options. For example, the Effects menu (for setting the number of frames in a scene, adjusting action speed, selecting screen transitions, or adding sound) isn't available. In addition, youngsters can only build cartoons consisting of a single scene.

Animators who design cartoons in Master mode (invoked by toggling the F5 key) have more tools at their disposal thanks to the Effects menu. In addition, they can build longer, more complex cartoon animations consisting of different sets of actors and multiple scenes. You can't display or modify in one mode cartoons that are created in the other mode.

The Bugs Bunny Cartoon

Workshop offers good value for your money. It's elegant and affordable, and the whole family can enjoy this product. Instead of passively watching Saturday morning television, you now have the tools to create and show original computer animations complete with audio effects and speech bubbles.

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FAXBUILDER

In this age of worldwide fax communication, the folks at Unison World have decided that fax senders also need some canned creativity. Like a book of clip art, *FaxBuilder* provides a seemingly endless array of pictures, logos, and borders to accompany fax transmissions.

While I don't go for flashy faxes myself, the *Print Shop* crowd will make frequent use of *FaxBuilder's* at-the-ready graphics capability.

The illustration on the front of *FaxBuilder's* box shows a fax message with the somewhat redundant heading "FAX MESSAGE" in bold, inch-high letters, along with an unnecessary border. After enduring the long wait for *FaxBuilder* to load onto your hard drive, you'll find little innovation. There's a vase full of flowers with "HAVE A NICE DAY!" taking up half a page, a passenger jet heading into the sunset for a "While I'm Away" message, and all manner of pushpins, flags, and maps.

Patching together one of these pictures for transmission takes a little time, though *FaxBuilder* does walk you through a relatively simple, straightforward process to create personalized faxes. As you work, *FaxBuilder* displays each change or addition clearly.

Automatically filling in some names and numbers from a permanent phone book, the program is set up to create cover sheets, text pages, and trailing sheets using a healthy variety of type sizes and styles.

In the end, unless a pair of shaking hands below the caption "Have I Got a Deal for You . . ." sounds appealing, using *FaxBuilder* as a sophisticated word processor to create distinctive documents may be its most suitable use. While clip art has appeal, the ability to easily manipulate fonts and typefaces seems a far more significant feature.

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RIGHTWRITER

Software applications that help you decide what to say and how to say it, assisting in the creative process, need further development. However, applications like Que Software's *RightWriter*, which deal mostly with the mechanical structure of a document, will help you grammatically.

To a lesser degree, this program will also provide assistance in increasing the creative quality of your documents by flagging clichés, slang, awkward phrases, and jargon. Such prose violations often come under the catchall heading of style.

RightWriter uses 5500 grammar rules to check for signs of weak, confusing, or incorrect writing. Reportedly, *RightWriter* detects more than 25,000 kinds of writing

errors (not all, one would hope, in a single document).

The program offers three primary levels of word processor compatibility. With wide-selling word processors such as *WordPerfect*, *Microsoft Word*, and *WordStar*, you can conveniently hot key directly into and out

of the program to understand the program's objection to what you've written or more help with solving the problem, you can turn directly to examples in the manual.

RightWriter's comments follow its analysis format. You can expect commentary on such classic mistakes as sub-

stitution. In time, you'll know them well enough to avoid them.

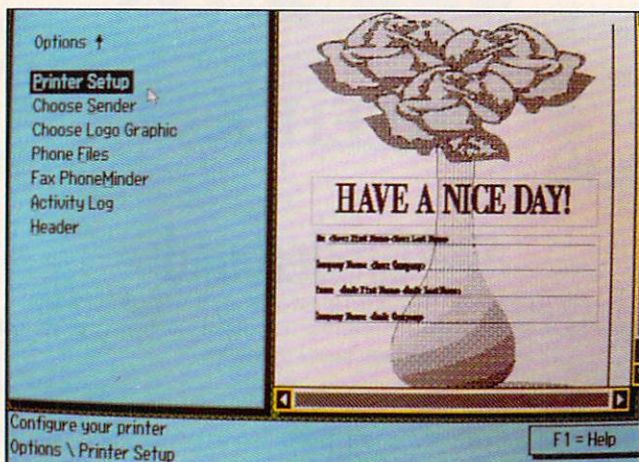
After completing its analysis, *RightWriter* presents a report that summarizes eight aspects of your work. Readability notes the ease of reading your text expressed in terms of education level. For example, a document with a readability index of 8.5 will make sense to anyone who reached the eighth grade or higher. Generally, business writing should fall within the sixth- to tenth-grade levels.

Strength measures the number of clichés, negative expressions, and passive terms you've used. The index's parameters range from 0 to 1. Clichés seriously diminish your quality of writing. You should avoid them like the plague.

An analysis of the number of adjectives and adverbs helps you avoid extremes of choppy and verbosity. Jargon, too, merits its own section, pinpointing buzz words and similar problems. Sentence Structure recommends general changes to improve a document's cadence and flow. Word List flags words that might be misspelled, abstruse, slang, or sexist.

