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ARTS & LETTERS

Robert Bixby

TAKING THE VENTURA OUT OF A PUBLISHER

You can't use *Ventura Publisher* for very long without grudgingly admitting that it has a few flaws. It lacks two-up printing, for example, and a few other little things that would be nice to have. Fortunately, *Ventura* is popular enough to make it profitable for small programming companies to create utilities to fill in the gaps.

EDCO (EDCO Services, 12410 North Dale Mabry Highway, Tampa, Florida 33618; 813-960-2356) is such a company. EDCO provides simple solutions to two *Ventura* deficiencies most vexatious to typesetters: hyphenation and kerning.

The hyphenation problem involves words improperly hyphenated according to the standard dictionary. This shows up when a word containing a syllable of a single character appears at the end of a line—*Ventura* often breaks

words incorrectly. The *EDCO Hyphenation Dictionary* is free of these errors, and it allows you to enter new words in the dictionary, complete with specified hyphenations to prevent errors from occurring. You can even specify how many letters should appear before and after a hyphen to prevent short words from breaking at all and long words from breaking before or after single letters.

LetrTuck is an interactive kerning engine that allows you to adjust the kerning of letter pairs in the 24 most popular PostScript fonts: roman, bold, italic, and bold italic forms of Avant Garde, Bookman, New Century Schoolbook, Palatino, Helvetica, and Times. You can specify a change of as little as 1/1000 of an em space. You can even enter letters not ordinarily kerned and specify a kerning value. *LetrTuck* and the *EDCO Hyphenation Dictionary* are available for \$99 each or \$148 for both.

2Up Publisher (Laser Age Software, 3231 Ocean Park Boulevard, Santa Monica, California 90405; 213-470-1397; \$159) is another interesting package designed to make up for what I consider a glaring inadequacy in *Ventura*: the lack of two-up printing. Two-up means setting up your pages so the resulting printout can be folded into booklet form.

With *Ventura* you can create landscape pages with two frames side by side, but then there's the problem of pagination. Laying out a booklet unassisted is both a nightmare and a headache rolled into one. To create a 32-page booklet, you could spend hours cutting and pasting text to get it in the right positions, and page numbers have to be entered by hand. That's a lot of work you shouldn't have to do.

It seems that *Ventura* is designed to frustrate creation of

a simple saddle-stitched booklet, but thankfully, *2Up Publisher* is designed to take care of that problem. You simply create pages in *Ventura Publisher* using a special format described in the *2Up Publisher* manual and then print them to a file. *2Up Publisher* then extracts the pages from the file and rearranges them so they can be saddle-stitched.

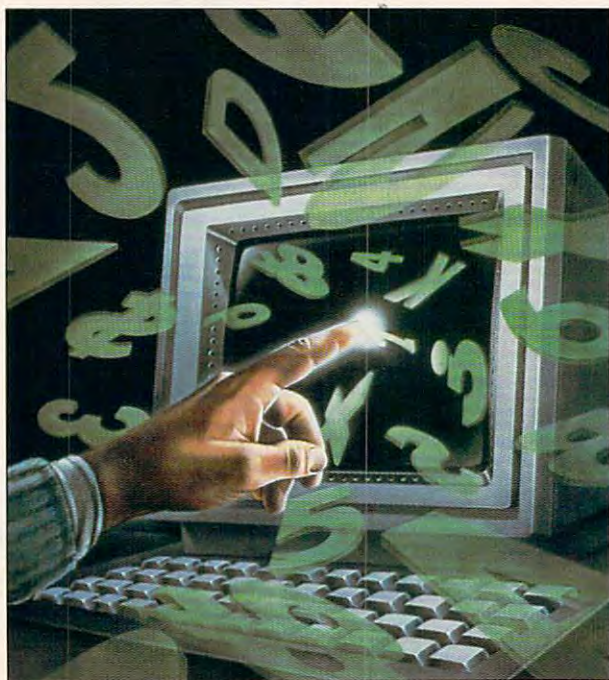
2Up Publisher only prints to a PCL printer, meaning it uses only PCL font files. If you're used to printing from *Ventura for Windows* to a PostScript device, the result is an unacceptable change of available fonts. Nonetheless, once you've set up *Ventura* to print in the appropriate format and made the necessary adjustments, *2Up Publisher* will generate perfect pages as advertised.

As I've mentioned before, I'm a man on a quest; I'm looking for the perfect pointing device to replace the mouse. The news from Quixoteland is that I may have found my true love—a device that makes pointing easier and allows me to draw with a natural motion. The creature's name is MousePen (Appoint Systems, 1332 Vendels Circle, Paso Robles, California 93446; 800-448-1184; \$109), and though it's a little fat around the middle, it works like a real pen.

You can hold it like a pen, draw on your mouse pad as if it were a sketch pad, and even draw with it on other surfaces, provided they aren't too slick. The mouse ball is a bead with a smooth finish rather than the rubber-coated ball bearing found in most mice.

Although I have several standard mice standing by to take the MousePen's place, I haven't rushed back to them yet. If the MousePen barrel can be made thinner, this sharp new input device will border on perfection. □

Ventura Publisher seems designed to frustrate the simple creation of a saddle-stitched booklet.

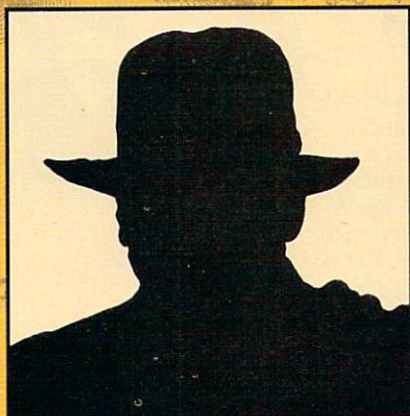


10° 20° 30° 40°

10°

The man with
the hat is back.

20°



30°

This time he's
in over his head.

40°

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In *Where in America's Past Is Carmen Sandiego?*, you hop in your Chronoskimmer 450SL and follow the Sandiego gang as they leap from time to time, starting prior to 1800 and going all the way up to the present day. (Well, up to 1988, anyway.) Although your goal may be a good arrest, along the way you'll learn much about important times in America's history, from the discoveries of the first explorers to the inventions of Thomas Edison to the introduction of rap music.

A typical game begins when ACME headquarters briefs you on the most current V.I.L.E. (Villains' International League of Evil) caper and issues you a Chronoskimmer for a specific period of time. At

the start of a case, you know only the crime and the criminal's gender. To complete your mission, you must identify, locate, and arrest the criminal before your time expires. The execution of most commands consumes time, so you must examine clues carefully and avoid taking unnecessary trips or requesting redundant information.

Because Brøderbund's America is divided into five geographic regions, each of which can be visited in any of nine time periods, guesswork will yield poor results. You must examine each clue to determine both the region and time period to which the criminal has fled. The game's documentation advises you to "refer to your personal volume of *What Happened When*." Study this impressive tome carefully and become thoroughly familiar with its organization. The book contains far too much information for anyone

to simply memorize.

Luckily, your first time jump is automatic, zapping you to the last place the criminal was sighted. When you arrive at your destination, your view screen offers a scene from the region in the appropriate time period, after which you start your investigation by choosing Ask a Bystander, Consult a Source, or Listen In. Whichever clue you choose, the interviewee will give information that may point to the criminal's next destination, time period, or both.

For example, a typical clue may read, "She said she was going to donate copies of the new book, *Uncle Tom's Cabin*, to a library in Austin." By looking up books in *What Happened When's* index, you find *Uncle Tom's Cabin* listed with a publication date of 1852. You now know your target has fled to the Southwest (Austin) in the year 1852 (you've also learned a little about classic



literature, but don't let that worry you), and you didn't even have to read the full entry in the book! Pressing the Chronoskimmer's map button brings up a map of the U.S. on your view screen. You select the 1850-1875 time zone and the Southwest region and press the launch button, and you're off.

When you arrive in the Southwest, you learn that "the first Texas cattle drive began in 1866 when a herd of 260,000 cattle was moved north, proving that cattle could be driven to market." Interesting though this fact may be, it doesn't help your search. But pressing the Search button allows you to question the witnesses.

As you search for clues, headquarters may send electronic mail, which gives you the latest lowdown on your suspect. Clues like "She had ruby-colored hair" let you narrow down the suspects. Enter the information into your crime computer. Once you know enough about the villain, you're issued a warrant.

The game continues in this fashion until you capture the suspect or run out of time. Sometimes, you may catch up with the suspect before you have a valid warrant, in which case, the suspect gets off—and you get chewed out by headquarters. If you end up with a warrant for the wrong person, you'll really feel like a dink.

Where in America's Past Is Carmen Sandiego? supports most graphics modes, including CGA, EGA, and VGA. Although obviously best played in VGA mode, the game's EGA mode is an acceptable alternative, with the CGA graphics being better than one might expect but still tough on the old orbs. The VGA graph-

ics are stunning, with many scenes rendered from digitized photos.

Not all the graphics are static scenes, however. Each time you jump to one of V.I.L.E.'s locations, a Sandiego henchperson makes an appearance in a carefully crafted, always amusing animation. I won't give away any of the surprises. Suffice it to say that, with a full dozen of these cartoonlike intermissions built in, you'll continue to enjoy them for many games. (If you don't see an intermission after a time jump, you jumped to the wrong location or time.)

While the straight PC-generated sound effects are OK, this game puts sound cards like Ad Lib and Sound Blaster through their paces. The professionally composed music is reminiscent of that of hard-boiled detective dramas, with a splash of sexy-cool jazz thrown in to keep you grinning and bobbing. The sound effects accompanying a time jump rattle your chair and echo spookily as you snap into your chosen slot in history.

No software is perfect, of course. When played using a Sound Blaster card, *Where in America's Past Is Carmen Sandiego?* sometimes leaves a note or two hanging, yielding a droning sound that can drive you wacky if it goes on too long. (This also may happen with other sound cards.) I also didn't care for the method by which the player gathers clues. Any software built upon a fictional scenario must maintain that all-important suspension of disbelief. Clicking on a button labeled *Ask a Bystander* or *Listen In* reminds you that you are, after all, just playing a game. It would've been much more effective to

WHERE IN AMERICA'S PAST IS CARMEN SANDIEGO?



have a person's portrait pop up, as though you were truly questioning people met randomly in the street. As the game stands, the Clue buttons might as well be labeled *Clue 1*, *Clue 2*, and *Clue 3* for all they add to the game's scenario. These are minor quibbles, however, when compared with the overall quality of the program.