Word Frequency recaps all the words in the document and the number of times you've used each word. Statistics quantifies a multitude of sentence and word statistics such as word count, number of sentences, number of unique words, average number of words per sentence, and the number of syllables per word.

To appeal to both grammatical purists and the casually concerned, *RightWriter* allows you to include or exclude any or all of the rules it uses to analyze your grammar, punctuation, usage, and style components. Likewise, the Customize Summary option enables you to pick and



Create distinctive documents, or construct the friendliest faxes in your office with FaxBuilder.

of *RightWriter*. This spares you from the save-exit-load-exit-reload routine.

With a dozen or so other popular word processors (*XyWrite*, *PC-Write*, PFS series, *Bank Street*, and so on), *RightWriter* will analyze documents created in their native format. However, you must be in *RightWriter* to initiate the error-detection process (save, exit, load, and so on). Finally, *RightWriter* will even accept text in ASCII format.

RightWriter creates, analyzes, and records its comments in a duplicate copy of your document. You have the option to name the clone file. When *RightWriter* finds a problem, it inserts a comment to flag the word or punctuation in question and usually offers a suggestion to solve the problem.

Comments are numbered, so if you need more informa-

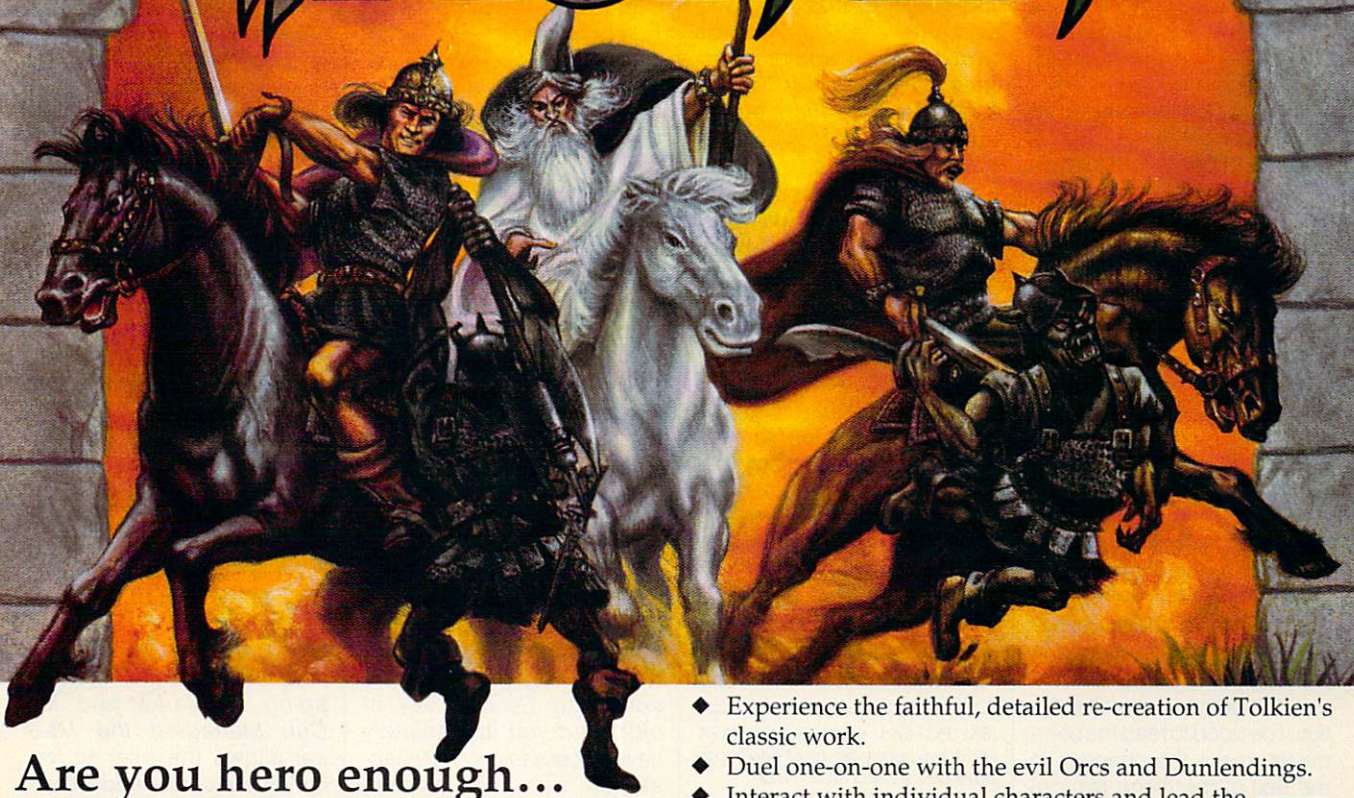
tion, you can refer to the subject-verb mismatch, run-on sentences, misuse of verbs and articles (which sounds more like a felony than a faux pas), and a whole range of punctuation problems.

RightWriter's usage rules help you avoid clichés, archaic language, sexist terms, and jargon. In addition, its usage rules address some fascinating and common errors such as modified absolutes ("almost perfect"), redundancy ("two twins") and euphemisms. Style comments alert you to a wide range of possible errors including passive voice, ambiguity, overly long sentences, and negativism.

Usually you aren't aware of the slips; you've allowed them to creep into your writing style over a period of years. So just as your English teacher once did, *RightWriter* draws your attention to the er-

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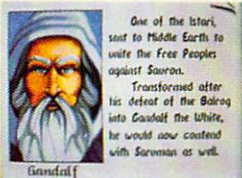
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choose from the summary's eight components to report on only those you want included or considered.

RightWriter's simple, self-explanatory menus deal equally with understanding the techniques of measuring clarity and running the program. You can start *RightWriter* directly from the command line. Add the requisite arguments, and you can control where it creates and what it names the marked-up duplicate copy.

One minor problem that arose concerned transferring corrections from the annotated copy back to the original. Some (but not all) of *RightWriter's* warning flags warrant altering your original text. Ideally, *RightWriter* should allow you to make the corrections you agree with and transfer the corrected text in a batch back into the original document. However, it doesn't work that way.

Instead, you must use a split screen (scrolling the corrected copy in one window while correcting the original in the other) or print out the corrected copy and use it as a guide to enter corrections in the original document.

After some experimentation, I decided to read the comments, make the changes in the text of the clone file, delete all comments, and then use the corrected copy as my original. Although I'd love to take credit for this technique, *RightWriter* anticipated it and contains a menu command that strips out the comments in a batch mode.

Detecting strictly mechanical errors (unpaired parentheses, missing periods, missing quotation marks) is easy. To detect the more subtle errors, *RightWriter* uses two artificial intelligence (AI) techniques to locate and correct writing errors.

The first, a parser, analyzes a sentence and then breaks it into its major components. After identifying dependent and independent clauses, the parser subdivides each clause into its subject and predicate and continues to analyze every word in every sentence to identify its purpose. The second AI technique uses what's popularly called fuzzy logic to compare the use of words and phrases against programmed guidelines. This, in turn, generates *RightWriter's* suggestions for correcting what it perceives as errors.

Despite the extensive data crunching *RightWriter* performs as it analyzes every word, it chewed through a 6000-word document in less than two minutes, providing some helpful suggestions and some comments I felt I could do without. *RightWriter* and I would seem to have the same relationship that many students share with their English teachers—I'm happy to have the assistance but still willing to break a few grammatical rules for the sake of more distinctive, snappier writing.

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ANDREW TOBIAS' MANAGING YOUR MONEY

Fed up with being broke, with not knowing where all the money from your paycheck has gone? For a little over \$200 and a few hours

of patient work per week, you and your personal computer can gain control of your financial life.

The award-winning *Managing Your Money* software has been revamped to compete with marketplace newcomer, *Quicken*. *Quicken* lists for less (at about \$60) and for most will seem easier to use. Furthermore, with *Quicken's* interface to the \$250 *Wealth Builder* program, *Managing Your Money* paled by comparison. Until, that is, the introduction of version 7.0.

Managing Your Money now features pull-down menus, multiple windows, hot keys, colorful graphics that support VGA, a pop-up report generator, and a window-based database module. Friendlier than previous versions, the new *Managing Your Money* remains a bit clunkier to use than *Quicken*. We can't have everything, after all.

Where *Managing Your Money* really outshines the *Quicken* and *Wealth Builder* double-team is the online help information from financial wizard and best-selling author Andrew Tobias. Just hit the F1 key (no longer the confusing Escape key of old), and you immediately have access to over 450 pages of wit and wisdom penned by Tobias. The program is almost as good as having your own personal accountant or financial planner in your computer.

Arranged like a book of eight chapters, *Managing Your Money* consists of File, Desk, Money, Tax, Insure, Analyze, Portfolio, and Net Worth options. Each of the eight options was put in place when the program originally came on the market, and over the years they have been refined by the suggestions and comments

of numerous users. The resultant program combines the talents of thousands of people, including Tobias.

The core of *Managing Your Money* provides for the paying of bills electronically or by printing checks, tracking income and expenses, creating and monitoring budgets, and keeping track of multiple bank accounts, cash management accounts, and credit cards. A very convenient new feature alerts you when your bills are due and must be paid.

For the individual and professional alike, Analyze proves an impressive tool. You may make many financial calculations and projections associated with financial decisions. The program allows you to compute answers concerning loans, annuities, retirement and tuition planning, mortgage refinancing, rental property analysis, and investment analysis. These features were enough to keep me busy for quite a while.

Managing Your Money allows for the integration of the Tax and Portfolio options with two other award-winning MECA programs: *Managing the Market* and *Tax Cut*. *Managing the Market* allows the user to log on to Dow Jones and download current prices, stock market trends, and articles from the *Wall Street Journal*. *Tax Cut* is a sophisticated personal tax preparation software package.

Insure allows you to compute the cost of an adequate life insurance policy tailored to your individual financial needs. Insure provides a vital financial and estate record file in preparation for the ultimate event.