Although the gameplay varies only slightly from one title to the next, these games continue to be entertaining and, best of all, painlessly educational—a tough combination to beat. As parents proved to their kids over five years ago when the first charming Carmen Sandiego adventure was released, learning can be fun. *Where in America's Past Is Carmen Sandiego?* is a must-have package for anyone interested in superior and engaging educational software. □

IBM PC and compatibles; 512K RAM for CGA, EGA, Tandy 16-color, and Hercules; 640K for MCGA and VGA; hard drive; supports mouse or joystick; supports Roland MT-32, Sound Blaster, Ad Lib, LAPC-1, and CM-32L—\$59.95

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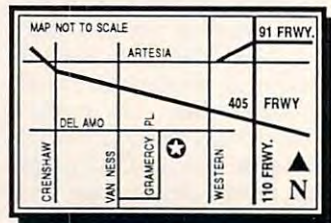
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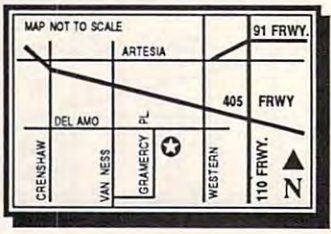
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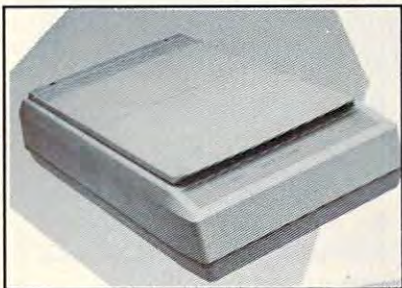
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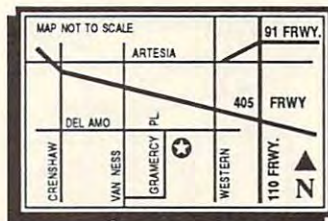
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- 300 dpi resolution
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TurboScript 3

PostScript Emulation Cartridge

UDP's PostScript cartridge gives you more than other leading brands!

- 47 Postscript fonts—scalable to any point size
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- Works on LaserJet II, IIP, IID, and III printers
- Supports Adobe Type 1 font formats

The TurboScript cartridge give you 47 high quality scalable Postscript fonts in any point size, that 12 more than HP's Adobe PostScript or Pacific Data's Pacific Page III Cartridge. It requires 1 MB less printer memory.

TurboScript is ideal for use with desktop publishing and WP applications such as Windows, Pagemaker, Ventura Publisher, Micrografx Designer, WordPerfect, Microsoft Word, Illustrator, Corel Draw and many more.

Postscript features include scaling, reverse type, rotation, shading, patterns, stretching, circles, arcs, clipping path, etc.

Two identical versions available for printer compatibility... TurboScript II for the HP LaserJet II and compatibles and TurboScript III for the HP LaserJet IID, IIP and III.

Compatible with IBM computers and compatibles. An additional appletalk-to-parallel connector box allows you to interface with the Macintosh computer.

\$299⁰⁰

Save \$100.00
\$399.00 Retail Price



47 Scalable Postscript Fonts... that's 12 more fonts than your standard postscript cartridges!

Postscript Effects



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Outline

Reverse



Clipping path

Impressive

Perspective

Turbo25

More Printing Power with 3.6 to 30 point Fonts

- Turbo25 gives you fonts from 25 HP cartridges plus headline and zingbat fonts
- Contains 152 fonts, 22 character sets and 220 "zingbats"
- Includes drivers for most WP software, including the new Windows 3 environment



The Turbo25 is designed to provide you with economy, flexibility and versatility. You get the most from your laser printer. Name the application: word processing, mathematics, legal, scientific and technical, tax forms, big bold headlines, spreadsheet...

Turbo25 cartridge adds all the right touches, with headline fonts, 22 symbol sets, 3.6 & 4.8 point type for spreadsheets to 30 point type for headlines; portrait and landscape, mono-spaced and proportionally spaced fonts, and much more.

Exceptional type quality. Hand tuned fonts give you crisp and sharp images. And you'll eliminate the need to store and download soft fonts, giving you faster printing and more computer memory.

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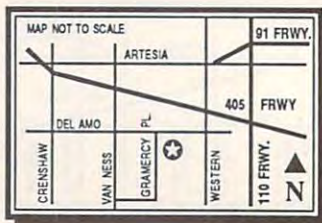
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For LaserJet II and IID

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167 complete font sets,
22 symbol sets and
222 graphic symbols

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- Script fonts from 12 pt. to 48 point makes terrific certificates
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- Driver support for many popular wordprocessing & spreadsheet programs, including Windows
- Works with HP LaserJet II, IIP, IID, III, IIID, Epson EPL-7000, Star Macronics, & Star LaserPrinter 4. Other printers may be able to use this cartridge if they emulate one of printers mentioned.



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IBM 4019



Laser Font Card

UDP Compatible
Font Card for
IBM 4019 & Compatible Printers

- Packed with 209 Fonts.
- Emulates Pacific Data's "25 in One" cartridge
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- Come with drivers for many popular applications and Windows 3.0 (with VGA screen fonts) in both HP emulation and IBM native modes.
- **Plus...** access to Pacific Data's "25 in One" driver, HP's ProCollection driver, IBM's Universal Card (#800) driver and other drivers for HP and IBM fonts.
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6450372	2MB Memory Adapter 6450367	395.00
6450603	1MB SIMM PS/2 70-E61; 121	68.00
6450604	2MB SIMM PS/2 50Z-70	108.00
6450608	2MB SIMM PS/2 70 - A21	128.00
34F2933	4MB SIMM PS/2 55SX; 65SX	279.00
6450375	1MB Mem. BD PS/2 80-041	96.00
6450379	2MB Mem. BD PS/2 80 111-321	158.00
6451060	4MB Mem. BD PS/2 80-A21-A31	298.00
6450605	2-8MB Xpand Mem. PS/2 70880 w/2MB	348.00
34F3077	2-14MB Xpand BD. PS/2 70880 w/2MB	388.00
6450609	2-14MB Xpand BD. PS/2 50-65SX w/2MB	388.00

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AST MEMORY

CAT. #	DESCRIPTION	NSI
500510-001	512K Upgrd Kit Prem 286 FASTRAM	39.00
500510-002	2MB Upgrd Kit Prem WS 386SX; WS 286; Bravo 286 & 386SX; Rampage Plus 286; Advntg Prem 8/2; Ram Advntg; Advantage	118.00
500510-003	1MB Upgrd Kit Premium 386	98.00
500510-004	4MB Upgrd Kit Prem 386; Rampage Plus/MC; Advntg 286 & 386	310.00
500510-007	1MB Upgrd Kit Prem 386C; 386/16	65.00
500510-008	4MB upgrd Kit Prem 386C; 386/16	230.00
500510-010	512K Upgrd Kit Prem WS 386SX & WS 286; Bravo 286, Rampage + 286	39.00
500510-011	128K Upgrd Kit Bravo 286	40.00
500709-001	512K Upgrd Kit Advn /2; Rampage PC	40.00
500709-003	512K Upgrd Kit Rampage Plus/MC	40.00
500718-001	1MB Mod. Prem 386/25 & 386SX/16	65.00
500718-002	1MB Mod. Prem 386/33-25; SX/16; 486/33-25T; 25T; 25; 25E; Adapter Board 500722-004	75.00
500718-004	2MB Upgrd Kit Prem 486 Series	186.00
500780-001	8MB Kit Prem 486 Series	870.00
500818-004	1-16MB Exp Bd Prem 386/25-33; Prem 486's	450.00
ASTSX20	1MB Mod Prem II 386SX/20	84.00

HP (GPU) MEMORY

Cat. #	DESCRIPTION	NSI
D1354A	2MB Up-Kit Vectra QS/16S & ES12 PC	114.00
D1640A	1MB Up-Kit VECTRA QS/20PC; RS25PC & 20C	62.00
D1642A	1MB Up-Kit VECTRA QS/20PC; RS25PC & 20C	234.00
D1540A	1MB Up-Kit VECTRA QS/16S	62.00
D1540A	1MB Up-Kit VECTRA QS/16S	62.00
D2150A	1MB Mod VECTRA 486 PC	78.00
D2151A	4MB Mod VECTRA 486 PC	282.00
D2152A	8MB Mod VECTRA 386/25; 486PC	930.00
D2381A	2MB Mod VECTRA 386/25 PC	144.00

ZENITH MEMORY

CAT. #	DESCRIPTION	NSI
ZA180-64	2MB Card Super Sport SX; 286E	240.00
ZA180-66	1MB Card Super Sport 286; 286E	180.00
ZA180-86	2MB Card Super Sport SX (ALPHA)	240.00
ZA180-87	2MB Card Super Sport SX (BETA)	240.00
ZA3034ME	1MB Card Turbo Sport 386E	199.00
ZA3034ME2	4MB Card Turbo Sport 386E	590.00
ZA3034ME2	4MB Card Turbo Sport 386E	590.00
ZA3600ME	1MB Mod. Z-386/20-25-33-33E	79.00
ZA3600MG	2MG Mod. Z-386/20-25-33	130.00
ZA3800ME	1MB Mod. Z-386/20-25-33-33E	79.00
ZA3800MK	4MB Mod. Z-386/20-25-33-33E	268.00

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CAT. #	DESCRIPTION	NSI
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PC7-PA8301U	2MB Mem Card Port. T5100	168.00
PC8-PA8302U	2MB MemCard Port. T1600	162.00
PC9-PA8340U	512K Mem Card Port. T3100E	120.00
PC9-PA8341U	2MB Mem Card Port. T3100E	168.00
PC10-PA8304U	2MB Mem Card Port. T5200	168.00
PC12-PA8307U	Toshiba Desktop T8500	
PC12-PA8309U	2MB Mem Card Port. T3200SX	168.00
PC14-PA8306U	4MB Mem. Card Port. T3200SX	389.00
PC14-PA8311U	2MB Mem Card Port. T1200XE	168.00
PC14-PA8312U	1MB Mem Card Port. T1000SE; T1000XE	218.00
PC14-PA8312U	2MB Mem Card Port. T1000SE; T1000XE	276.00
PC15-PA8308U	2MB Mem Card Port. T3100SX	162.00

NEC MEMORY

Cat. #	DESCRIPTION	NSI
APCH655X	2MB Mod Powermate 386/25	458.00
APCH656X	8MB Expansion Bd. Powermate 386/25	1,190.00
APCH657X	3MB Base Bd. Powermate 386/25	1,250.00
APCH850E	1MB Expansion Bd. Powermate SX Plus	240.00
APCH852E	4MB Expansion Bd. Powermate SX Plus	690.00
PC21-21	1MB CD ProSpeed 286; 386SX	245.00
PC21-22	4MB CD ProSpeed 286; 386SX	569.00
PC21-26	2MB CD ProSpeed 286; 386SX	309.00
PC31-21	2MB CD ProSpeed 386	319.00
PC31-22	8MB CD ProSpeed 386	1,190.00
KTN2000SX	2MB Exp. Bd. Powermate SX Plus	440.00
KTN8000SX	8MB Exp. Bd. Powermate SX Plus	1,190.00

LASER PRINTER MEMORY

Cat. #	WORKS WITH	NSI
H33474B	1MB HP Laser Jet IIP, III, IIID	99.95
H33475B	2MB HP Laser Jet IIP, III, IIID	139.95
H33477B	4MB HP Laser Jet IIP, III, IIID	214.95
H33438B	1MB HP Laser Jet II & IID	99.95
H33444B	2MB HP Laser Jet II & IID	139.95
H33445B	4MB HP Laser Jet II & IID	214.95
EP1000	1MB Epson EPL-6000	129.00
EP2000	2MB Epson EPL-6000	169.00
EP4000	4MB Epson EPL-6000	249.00
T11000	1MB Texas Instrument MicroLaser PS	129.00
TB1000	1MB Toshiba Page Laser 6	118.00
TB2000	2MB Toshiba Page Laser 6	164.00
TB3000	3MB Toshiba Page Laser 6	208.00
TB4000	4MB Toshiba Page Laser 6	248.00
1039136	1MB IBM Laser 4019; 4019E	129.00
1039137	2MB IBM Laser 4019; 14019E	169.00
1038675	3.5MB IBM Laser 4019; 4019E	229.00
M6005	1MB Apple LaserWriter II/NTX	85.00
M6006	4MB Apple LaserWriter II/NTX	319.00
S63-1300	1MB Canon LBP-8II	119.00
S63-1880	2MB Canon LBP-8II	189.00
N/A	4MB Canon LBP-8II	269.00
PA1000	1MB Panasonic KXP4420; KXP4450I	118.00
PA2000	2MB Panasonic KXP4420; KXP4450I	164.00
PA3000	3MB Panasonic KXP4420; KXP4450I	208.00
PA4000	4MB Panasonic KXP4420; KXP4450I	248.00

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256x8	15.00	17.00	19.00	22.00		
256x9	17.00	19.00	21.00	24.00		
1MBx8			50.50	51.00	60.00	65.00
1MBx9			53.50	54.95	65.00	68.00
4MBx8					224.00	234.00
4MBx9					234.00	244.00
					274.00	284.00

COMPAQ MEMORY

CAT. #	DESCRIPTION	NSI
107331-001	512KB Upgrade Portable III	38.00
107332-001	2MB Upgrade Portable III	118.00
107651-001	1MB Module Portable 386	218.00
107653-001	4MB Xpand Mem. Portable 386	630.00
107654-001	4MB Mem. Xtension Portable 386	630.00
108069-001	1MB Xpand Memory DP386-16	288.00
108070-001	4MB Xpand Memory DP386-16	630.00
108071-001	1MB Memory Upgrade DP386-16	108.00
108072-001	4MB Memory Upgrade DP386-16	438.00
110235-001	1MB Memory BD Slt 286	162.00
110237-001	4MB Memory BD Slt 286	630.00
112534-001	4MB Module DP386S-16	298.00
113131-001	1MB Module DP386286E; 386 20-25E	96.00
113132-001	4MB Module DP2866E; 386 20-25E	228.00
113633-001	1MB Xpand Mem. DP386S-16	148.00
113634-001	4MB Xpand Mem. DP386S-16	358.00
113644-001	1MB Xpand Mem. DP386 20E, 25E	148.00
113645-001	4MB Xpand Mem. DP386 20E, 25E	358.00
113646-001	1MB Module DP386S-16	110.00
115144-001	1MB Module DP386-33; 486-25; Syspro	158.00
116561-001	8MB Module 486-25; Syspro	899.00
116568-001	32MB Module DP486-25; Syspro	4,990.00
117077-001	512KB Mem. BD Portable LTE	119.00
117081-001	1MB Mem. BD Portable LTE 286	99.00
117081-002	2MB Memory BD Portable LTE 286	158.00
118304-001	1MB Module for SLT/386	174.00
118304-002	2MB Module for SLT/386	270.00
118305-001	4MB Module for SLT/386	380.00
118688-001	1MB Module DP286N; 386N	90.00
118689-001	2MB Module DP386N; 386S-20	168.00
118690-001	4MB Module DP286N; 386N; 386S-20	396.00
118700-001	0-4MB Exp-BD DP286N; 386N	108.00

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with 4MB 289.00
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with 4MB 299.00

BOCARAM 50Z—Provides up to 2MB, 0 wait state, expanded or extended memory for IBM, PS/2 model 50, 50Z, 60. Uses 11MB D-RAM—

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	150	120	100	80	70	60
64x1	.90	1.20	1.50			
64x4		2.00	2.15	2.50		
256x1	1.25	1.40	1.60	1.85	2.10	
256x4		5.35	5.70	6.00	6.75	7.75
1MBx1			5.45	5.65	6.50	7.50

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Model Name Description NSI Price

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ST251-1 (MFM)	42MB 28ms HH	208.00
ST4096(MFM)	80MB 28ms FH	508.00
ST4144R (RL)	122MB 28ms FH	468.00
ST157A (IDE)	44MB 28ms 3.5"	198.00
ST1102A (IDE)	84MB 20ms HH	408.00
ST1144A (IDE)	125MB 20ms HH	468.00
ST1162A (IDE)	143MB 15ms 3.5"	638.00
ST1239A (IDE)	211MB 15ms 3.5"	778.00
ST2274A (IDE)	193MB 16ms HH	1,178.00
ST2383A (IDE)	338MB 16ms HH	1,980.00
ST2106E (ESDI)	94MB 18ms HH	598.00
ST2182E (ESDI)	160MB 15ms HH	958.00
ST2383E (ESDI)	337MB 15ms HH	1,298.00
ST4182E (ESDI)	160MB 16.5ms FH	828.00
ST4383E (ESDI)	328MB 18ms FH	1,288.00
ST442E (ESDI)	373MB 16ms FH	1,419.00
ST4766E (ESDI)	660MB 15.5ms FH	1,878.00

CONNER

CP3044 (IDE)	42MB 25ms 3.5"	224.00
CP3184 (IDE)	84MB 25ms 3.5"	370.00
CP3104 (IDE)	104MB 25ms 3.5"	409.00
CP30104 (IDE)	120MB 17ms 3.5"	449.00
CP3204 (IDE)	209MB 16ms 3.5"	669.00

MAXTOR

XT4170E (ESDI)	157MB 14ms FH	\$855.00
XT4230E (ESDI)	203MB 16ms FH	1,129.00
XT4380E (ESDI)	338MB 16ms FH	1,240.00
XT8380E (ESDI)	360MB 14ms FH	1,265.00
XT8760E (ESDI)	676MB 16ms FH	1,865.00
8651A (IDE)	42MB 28ms 3.5"	279.00
7040A (IDE)	42MB 19ms 3.5"	299.00
7080A (IDE)	81MB 19ms 3.5"	399.00
LXT200A (IDE)	207MB 15ms 3.5"	829.00

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Works like a mouse, shaped and held like a pen! Light, Responsive, Easy to Use!

The Mouse Pen is comfortable with either hand and requires minor wrist movement to operate and adjust its response automatically to your movement. It is the most advanced pointing device technology available today. Uses existing drivers in Windows and works with Microsoft or IBM OS/2 drivers.

Includes...

- Microsoft compatible driver
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- Large Alphanumeric LED display

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The Intel Math CoProcessor is an inexpensive way to make over 1000 powerful software programs run even faster. The Math CoProcessor offloads the complicated math function from your computer's main processor, and handles in one instruction what would have required many steps with the standard processor. Depending on your application, your software will run up to five times faster.

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Math CoProcessor for 33MHz 386 DX-based computers including the Zenith 2-386/33, Compaq DeskPro 386/33, and CompuAdd 333. The fastest Intel technology. Cat. # BOX387DX-33 \$269.00

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INTEL 387 DX-20

Math CoProcessor for 20MHz 386 DX-based computers including 20MHz IBM PS/2 Model 70, Compaq DeskPro 386/20e, and CompuAdd 320. Up to 20% faster than the previous Intel 387 DX-25 Math CoProcessor. Cat. # BOX387DX-20 \$249.00

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INTEL 387 SX-16

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80287-8 MHz \$69.00
80287-6 MHz \$49.00

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8087-2

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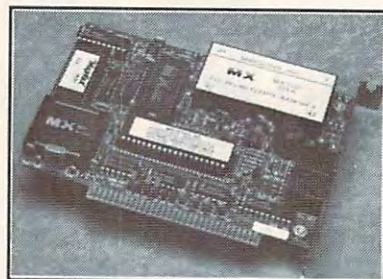
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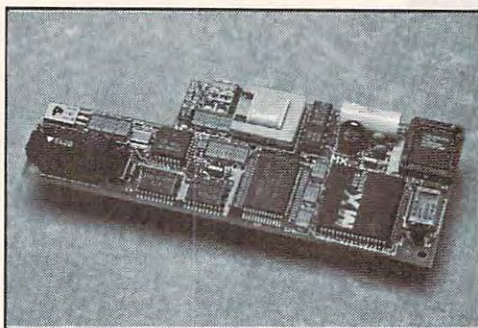


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PATHWAYS

Steven Anzovin

CYBERWOCKY

*'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe;
All mimsy were the borogoves
And the mome raths outrave.*

Those lines from Lewis Carroll's "Jabberwocky" may not sound like the future of computing to you, but if you listen closely, you can hear them in all the talk about VR (Virtual Reality), perhaps the ultimate computer buzzconcept.

The whole idea of VR, which we'll define here as "a computer-generated simulation of real experience," has given birth to a staggering amount of verbal goulash, much of which makes "Jabberwocky" sound sensible.

Virtual reality, artificial reality, synthetic reality, cyberspace, cyberarts, multimedia, hypermedia, or whatever it is—you know there's some basic confusion here when the experts can't agree on what to call it—is hot stuff right now.

It's attracting plenty of press, including this magazine, and the attention of some big players in the industry—Autodesk, Apple, IBM, Microsoft, VPL Research, Evans & Sutherland, and many more. But since researchers really don't know what they're doing yet, VR stuff tends to stay in the labs. In fact, most of it's just theorizing—virtual VR, so to speak.

Not much VR has filtered down to the real-world level—a few pieces of hardware, like the Gold Brick for the Mac, and some innovative software like *Vista* for the Amiga. You have to look in the journals and attend the conferences to get a real sense of where VR research is headed.

Writing in last year's summer issue of *Multimedia Review*, Randal Walser, manager of the Autodesk Cyberspace project, outlined a VR world sys-

tem that involves a puppet (a virtual actor in the virtual world) controlled by a patron (a real person in the real world). This puppetmaster paradigm leaves me cold—too schizophrenic. Remember the "Twilight Zone" episode in which the evil dummy takes over the ventriloquist?

I go for the virtual telepresence model espoused by Scott Fisher, formerly of the NASA Ames Research Center. In this concept you can take on an entirely different identity (someone rich and famous, for example) and interact with others in their virtual identities. In other words, instead of just watching "Star Trek," you can be in it. As you can see, conceptualizing about VR is still at the infotainment level.

Some thinkers warn us to ground our virtual realities in some aspect of true reality, lest we lose our way in them. (Maybe it's the VR theorists who have lost touch with reality.) While moral and ethical questions don't come up often in mainstream VR research, VR does have its own Moses.

At the last Virtual Reality Conference held in San Francisco in December 1990, Professor Michael Benedikt of the Univer-

sity of Texas brought down from the mountain seven commandments for the design of virtual realities, including:

- The world is indifferent to the user.
- One may not enter a space invisibly.
- Shared spaces exist by the consensus of those sharing them.

It seems that Benedikt's main concern is to prevent cyber-spatial voyeurism. That takes all the fun out of it for me, but my personal favorite is, "Each world contains fewer dimensions than itself." Think about that for a minute.