Net Worth provides the unique feature of tracking your personal net worth and

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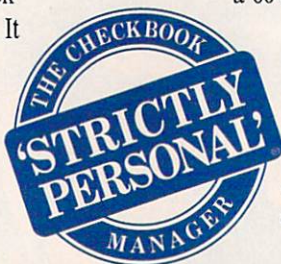
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providing printed statements for personal and business endeavors on a monthly basis at the press of a key, provided you keep all the information in *Managing Your Money* up-to-date. These statements can be helpful in providing the bank with the information needed in applying for a loan.

Managing Your Money has an improved Desk option that provides utilities such as a reminder pad, a card file, a word processor, a five-memory full-function financial calculator, and a date display. Another feature allows for multiple data files for family members and businesses. An accountant could also use this option to track different business and personal clients.

Managing Your Money supports 256-color VGA with a variety of eye-dazzling graphs and displays that can be printed for ready reference. Many types of printers and modems are supported via the existing printer files

and modem setup program.

Mouse and hot-key keyboard action makes moving from one screen to another a logical and rapid process.

Bill paying and bill printing seem better implemented in this version than before.

Did I have any problems with *Managing Your Money*? The program suffers a substantial increase in processing time with operations over 1000 transactions long. The support line suggests that you either limit the period from which you are extracting reports or use version 6.0 until the problem is solved. There is no 800 number, and the wait on the toll-call support line is described by support people themselves as being extremely lengthy. The whole time you're waiting for assistance you pay long-distance rates.

In summary, no package on the market today can compete with *Andrew Tobias' Managing Your Money* on the basis of number of features in one package. While

not as versatile as *Lotus 1-2-3* or as easy to use as *Quicken*, *Managing Your Money* does what all the rest do in one complete financial planning package.

ALFRED C. GIOVETTI

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ZOOM/ FAXMODEM FC 9624

If all fax/modem boards are not created equal, at the very least they necessarily share a number of similarities. Most of them transmit data at a speedy 9600-baud rate for fax transmis-

sions and 2400 baud for modem communications. The ZOOM/FaxMODEM shares these capabilities.

Most of these boards readily plug into an expansion slot, providing an extra jack for a telephone; so, too, does the ZOOM/FaxMODEM. Most come with software for sending and receiving fax transmissions as well as traditional modem communications. But it's in the software that the similarities come to an end.

For quick, workmanlike transmission by fax and modem, the ZOOM/FaxMODEM serves as well as any board made for that purpose. And unlike some boards on the market, this one receives faxes.

If your COM1 and COM2 are permanently assigned for other purposes, you'll certainly appreciate the ability to choose from among four COM port assignments and four interrupts. The board comes with a seven-year warranty. Its accompanying software—*ProComm* for modem

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transmissions and *BitFax* for sending and receiving faxes—gets the job done, providing just enough services and not too many complicated layers to plow through.

Comparing the two pro-

grams, *BitFax* does its job better. Like its companion communications software, *BitCom*, *BitFax* appears on-screen ready to roll with the punch of a key or two, insisting on no obscure key com-

binations for either sending or receiving faxes.

Its onscreen display of documents, whether those received or about to be transmitted, is generally clear and large enough to be fully legible. A scheduler allows the user to transmit automatically when phone rates are low, and a readily accessible phone book makes it easy to send faxes repeatedly to oft-called machines.

Like the program itself, you'll be glad to know the user's manual for *BitFax* is clearly organized and easy to use.

While *ProComm* gets its job done almost as easily as *BitFax*, the program does have a disadvantage or two. For one, the main screen displays no choices for action. You're required to either memorize several key combinations or call up a help menu everytime the program is used. Another annoyance is that every action generates an unusual electronic sound effect that, while cute in concept, I found grating in

execution. Also, there's no manual for the program, although the help file seems generally adequate.

Installation of the ZOOM/FaxMODEM's software was refreshingly easy, and configuring the board itself took only slightly more time.

Several jumpers had to be adjusted before installation. Instructions for doing so were detailed in the board's somewhat primitive manual. Once installed, the software merely had to be adjusted to reflect the proper port, and transmission could begin.

The ZOOM/FaxMODEM isn't flashy; it's just a sturdy tool for doing more than one task. For day-to-day communications, most users should find it more than adequate.

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MICROSOFT FLIGHT SIMULATOR AIRCRAFT AND SCENERY DESIGNER

If you're one of the thousands of armchair pilots who earned their wings with Microsoft's *Flight Simulator*, you know that the program's realism and attention to detail make it one of the most rewarding simulations to master. However, by now you probably also realize that the program is deficient in one important area—scenery.

Oh, sure, you can buzz the Statue of Liberty, loop under the Golden Gate Bridge, or fly rings around the Sears Tower in Chicago. But where are all the really important landmarks like your house, your old school, or the building where you work? Microsoft's *Aircraft*

and *Scenery Designer* not only lets you add these buildings but also allows you to customize the landscape with other types of static scenery, including trees, rivers, mountains, highways, cars, and even navigational aids and runways. Dynamic scenery such as moving ground traffic, sailboats, and aircraft can also be added to bring the area around your local airport to life. You dictate the movement patterns and decide whether the movement should be continuous or begin only when you enter the specific scenery area.