The academic approach to VR, however, is not for everyone. The really interesting action is elsewhere. For a look at the outlaw fringe of VR—as well as other bizarre manifestations of the electronic age—check out *Mondo 2000* magazine (P.O. Box 10171, Berkeley, California 94709).

Self-described as a "mutazine" for cyberpunks, hackers, crackers, and wild-eyed visionaries, *Mondo 2000* is kind of a blend of *Interview*, *Mother Jones*, *Shaman's Drum*, and *New Media Age*. It covers everything from weird electronic conspiracies—if you believe the letters to the editor, there are a lot of them out there—to the latest trends in drug-free expansion of the senses.

The race for VR (as *Mondo 2000* likes to call it) is fascinating to follow, and the VR toys are fun to play with, but you really have to wonder, why are we so anxious to escape into alternate realities? And given the state of the real world, what makes us think the virtual worlds we create will be any better than the real thing?

Such questions make me a bit anxious about the "frabjous day" when VR is—you'll excuse me—a reality. □



What makes us think the virtual worlds we create will be any better than the real thing?



PART 1

USE YOUR
PC FOR INTELLIGENT
HOME SECURITY

TURN A HOME SWEET HOME INTO A SMART HOUSE

BY HOWARD MILLMAN
PHOTOGRAPHY BY MARK WAGONER

Want to make a computer happy? Give it something to do over and over again. Let it check a window several times a second to see if it's been forced open, or take indoor and outdoor temperatures and constantly adjust the heat accordingly, or "look" to see if someone's entered a room and then turn on the lights if it's after 7:00 p.m. These are typical activities in a computer-controlled Smart House.

In 1984, the National Association of Home Builders (NAHB), who coined the term *Smart House*, developed the idea of a computer-controlled home—whether a house, condominium, or apartment—that would allow owners to spend more time pursuing life's rewards and less time performing routine household tasks. The result of that idea is a 40-million-dollar prototype the NAHB hopes will evolve into an industry standard.

In the meantime, the Electronic Industries Association (EIA) is already promoting a competing standard: the Consumer Electronics Bus, or *CEBus*. The primary difference between NAHB's Smart House and EIA's CEBus is that the Smart House uses a central computer, while the CEBus requires individual devices to have on-board intelligence and computers to exchange data with each other through a common language. Generally, the NAHB standard appears well suited to control equipment and processes while the CEBus delivers greater versatility in controlling appliances.

In addition to NAHB and CEBus, existing standards such as X-10 are also

clamoring for a piece of this quickly expanding market. X-10 devices are popular because they use the home's existing electrical wiring to carry a superimposed signal that controls lights and appliances. However, a major problem with X-10 is that because they're line-carrier devices, line voltage electrical noise sometimes falsely triggers wired-in appliances.

A Low-Cost, High-IQ Security System

The computer-in-residence system designed by *COMPUTE* uses a central computer for two reasons: It involves a lower initial cost, and it's easier to retrofit into an existing building, which makes it a good system to use as a model for your own smart house.

COMPUTE's system consists of four elements: sensors to sample physical events such as temperature, light, sound, motion, and heat; analog/digital cards to convert data received from the sensors into digital form so the computer can understand it; a personal computer with compatible control software to analyze and act on the data it receives; and a series of relays to control different pieces of equipment, processes, and appliances. Since many data-acquisition and control (DA&C) functions are time based, your computer should contain a battery-backed clock and calendar.

This may all sound expensive, but in fact, you can assemble it for less than \$600 if you already have a PC. In fact, if you have an old XT collecting dust in the closet, that's the one you should use. Control software that

operates the security system is written in BASIC and will run under BASICA or GW-BASIC on essentially any PC, including older ones (see Programming Your Smart House below).

The first task you'll want to assign your computer is providing perimeter security. According to a recent U.S. Justice Department survey, burglaries are four times more likely to occur in homes without intrusion alarms. In addition to your improved peace of mind and the property protection, an added bonus to having a system is that some insurance companies provide premium reductions for homes protected by security systems. Be sure to check with your insurance company to find out if you're eligible for such a premium. You may want to switch carriers if not.

At some time or another, most any alarm system is going to inconvenience you—and your neighbors—to some degree, usually in the form of nuisance alarms. A major reason for nuisance alarms is dumb alarm systems that "think" every occurrence warrants an all-hands alert. Such systems are usually activated by a solitary event.

Conversely, a smart alarm system will compare data received from its different sources to determine if a verifiable alarm condition exists. The system we've designed here employs two sensor circuits. Circuit 3 on the analog/digital board you'll use monitors windows and doors with magnetic contacts; circuit 4 uses a low-cost passive infrared detector. When the two data-reporting sources independently confirm activity, the alarm will sound.

While you'll design in some safeguards, you should also recognize that excessive caution is undesirable. Too many precautions mean an overencumbered alarm system may not operate when it should.

PLEASE NOTE: THE FOLLOWING SECTION INVOLVES WIRING YOUR SYSTEM TO DANGEROUS HOUSEHOLD ELECTRICAL CIRCUITS. UNLESS YOU ARE EXPERIENCED WITH HOUSEHOLD CIRCUITS, LEAVE ALL HIGH-VOLTAGE WIRING TO A LICENSED PROFESSIONAL.

Installing the Smart Security System

The first step of installing the system is to define the areas of your home you want to include. Depending on the number and type of sensors you choose, the cost of your alarm system components should only total between \$20 and \$150.

Your computer's interface will remain the same for all installations. Alpha Products' DA&C cards are recom-

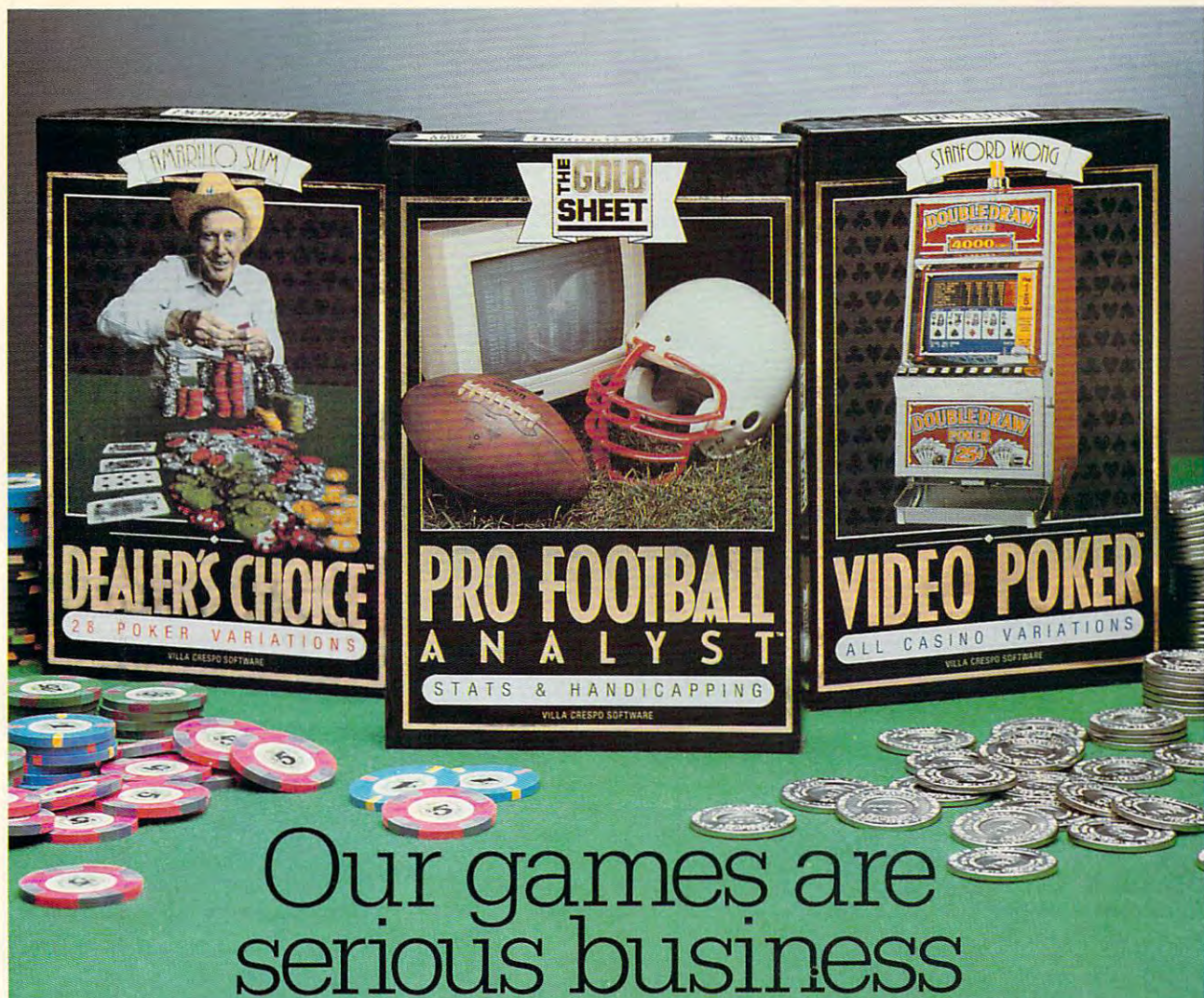
BASE SYSTEM SUPPLIES

Alpha RE-140 eight-relay output card	\$142
Alpha AD-142 eight-channel analog/digital input card	\$142
Alpha AR-133 PC bus adapter	\$ 69
Alpha CA-162 ribbon cable for two cards	\$ 34
Alpha PS-126 12-V power supply	\$ 12

Alpha offers a special package for \$379 that includes these components as well as its CD-113 light sensor and TS-111 temperature sensor, which you'll learn about in January's *COMPUTE*.

ALARM SYSTEM SUPPLIES

Radio Shack 49-488 internal/external 12-V siren	\$19.95
Radio Shack 49-495 surface-mount magnetic contact	\$ 3.59
Radio Shack 49-496 magnetic contact for concealed mounting	\$ 3.99
Radio Shack 49-521 glass-break sensor	\$ 3.95
Radio Shack 49-531 passive infrared detector	\$59.95
Radio Shack 278-777 double-shielded cable for analog inputs	\$ 7.95
Radio Shack 278-874 six-conductor telephone station wire for digital inputs and all low-voltage outputs	\$14.99
Radio Shack 278-1440 100-foot SPT-2 16-gauge lamp cord for interior 120-V circuits (use weatherproof cable for exterior locations)	\$21.95
Radio Shack 22-127 120-V AC/2-V DC power supply	\$26.95



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HOMEBOT

Samsung's SCOUT-ABOUT may not be R2D2, but it's the closest thing yet to a personal droid—particularly if you're looking for a convenient way to guard your home and, according to its makers, if you're on a budget. The robot will sell for less than \$1,000 when it arrives in stores and catalogs next February.

The SCOUT-ABOUT is what Samsung calls a home service robot, but its main function is to guard your personal property. It will roam any area of your home for up to 50 hours at a time, making its way around objects over two inches high, stopping to check out the conditions of the area it patrols. Using a dual-detection ultrasonic and passive infrared sensory system, the SCOUT-ABOUT alerts an automatic digital dialer by way of radio signals if it detects body heat, motion, a consistent change in air temperature, or shattering glass.