Although *Flight Simulator* already includes an aircraft design option, *Aircraft and Scenery Designer* surpasses the features of this mode by allowing you to modify a much wider variety of design parameters. These include color, instrumentation, aerodynamics, and visual design.

If, after all your hard work designing scenery, you're too tired to design a new aircraft from scratch, you can

still cruise around in a new plane. *Aircraft and Scenery Designer* comes with four new aircraft—a Piper Cherokee Archer, a Beechcraft Starship, a Boeing 747-400, and a seaplane. With all these planes and scenic improvements, *Flight Simulator* holds its own against the current flock of simulators.

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ALPHA FOUR

Clumsy and complex—that's how many people describe the databases they use for creating, maintaining, and extracting information. To the rescue comes *Alpha Four*, which permits you to define the format of your database, enter the data,

and recover what you need with a minimum of effort. And, as a relational database manager, *Alpha Four* allows you to include information from several specialized databases in a single report.

When you design a database, the program permits as many as 128 fields. There are five kinds of fields, and four of these (character, numeric, date, and logical) are traditional fixed-length format. A memo field points to a file that can contain 5000 characters of text. After defining your fields, you can define field rules—a powerful aid. The rules speed up data entry, ensure consistency, and help to prevent you from entering invalid data.

With the field rules, you can specify whether an entry is calculated from other fields or user entered. You can perform case conversion, design templates to speed up data entry, define masks to ensure typing accuracy, set maximum and minimum values for numeric and

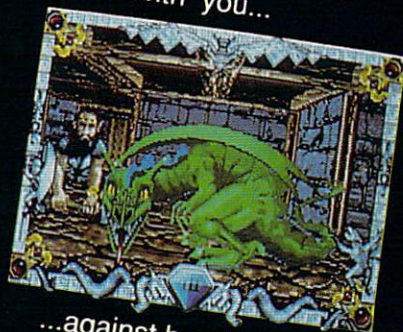
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REVIEWS

date fields, specify mandatory entries, automatically skip fields if specified conditions are met, and define many other features of data entry.

Of particular value, the lookup rule seeks information from another database or from a table. Use the rule to define a list of choices for a field as optional, mandatory, or unpermitted. These options appear in a lookup window in which the selection can be highlighted for easy entry into the record.

As part of its relational scope, *Alpha Four* offers sets that allow you to use multiple databases without needless duplication of information. To define a set, you specify separate databases and the fields of interest within them. The program links those databases and creates a virtual database. You can then call up this virtual database, or set, and use it just as if it were a single database. The key point of relational databases is that they allow you to eliminate data duplication. The set provides convenient and powerful implementation of this capability.

View records either one at a time (with multiple pages if there are too many fields for a single screen) or in a browse mode with 20 rows to a screen and each row a record. In either mode, an index you define determines the order of the records. Each database can have seven indices, and these can be simple, such as a single field, or complex, with primary and secondary indices, exclusions, conditions, and ranges. Changing from one index to another requires little effort.

Alpha Four provides two modes of searching a database. The faster mode searches only the index you've chosen, including only those re-

ords the index admits. Incomplete words are permissible; if you're searching on a name, for example, you can use only the first few letters as a search pattern. This mode, unfortunately, doesn't permit sequential search. The search stops with the first match and won't search further. The other mode, a string search throughout the database, uses the fields you specify and will do sequential searches. Since the memo field contains descriptive text, this mode can be very useful indeed.

The program accepts files from such spreadsheets as *Lotus*, *dBASE*, and *VisiCalc*, or from ASCII files. It can export files to those programs as well as to *WordPerfect* and *MultiMate*. Compatible with a large number of printers, *Alpha Four* provides excellent routines for printing form letters and mailing labels, and attractive customized reports.

The documentation more than sufficiently explains the use of the software. The program is menu driven, and I fault it on only two counts. It lacks mouse support and forces the user to conform to DOS conventions in naming files and fields.

Alpha Four provides a powerful database management tool capable of performing sophisticated tasks for the experienced user and, at the same time, offers an easy means of database upkeep and use for the novice.

CHARLES IDOL

IBM PC and compatibles, 512K RAM; hard disk recommended—\$549, competitive upgrade (with proof of purchase of another database manager)—\$99