If it isn't convenient for the robot to roam, you can plug it into a wall socket where it acts as a stationary monitor. Running on batteries alone, it will monitor from an idle position for about 70 hours before needing a recharge.

The robot is perfect for apartments, condominiums, vacation homes, small businesses, or any other place needing effective intruder security that's

simple to implement. And at under 16 pounds, it's portable enough to use in automobiles, boats, and campers.

Since SCOUT-ABOUT is equipped with a radio transmitter, it can act as a one-way monitor for the baby's room, allowing you to hear everything within 150 feet of the robot. The SCOUT-ABOUT package also includes a medical alert pendant with a button that directly acti-



vates the autodialer. So if you've fallen and can't get up, the SCOUT-ABOUT may not come to your rescue, but the autodialer will.

For \$1,000, you can assemble a much more elaborate security system than the SCOUT-ABOUT—one that monitors your entire house. Robots won't roam your house, but you'll be secure. —JILL CHAMPION

mended for their excellent quality, ease of use, availability, and competitive prices, and because Alpha's control software, *SMART1*, is included free of charge with orders. However, you should certainly feel free to shop around for what you consider the best components and prices.

One recommended card is Alpha's AR-133 PC bus adapter, which plugs into any available 8- or 16-bit expansion slot of a PC. Also, Alpha makes a CA-162 ribbon cable, which contains two connectors that accept the RE-140 eight-relay output card and the AD-142 eight-channel analog/digital input card, which you'll use.

Circuit 3 on the Alpha AD-142 uses magnetic contacts to detect open doors and windows. For surface-mount contacts, Radio Shack's 49-495 surface-mount magnetic contact works well. For concealed mounting, use Radio Shack's model 49-496 contact. Although circuit 3 appears to have only two sensors, it will accommodate many more, including a glass-break sensor such as Radio Shack's model 49-521. Circuit 4 uses a passive infrared detector, such as Radio Shack's model 49-531, to confirm an intruder's entry.

Install the sensors in series so that power flows through each one. Since this is normally a closed system, an alarm condition exists if any one sen-

sor "opens." You can install multiple detectors (in the same or different areas) by wiring them into a series circuit.

The RE-140 card, mentioned earlier, governs the output—flashing lights and a siren. Wire the flashing-light circuit to 120-volt output 0 on the RE-140 card.

Connect the siren to low-voltage output 7 on the RE-140. For the external siren alarm, use Radio Shack's 12-volt model 49-488 or an equivalent model.

Wires for low voltage (outputs 4, 5, and 6) on the RE-140 can be 24 gauge. Use a minimum three-pair cable to allow for future expansion and spares. Wiring between the 120-volt outputs to the light or lights must be at least 16 gauge and rated for 120-volt service. Be sure to install a snubber circuit here, or make sure your electrician installs it, to protect the relay's points against arcing and to protect the computer against stray signals.

Programming Your Smart House

You must have the right software to operate any computer-based security system. You can order a free copy of Alpha's GW-BASIC control software, *SMART1*, when you buy Alpha components. Data Systems Services also offers an easy-to-use, menu-driven BASIC program for \$134. Both companies are listed in the product information box at the end of this article.

Your basic security alarm system

should now be complete. That's all there is to it. In January's issue of *COMPUTE*, you'll learn how to expand the base system you just set up to include two more elements of intelligent home security—temperature control and lighting management.

Your March issue of *COMPUTE* will conclude the smart house series. There, you'll learn about sophisticated applications that range from using remote control to operate your appliances by telephone to transmitting realtime still video images over ordinary telephone lines to using infrared as well as direct-voice command of your computer's control programming. □

This computer-in-residence system is designed to be installed by you. If you're not familiar with 120-volt circuits, or if your local building codes prevent you from installing line-voltage wiring, have a licensed contractor install the wiring to the lights.

PRODUCT INFORMATION

For more information about buying security-system components and control software, contact the following companies. Radio Shack products can be purchased through a local Radio Shack store.

Alpha Products

303 Linwood Ave.
Fairfield, CT 06430
(800) 221-0916
(203) 259-8813

B&B Electronics

4000 Baker Rd.
Ottawa, IL 61350
(815) 434-0846

Data System Services

38 Amber Dr.
Croton, NY 10520
(914) 271-6883

Electronic Energy Control

380 S. Fifth St.
Columbus, OH 43215
(800) 842-7714

Real Time Devices

820 N. University Dr.
P.O. Box 906
State College, PA 16804
(814) 234-8087

You're encouraged to request home automation catalogs from the following companies, which carry a fascinating assortment of equipment and devices to control practically every appliance and process in your home.

Heath Company

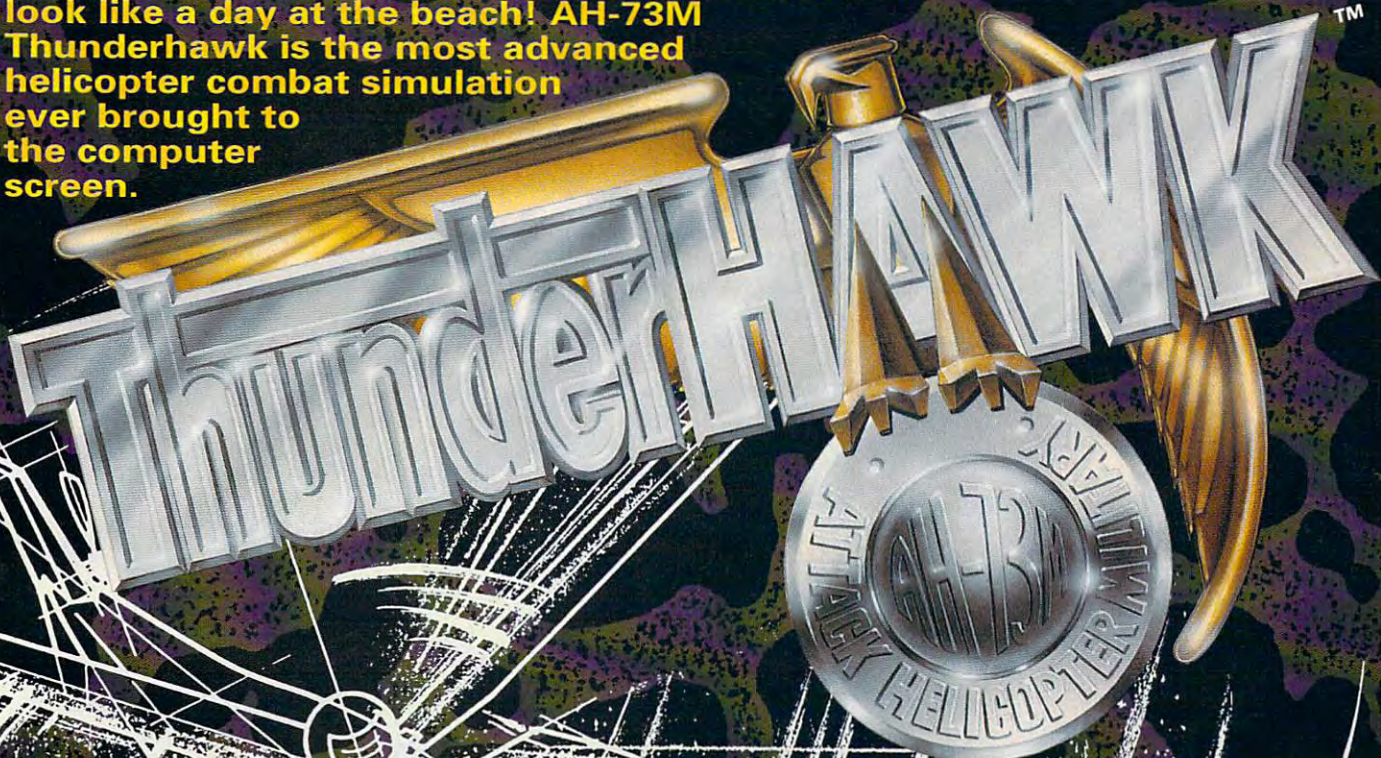
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FAST FORWARD

David English

WE'RE OFF TO SEE THE WIZARD

They call it Hot 'Lanta. It's the home of Ted Turner, a movie theater that only runs *Gone with the Wind*, and Spring COMDEX, the massive computer trade show. In past years, COMDEX has been a hardware show, but this year the organizers added WINDOWS WORLD, a *Windows* show-within-a-show. Guess where the biggest crowds were. That's right—most of the attendees spent most of their time check-

enough, Upgrade Kits). If you choose the upgrade path, you'll generally get the *Windows* multimedia extensions, a CD-ROM player, and a sound card.

Not surprisingly, the two biggest PC manufacturers were busy showing off their soon-to-be-released Multimedia PCs and Upgrade Kits. IBM is offering two Upgrade Kits that can transform a PS/2 into either a Training System or an Information Delivery System (more product names for lawyers). A Training System is a 386-based PS/2 that includes a

VGA monitor, a laser disc player, and IBM's M-Motion sound card, as well as support for touch input. An Information Delivery System is a 286-based PS/2 with VGA graphics, a CD-ROM, and

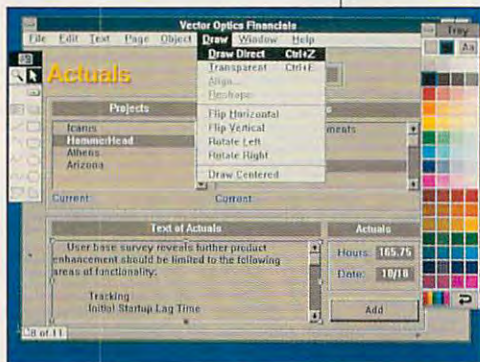
Turtle Beach Systems showed its new 16-bit sound card, called MultiSound, which provides CD-quality sound for \$995. With a top-selling Proteus synthesizer built into the card, this represents a truly significant price breakthrough for adding professional-quality sound to *Windows* applications.

In software, Passport Designs announced that its latest version of *Master Tracks Pro* (\$395.00) supports *Windows* with *Multimedia*. It's currently the top *Windows*-based MIDI-sequencer program, but expect one of the major Macintosh MIDI-software developers to announce a competing *Windows* product real soon now. Brown-Waugh showed its new *Cyber Animator* (\$199.95), a low-cost *Autodesk Animator* competitor that can read *Animator FLI* files. You can have individual animation frames trigger sound effects that play through a Sound Blaster.

Asymetrix demonstrated a faster version of *ToolBook* (version 1.5, \$395). It displays objects on the screen 30–40 percent faster than before. A special multimedia version of *ToolBook* should be available by the time you read this. And U-Lead wowed the crowd with its new *PhotoStyler* (\$795), a slick new image-processing program that's similar to *Adobe Photoshop* and *ColorStudio* on the Macintosh. It's the first serious 24-bit-color photo-editing program for the PC. More are on the way.