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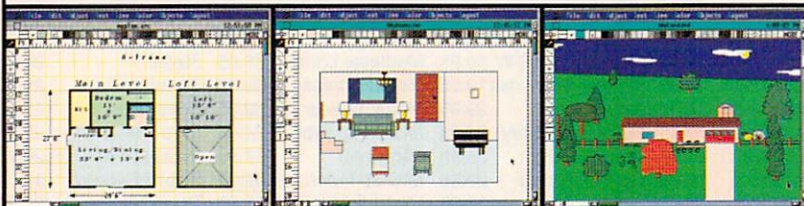
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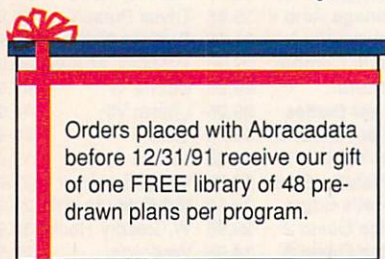
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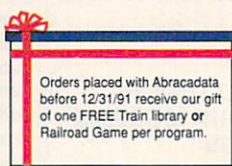
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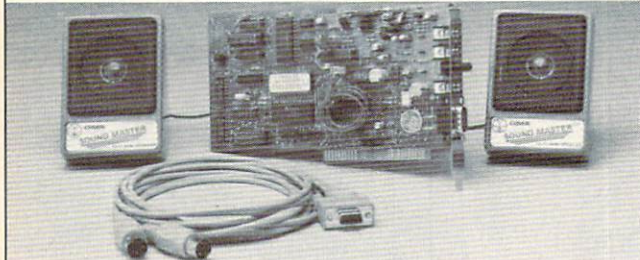
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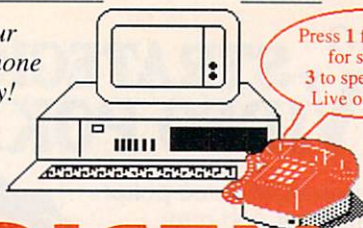
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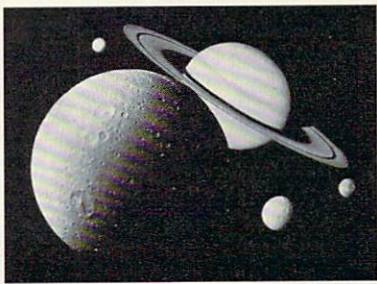
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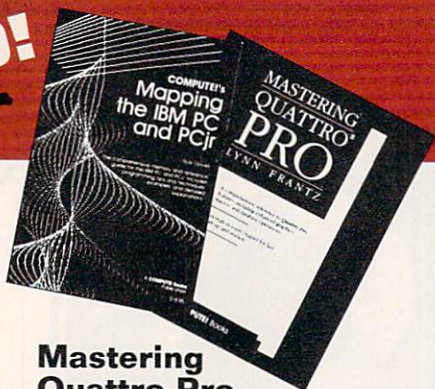
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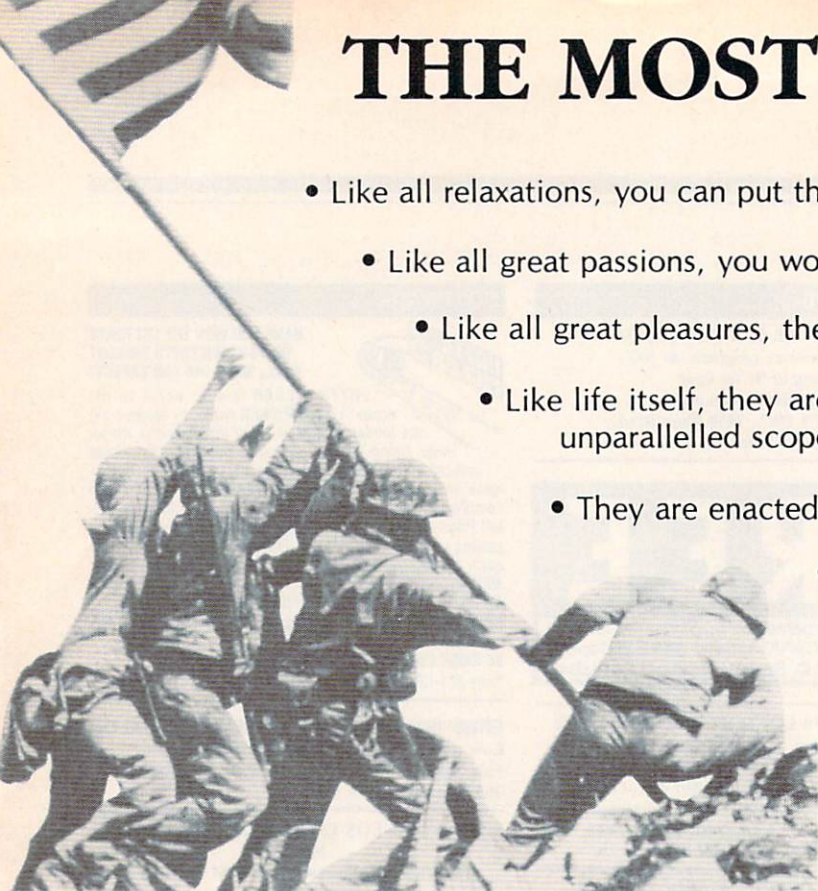
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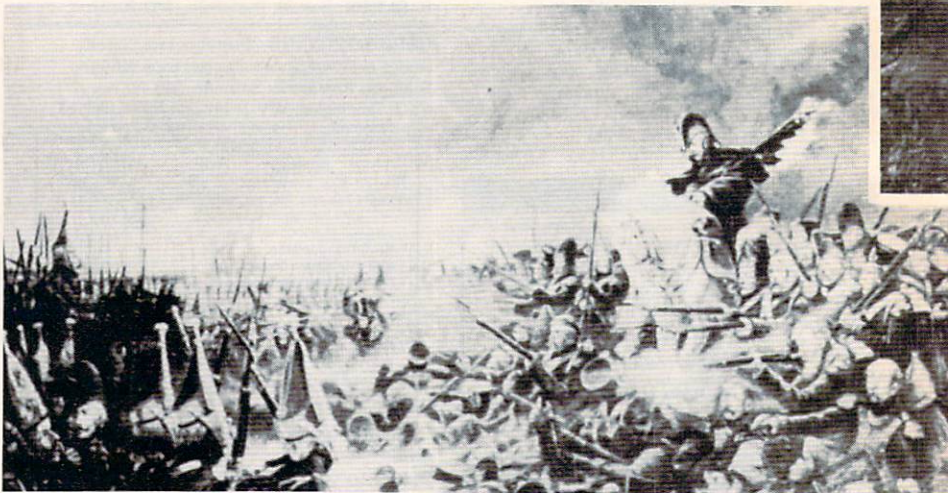
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The tapestry of these struggles was dark to its creators, its final outcome obscure and inevitably the result of a panoply of individual efforts. For example, the French were undone in Spain by *Napoleon's* inability to personally supervise the campaign.

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CONVERSATIONS

CYBERPUNK

The authors of *Cyberpunk* appeared on America Online shortly after their book hit the stands. Here's some of the conversation that ensued.

Question: Do you think that a false sense of security was the principal culprit in the hacker cases you have reported?

Cyberpunk authors: That's one element, but we were trying to get at what we see as an emerging global culture based on computers and networks. The companies are generally asleep at the switch, however. Digital Equipment would never discuss any of the cases with us, although it was involved in each story we wrote about.

Q: Your book seems to be about criminals. Is this your definition of a cyberpunk?

Cyber: To us, *cyberpunk* is defined by the intersection of high technology and outlaw society. There is a great

debate among science fiction buffs about what it really means, but we decided that it was the best word

to capture what we were trying to describe. It's about an underground as much as the idea of criminals.

Q: To what extent do you think Bill Gibson and Bruce Sterling's books encouraged the subculture to develop?

Cyber: The subculture was already definitely there, but it might have encouraged a new generation of explorers.

Q: Are you concerned that people will "get ideas" from books like yours? You made parts of the culture seem pretty attractive in a downbeat kind of way.

Cyber: One of the reasons Digital wouldn't talk to us is that it was sure that we were writing a recipe book. But it's not recipes. It's about people and what they did. You can't avoid these things and hope they will go away . . . and [we] didn't glorify any of this.

Q: Is computer crime really "the perfect crime"? Are people getting away with it?

Cyber: Well, . . . cops say that you only catch the dumb ones, and in computers there are no dumb ones. We tend to think that computer crime is the most underreported crime because corporations tend to cover up the fact that they are victims. The people we wrote about weren't criminals in the traditional sense. They weren't out (for the most part) for profit.

Q: Did you ever do any hacking of your own?

Cyber: What? Us? Can you imagine a *New York Times* reporter doing such a thing? Actually, Katie says that Pengo [one of the German hackers caught by Clifford Stoll] offered to show her how one night, but when they got to his apartment, he couldn't find his modem.

Q: You mentioned a burgeoning international network. Where do you think this cyberculture is going? What do you

think its values will be?

Cyber: The internet is absolutely exploding (the internet is a collection of 2600 networks linking colleges, corporations, the government, and increasingly, the public as well). Cyberpunks will remain a part of this just as criminals [remain] in the rest of society, but increasingly, there is going to be this virtual world out there. Electronic communities like [America Online].

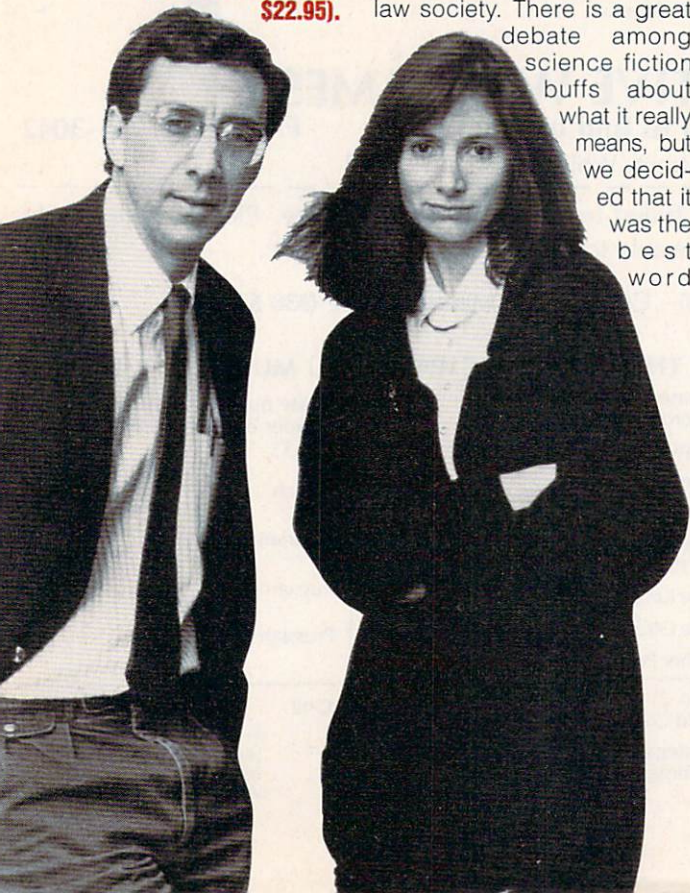
Q: How do you see virtual reality and hyperreality figuring into the world of the cyberpunk?