The rest of the new multimedia hardware and software will have to wait for future columns. Spring COMDEX proved that multimedia isn't all smoke and mirrors. These are real products that can turn frustrated nonprogrammers (or tinkering weekend programmers) into professional-level multimedia wizards. □

Asymetrix's *ToolBook 1.5* was just one of the new multimedia products shown at COMDEX.



ing out the latest offerings in *Windows* programs.

Within WINDOWS WORLD, you could find a section devoted to *Windows*-based multimedia products (sort of a show-within-a-show-within-a-show). Microsoft was touting the imminent release of *Microsoft Windows graphical environment 3.0 + Multimedia Extensions 1.0*. That's the official name for what Microsoft used to call *Multimedia Windows*. It's a name only a lawyer could love and journalists and computer users will quickly come to hate. According to Microsoft, the official informal name is *Windows with Multimedia*.

Whatever you call it, it should be available by the time you read this, either in the form of new PCs (officially called Multimedia PCs) or upgrade kits (called, oddly

an 8-bit sound card.

Tandy, the other big PC manufacturer, announced three Multimedia PCs—a 16-MHz 80286, a 20-MHz 80386SX, and a 16-MHz 80386DX. All three include an internal CD-ROM drive, Tandy's multimedia sound board (with full MIDI support and Sound Blaster compatibility), and a VGA Plus video card and monitor (for a resolution of 640 × 480 with 256 colors). Tandy's Upgrade Kits include *Windows with Multimedia*, a CD-ROM drive, and Tandy's multimedia sound board. The kits sell for \$799.95 (with an internal CD-ROM drive) and \$899.95 (with an external CD-ROM drive). By the way, Tandy's new internal CD-ROM drive is a real bargain at \$399.95, and it fully meets the Microsoft multimedia specifications.

MORE BABES. MORE BREWSKIS. MORE BAD JOKES.



Ah, college life! Tree-lined walks. Hushed study halls. Ivy-covered professors. The days are filled with the quiet pursuit of knowledge. The

nights, however, are a different story!

ERNIE IS BACK!

Welcome to *Spellcasting 201: The Sorcerer's Appliance*. Ernie Eaglebeak is back at Sorcerer University for his sophomore year and he wants to join a fraternity. No problem, except for those quaint, harmless initiation rituals known collectively as... HELL WEEK!

RETURN TO ANIMAL HOUSE

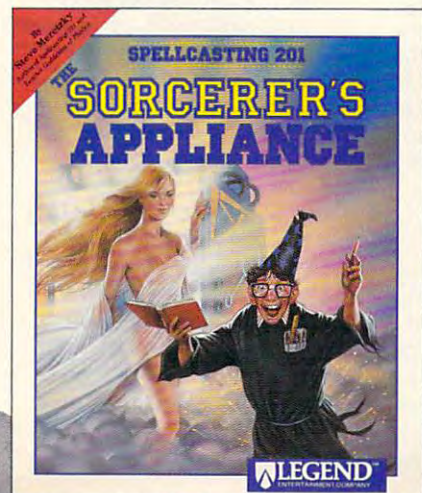
Every night, in a mysterious chamber below the fraternity house, a vindictive pledgemaster dons a ceremonial chicken suit and burdens Ernie with a series of ridiculously impossible hazing tasks. Fortunately, Ernie knows where to get help. He creates it!

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Harnessing the powers of the mysterious Sorcerer's Appliance, Ernie creates a woman. Meet Eve. (It's only been done once before, and that time it cost the guy a rib). Eve is the ideal woman. Well, maybe not ideal, but certainly entertaining.

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WE HOPE YOU'VE DONE YOUR HOMEWORK

Join Ernie and Eve in this hilarious romp through the bedrooms, turrets, and tunnels of both Sorcerer University and nearby Barmaid U (where grading on a curve takes on a whole new meaning). To pass this course you'll need to cast ridiculous spells, solve ribald puzzles and "interact" with gorgeous women. Any questions? We didn't think so. Class dismissed.

From the scandalous imagination of Steve Meretzky, *Spellcasting 201* is the sequel to his award-winning hit, *Spellcasting 101: Sorcerers Get All The Girls*. These games may be considered unsuitable for young minds, as they contain material and situations that children have already seen in far greater detail on daytime television. Available for MS-DOS and compatibles.



ENTERTAINMENT

COMPUTE CHOICE. Ride herd over a passel of adorable—but shortsighted—rodents in this subterranean diversion.

David Sears

LEMMINGS

I feel driven to play *Lemmings*, and it's not just for the entertainment value. Perhaps Psygnosis has tapped into the human instinct for survival in formulating this perfect blend of puzzle, strategy, and action.

Better known for its less sedate titles that have you blasting every object that dares scroll past on a starscape, Psygnosis downshifts here with surprising results. Unlike most of its other games—unlike most games from many software houses—*Lemmings* doesn't exasperate. Though at times you'll be hard pressed to move all your lemmings from point *a* to point *b*, you'll sense a solution to every level just around the corner, no matter how difficult the gamut of pitfalls appears. Nor does *Lemmings* depend heavily on your manual dexterity. Don't expect to mistime the same segment of play over and over again. Sure, you'll plummet to your death a couple of times, but you'll do better. Your onscreen brothers depend on you.

As the primary controller for all the characters in *Lemmings*, you not only must plan a mass exodus from each perilous level but also must learn the personality traits of your charges. First and foremost, your cartoonish brethren need guidance because they possess the brainpower of common hamsters. Once the hatch opens in the ceiling of each cavernous level, lemmings drop at an alarming rate. They amble forward in their baggy tunics, little green tufts of hair bouncing, until they smack into a wall or rocky



outcropping. Then it's full reverse and off in the opposite direction until they encounter a similar barrier. We might respect the little guys' determination; like most rodents, they'll pace back and forth, slamming into objects and swarming in a manner that renders them all but impervious to your selection and guidance of individual lemmings. If you have a task for a particular lemming to perform, you'd best assign the duty before you lose him in the crowd.

To provoke a lemming to a specific action, position the crosshairs over the standard-issue lemming and click. Depending on which attributes you've chosen on the icon bar, you've just designated a specialized worker, or hero, if you prefer. On the icon bar, you'll find what might seem a perplexing array of customization choices, but that confusion will fade fast. If you don't alter at least a few lemmings in each level, you won't see much of the quirky, exhilarating, and torturous world that

lemmings populate. Of course, they don't experience the apprehension of future levels as much as you might, since they see only the walls in front of them.

Often you'll want to send a scout ahead to pave the way for the masses and to reveal the traps. To do this, let the first lemming out of the gate pass; then change the next lemming to a Blocker. He'll stand in the path of the oncoming gang with his hands up in defiance. The others will bump into him and rebound toward the gate. You might need to plant another Blocker to stem the tide in that direction; pitfalls exist everywhere, and your entire crew could fall into a crevice, lost forever.

Meanwhile, your intrepid explorer may encounter a vertical cliff, a column, or another sheer surface. Select the Climber icon and transfer that ability to the explorer, and he'll clamber straight up. Should

he face a fatal drop on the other side of the mountain, activate the Floater icon and transfer that safety feature to your trailblazer, and no matter how far the drop, he'll parachute serenely down thanks to a trusty umbrella. Unlike most of the attributes you can imbue, Climbing and Floating have staying power. Until the lemming gifted with either or both of those powers dies or reaches the next level, he will retain those abilities.

When your front runner clears the first mountain only to be stopped by a lava flow, do you worry? No, just add Builder to his list of talents, and he'll construct a bridge that will support any amount of pedestrian traffic. You can't use bridges for everything, though. Sometimes you'll have to tunnel horizontally, vertically, or diagonally through a piece of rock or other substance. *Lemmings* supplies you with suitable iconic options for surmounting these obstructions—Basher, Digger, and Miner, respectively. When excavating drones run out of material to displace, they revert to type and won't dig again unless you reassign them special abilities.

With diligence, you'll guide the first of your lemmings out of the worst culs-de-sac and to the egress. There, he'll happily bail out of the cavern, showing you the bottoms of his feet as he crawls up and over to safety. But what about the others? Up to 99 lemmings might have been involved in this subterranean peregrination, and we've left them back at the entrance, bouncing off the walls and one stolid Blocker. Here *Lemmings* teaches the art of sacrifice. To finish the level, that Blocker—the one who's

done such a commendable job deferring his brothers' date with destiny—well, he'll have to die. Choose Bomb and click on your poor, dutiful Blocker. A five-second countdown display begins over his head and stays there until the fateful explosion occurs.

Don't expect remorse or gratitude from the rest of the group. For them, the Blocker just delayed progress. With their mindless intent to go places, the surviving lemmings will troop over the crater left by their defunct comrade, through tunnels excavated by their long-gone nameless kin, and over bridges erected especially for them. Rather like a civil servant, no lemming should expect thanks for a job well done; neither should you.

Your reward for completing a level and orchestrating the actions of so many myopic, disaffected jokers is a password; with it you can return to this point in the game without performing any sort of disk-based save-game procedure. You also merit the intense satisfaction that comes from surviving—even vicariously—the worst the world (or game designers) can throw at you.

You'll have to play *Lemmings* for the PC solo. The design team left behind the two-player version offered for other machines. Don't fret over that loss too much; the two-player game might seem more entertaining at first because players can cooperate, but soon enough, they'll start killing off each other's lemmings just because they can. Playing *Lemmings* on your own should provide adequate challenge and allow you to focus on the real object of the game—saving as many lemmings as possible.



Though not the most graphically detailed creatures, lemmings animate flawlessly, and when they combust, explode, drown, or grind themselves into hamburger, you'll be quite aware of what they go through. With a sound card, *Lemmings* supplies a satisfactory array of thuds and chirps and—while not traditional Psygnosis disco by any stretch—a charming soundtrack.

Squint at *Lemmings*, and you'll see a number of metaphors ideal for mention in the conversational circles of the sociologically minded. Draw comparisons between *Lemmings* and the me-first, me-now generation; your friends who never play computer games will marvel at your insight and wonder if they shouldn't buy a machine of their own. Mention the fun, too, of course—that sells more games than any amount of political correctness. □

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GAMEPLAY

Orson Scott Card

CENSORING THE FUN OUT OF PRODIGY?

A few columns back I talked about the online service Prodigy. All the good things I said are still true: It still has the simplest interface I've seen for allowing complete novices to access everything the service offers. But in one area, at least, Prodigy has succumbed to the principle that guides far too many software companies: "Do it my way, you poor ignorant user."

Oddly, the area where Prodigy is blowing it in a big way is with one of its *best* ideas: editing the bulletin boards.

The bulletin boards are major sources for online entertainment. A witty few engage in scintillating conversation while others listen and think and occasionally interject comments of their own. It's the electronic equivalent of the general store.

People often post "public conversation" that should have been private, so when you sign on, you have to wade through mountains of

meaningless personal trivia. Prodigy had the right idea when it installed editors for the bulletin boards to weed out messages that ought to have been sent privately. When you browse through the board, you're given a menu of all the possible subjects and can take a look at any that seem interesting. You waste far less time trudging through things that don't interest you before getting to the things that do.

Alas, there are problems.

First, when Prodigy returns a message to you, its explanation is cold and impersonal and tells you almost nothing about why your message was deemed unworthy. It can be frustrating when a message you spent time composing is rejected without an apology.

Second, it has run into a standard problem with all editors everywhere—Correction Anxiety Syndrome: The editor is reading along and hasn't corrected anything in a long time and gets more and more nervous (*what mistakes am I missing?*) until finally he starts correcting things that aren't wrong at all. When I talked to a Prodigy troubleshooter (a person without authority whose job is to listen patiently until the complainer feels better), I was told proudly, "After all, more than 26,000 messages have been posted." "Out of how many?" I asked. "More than 28,000," he said.

Since Prodigy is rejecting almost 8 percent of the members' postings, practically everyone is going to have a message rejected for every dozen postings.

Third, its rules are too rigid. For instance, some users were playing games they had invented in the Writing topic of the Arts Club. Under subject headings like "12-Word Love Stories" and "3-Word Stories," they were inventing clever and resourceful phrases and sen-

tences that implied whole novels of characters, relationships, and events; many were screamingly funny.

Suddenly Prodigy wiped out the game, rejecting all new postings to those subjects. Why? Because the Writing topic was "not meant to be used for posting original literature."

How absurd! These people weren't posting the stories and poems they meant to mail off to magazines. They were playing *games* together, and the games were killed because the editors didn't understand them.

Here you have an entertainment network that sells advertising time for public conversations, many of which are wonderfully clever and entertaining and informative.

Then, as if it entirely missed the point of its own enterprise, Prodigy hires people to step into the room and, with almost no understanding of what the conversation is about, say, "You've gotten off the subject. You'll have to talk about something else." Or, "We never thought of anybody's using this topic this way, so stop it."

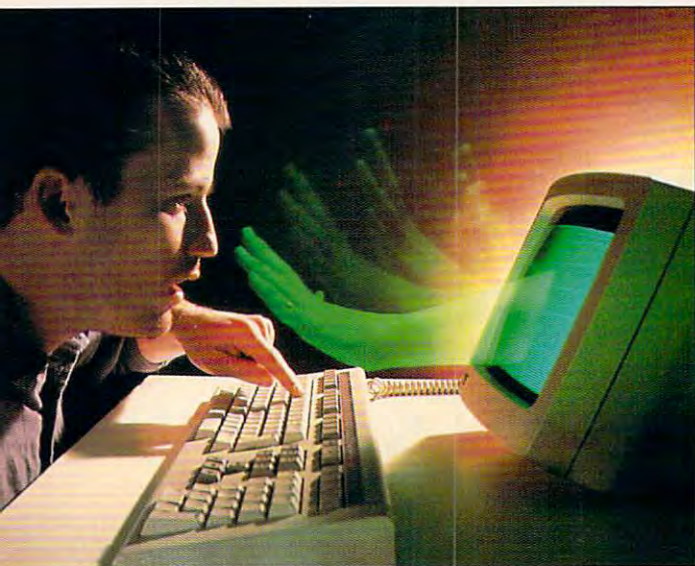
Prodigy, you've got a great thing going. All you have to do to make it perfect is to tell your editors to lighten up.

Let your users create entertainment for themselves. Keep on rejecting the *truly* private conversations, but let the rest of the messages through.

If you don't, I'm afraid you'll find the best and most creative of the conversationalists going to some other service, and you'll soon find Prodigy—both the good and the bad—dead and buried.

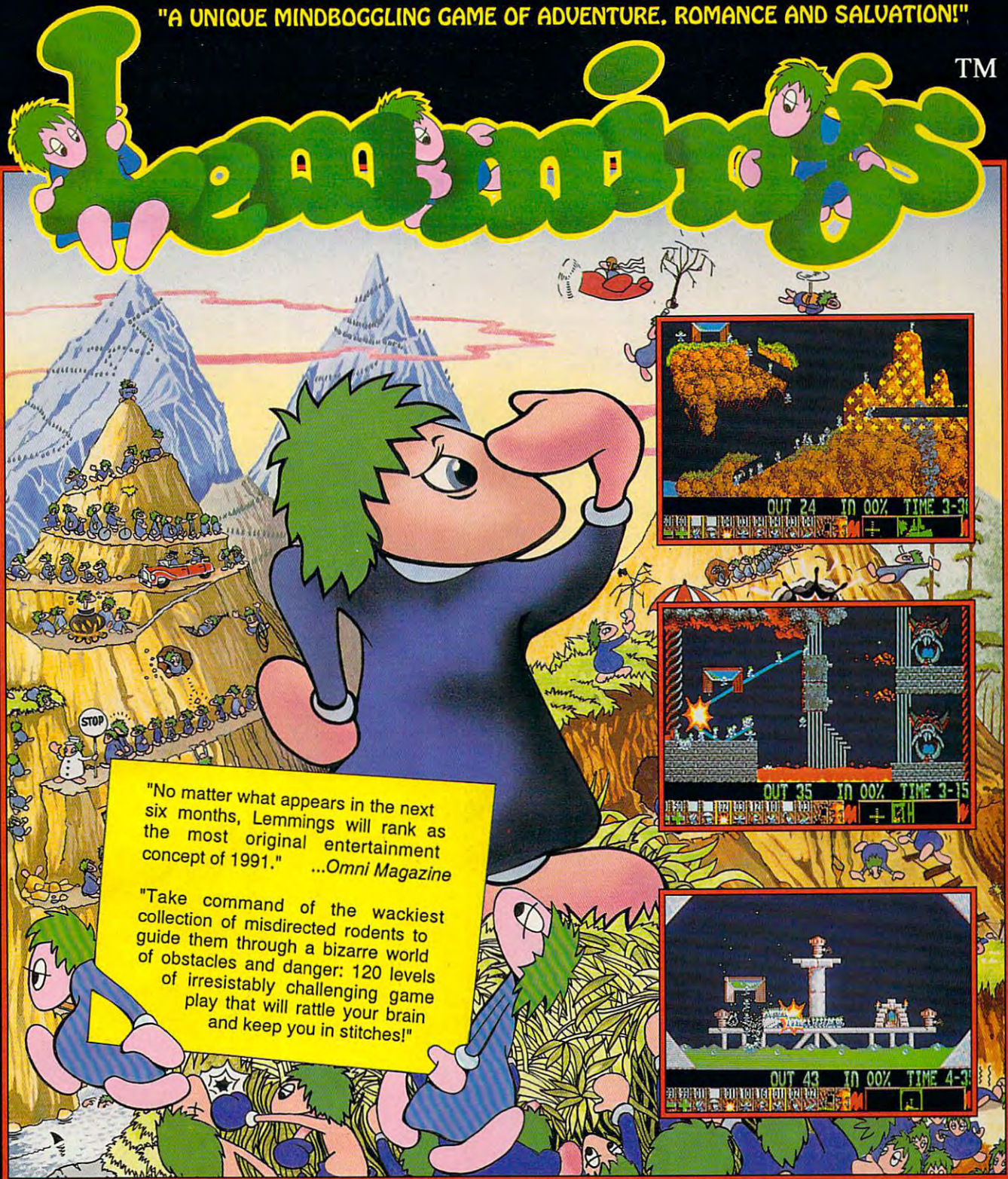
I hope other services are looking at what Prodigy is doing right, because if they learn the right lessons and avoid the "Do it my way" principle, we will eagerly embrace those services the way we've tried to embrace Prodigy. □

Prodigy, you've got a great thing going. All you have to do to make it perfect is to tell your editors to lighten up.



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SPECIAL REPORT

BY TOM NETSEL AND PETER SCISCO

This summer's Consumer Electronic Show had a little bit for everyone.

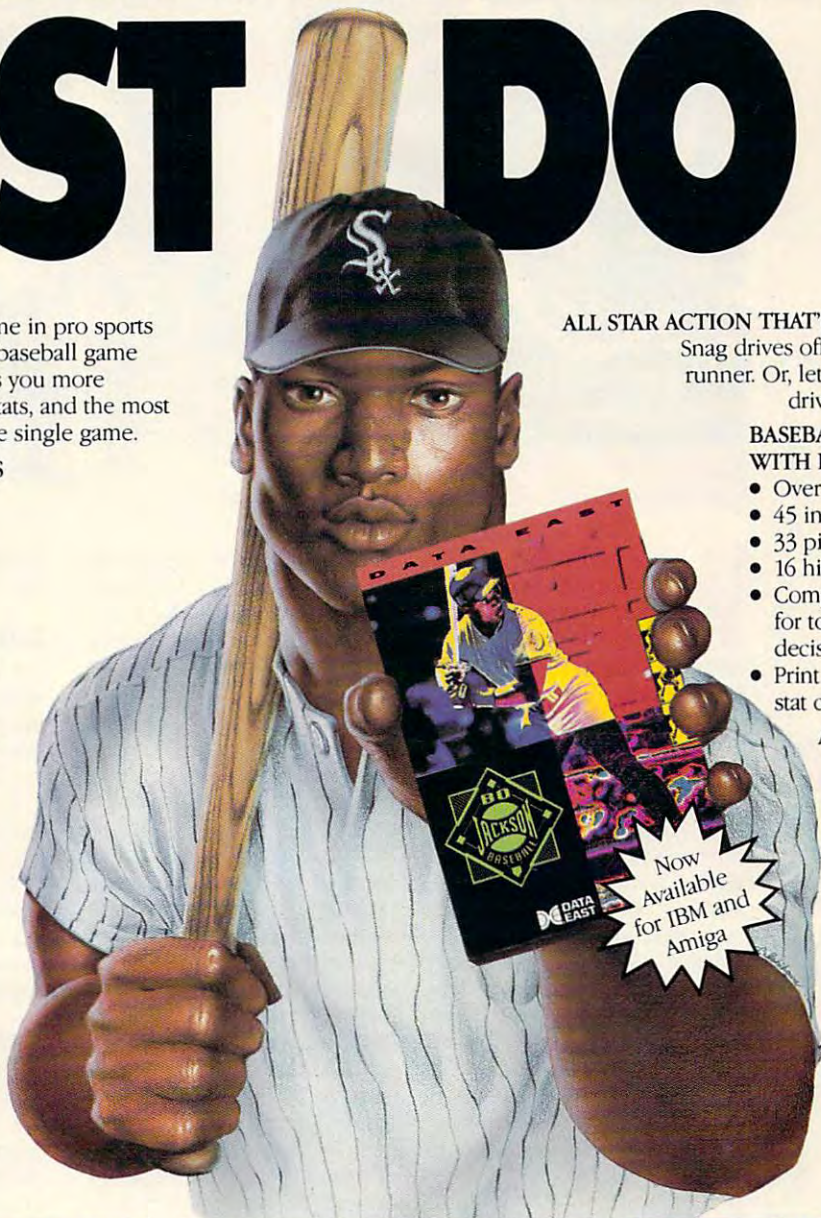


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ROBERTO	11	32	34	43	54	2-1	0	3.52	16	247
SCOTT	11	30	34	19	54	7-13	0	3.32	37	227
MALASQUEE	11	30	18	20	52	11-10	0	3.53	36	233
MULLIKENS	11	33	32	20	51	10-14	0	3.45	35	233
DARWIN	11	15	13	27	43	11-4	2	3.53	30	211

BULLPEN										
	T	IP	H	BB	SO	U-L	SV	ERA	HR	AVG
SPANKE	11	3	1	1	3	1-1	0	3.75	1	33
CLANCY	11	7	10	13	20	2-3	1	3.38	13	33
ANDERSON	11	26	73	33	55	5-2	7	3.68	17	20
SMITH	11	6	4	2	13	4-2	3	3.45	14	13

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Better sound, improved graphics and adventures, more creative play, and a host of roles are on the way with this year's crop of consumer entertainment software and hardware.