Cyber: We recommend that you read Vernor Vinge's science fiction novel *True Names*, which takes today's BBS society and computers and assumes infinite bandwidth and MIPS. It's the best description of the way the future network world will look.

Q: What are the officials doing to prevent illegal hacking?

Cyber: There are efforts to create new laws, and there are also some special investigative task forces. But all in all, [officials are doing] very little. There are some vivid descriptions of authorities' ignorance in the book. In one case Kevin Mitnick fooled a task force of police and telephone investigators into raiding a house in Malibu. When they arrived, they broke in on an Iranian short-order cook who was drinking beer and watching television. Imagine his surprise! In another case, Digital actually gave up trying to keep Kevin and Lenny [DiCicco] out of its computers. Some managers were furious. Kevin and Lenny were only caught because they quarreled and Lenny snitched on Kevin. [We] need to educate young people about being good network citizens. Many people have no understanding of the damage that can be done via a computer network. □

**Katie Hafner
and John Markhoff,
authors of
Cyberpunk: Outlaws
and Hackers
on the Computer
Frontier
(Simon & Schuster,
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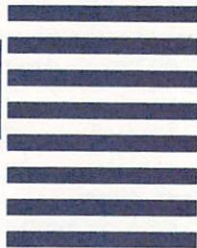
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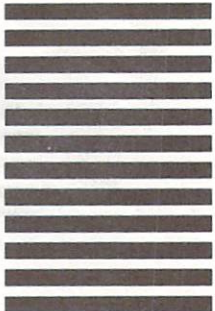
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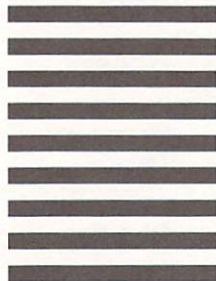
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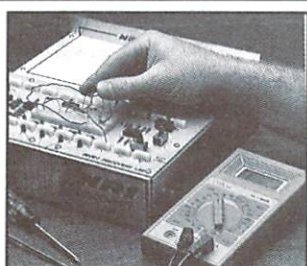
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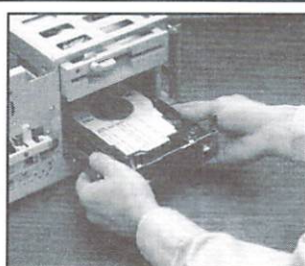
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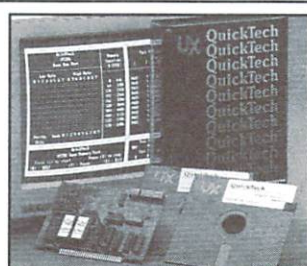
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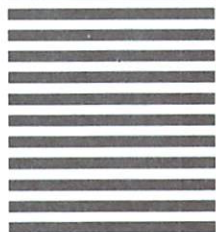
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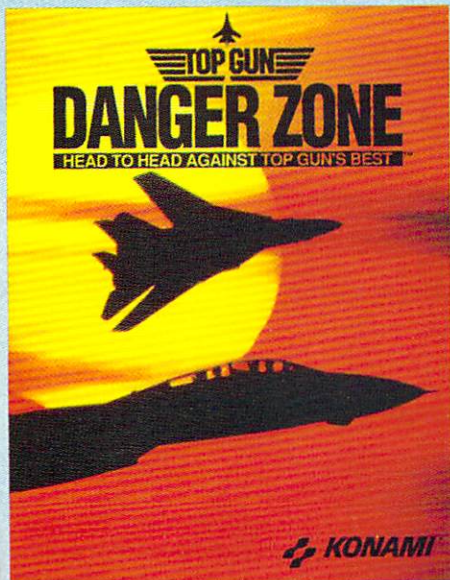


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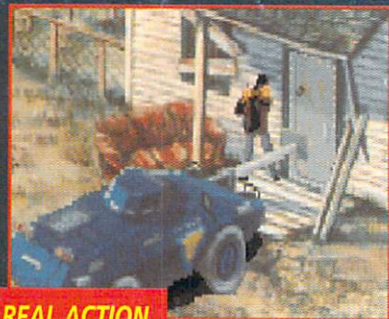
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