While the rest of the consumer electronics industry languishes in recession, computer makers and software developers are experiencing steady, if less than spectacular, growth. The thrills surrounding the PC and videogame exhibits at the 1991 International Consumer Electronics Show in Chicago were bolstered by advances in PC software entertainment and a new generation of videogame consoles. More than 250 companies that had never participated in a Summer CES, including IBM, Wang Labs, Leading Edge, and Prodigy, picked up on the excitement. Here's a preview of some of the products that are heading your way this fall.

Accolade

Who is kidnapping the biggest stars in Hollywood? To help you solve this sinister mystery, call in the man who found the world's greatest entertainer in Accolade's first graphic adventure, *Search for the King*, and now stars in the sequel, *Les Manly In: Lost in L.A.* (\$59.95).

Mike Ditka Ultimate Football (\$54.95) is the first football simulation to feature multi-angle player perspective, allowing computer coaches to view the action from any of four different viewing angles.

In *Elvira II: The Jaws of Cerberus* (\$59.95) players must

rescue Elvira from the ghastly Cerberus, a 60-foot tall, three-headed demon. See our Sneak Peek of this game on page 121 in this issue.

Ad Lib

The competition among sound-card makers heats up with Ad Lib's announcement of its Gold Series. The Gold PC-1000 (\$300) is a basic sound card for disk-based applications that features a microphone jack and tabletop microphone, game and MIDI ports, and standard stereo input/output jacks. The Gold PC-2000 (\$400) adds a SCSI interface for CD-ROM applications. The Gold MC-2000 (\$500) is designed for the IBM PS/2 MCA bus. All of the cards carry 20 channels of synthesized sound, 2 channels for sampled sound, stereo recording and playback, enhanced FM synthesis, 12-bit stereo digital-to-analog conversion and other professional features. Originally scheduled for a late summer release, Ad Lib says chip shortages have delayed release of the Gold Series until late fall at the earliest.

Broderbund

Game designer Chris Crawford is back with *Patton Strikes Back* (\$59.95). This strategy game puts you in command of Allied or Axis troops during the Battle of the Bulge. This war game emphasizes tactical thinking over

weapons skills. It's packed with data and analysis.

California Dreams

Take over as leader of Poland's workers union in *Solidarity* (\$59.95) and attempt to lead the country to freedom in the face of tremendous Soviet military and economic pressures. Or, take the helm of a high-tech submarine in *Wreck Hunters* (price not available at press time), the working title of a new interactive game in which you search for sunken treasure.

Data East

Data East's latest combat game is—get this—compatible with Novell networks. Guide a fleet of mechanized droids against an alien race that has practically obliterated humanity from the face of the planet. Operate scout, supply, and soldier robots over a harsh landscape. A two-player mode allows for cooperative play against the mysterious aliens. The network version will support from six to seven players. The stand-alone version of *Ultrabots Sanction: Earth* will ship to stores this month. The company expects to have the network version ready by late November (just in time for that Christmas office party). The price wasn't available at press time.

Data East's other introductions included *Battlefield*

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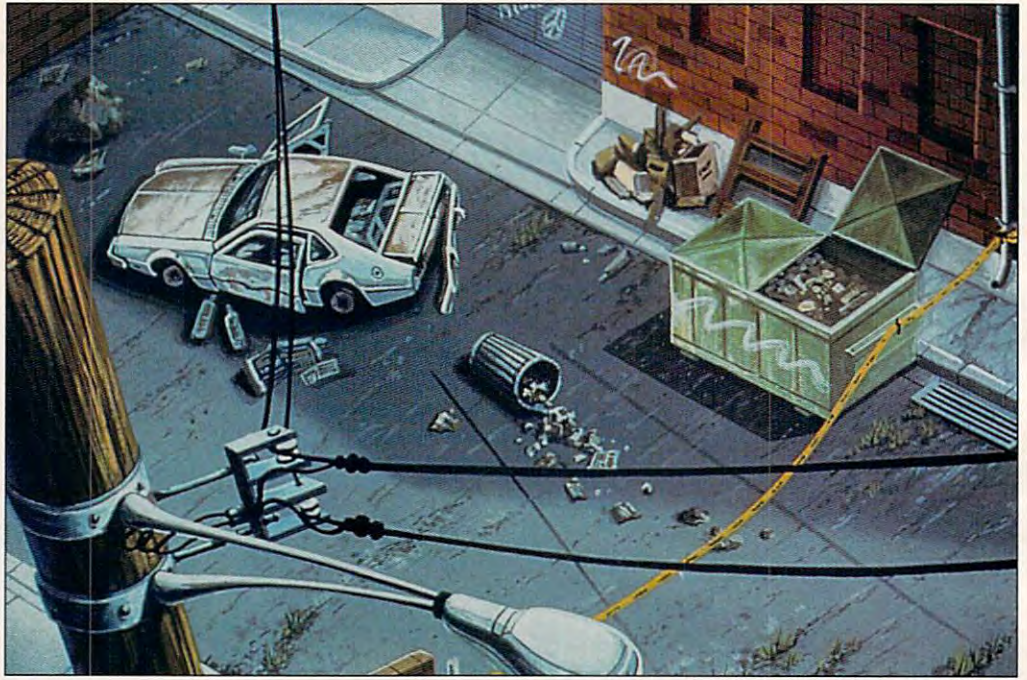
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2000, the working title for a tank-battle game (\$59.95), *Bo Jackson Baseball* (\$49.95), and *ABC Wide World of Sports Boxing* (price unavailable at press time).

Electronic Arts

Big new products from EA include *Chuck Yeager's Air Combat* (\$59.95) and *Earl Weaver Baseball II* (\$49.95). A Sneak Peek of *Air Combat* appeared in the July issue of *COMPUTE*. Racing fans can get behind the wheel of *Mario Andretti's Racing Challenge* (\$49.95).

Powermonger (\$49.95), from the makers of *Populous*, casts you as the leader of a displaced tribe newly arrived in an uncharted territory.

Electronic Zoo

This fall, look for *Eco Phantoms* (\$49.95), a struggle for earth's survival; *The Ball Game* (\$49.95), a test of strategy and reflexes; *Geisha* (\$49.95), the Orient of the future; *Star Collection* (\$29.95), a collection of great arcade hits; and *Peghole* (\$49.95), a classic tactical game.

Konami

Simpson fans can get radical with *Bart Simpson's House of Weirdness* (\$49.95), an adventure/strategy game that challenges players to be as resourceful as Bart. *Simpson's Arcade* (\$49.95) is a conversion of the coin-op.

Challenge your ninja skills

and fight crime in Manhattan with *Teenage Mutant Ninja Turtles: The Adventure* (\$49.95). If you want more Turtle action, try *Teenage Mutant Ninja Turtles: The Arcade Game* (\$49.95). More movie action is heading your way with *Back to the Future III* (\$39.95) and *Predator 2* (\$19.95).

Baseball card collectors have a new utility to help them manage and track their collections. It's the *Official Collector Series—Baseball Card Collector* (\$49.95). This could make an excellent holiday gift for the hardball fan on your list.

Topping the long list of Konami's brand-new role-playing games is Steve Peterson's

LASERWARE

Recent innovations could change the way we regard our favorite optically-based storage device.

The Commodore booth at CES was almost entirely devoted to CDTV, a portent of the impending consumer interest in CD technology.

North American Philips/Magnavox was once again showing their long-delayed CD-I (Compact Disc-Interactive) player, this time promising that it would ship in October. Similar in concept to CDTV, the CD-I player has a few advantages: it sports a 16-million-color palette, a slightly faster processor and, most important, has the marketing muscle of Magnavox, Sony, and Matsushita (Panasonic) behind it. However, it also has its share of disadvantages: It's more expensive (\$1400 compared to CDTV's \$999), and its "thumbstick" controller is less familiar to American kids

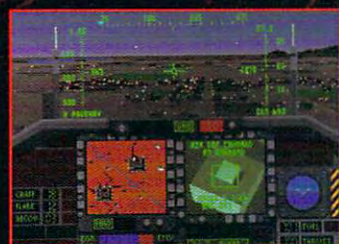
than the CDTV's Nintendo-like joypad (and more fragile).

Another CD product making the rounds was Sony's consumer-oriented CD-ROM drive for the IBM PC. Called the Laser Library, the system consists of an external CD-ROM drive with audio capability and a collection of six topnotch CD-ROM titles. The entire library retails for \$699.

With Kodak's new Photo CD, you can take pictures using conventional 35mm film, and then have those photos developed and stored on compact disc for viewing on a TV or for use in image-processing software. Photo CDs will work with either a CDTV, CD-I, or dedicated Photo CD player. Kodak expects Photo CD processing to be available by June 1992.

DENNY ATKIN and DAVID SEARS

Rule the Desert Skies

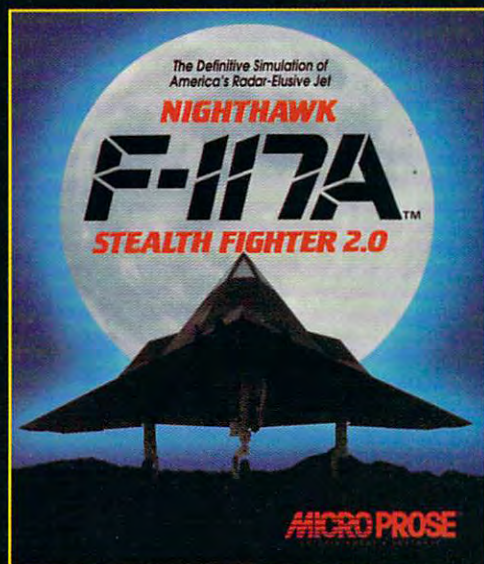


Like some sleek, metallic bird of prey, it slices through the thin air of the desert night. Below, the enemy's radar frantically scans, searching for a sign. But the only warning is the deafening roar of ordnance demolishing its target. Before fighters can scramble, this airborne apparition vanishes, like a ghostly dream.

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VID NEWS

The war for the hearts and minds of America's videogame players reached a peak at this summer's CES, with volleys from all major players. The smoke won't clear until after the holiday season. Sega announced a new CD-ROM accessory for the Genesis, Nintendo aligned itself with N.V. Philips and CD-I, NEC launched a new line of CD-ROM interactive videogames, and SNK added 12 new titles to its NEO GEO library.

On the Sega front, an affordable CD-ROM accessory for the Genesis was announced for an early 1992 release. The player's high-speed laser pick-up drive mechanism, 16-bit microprocessors in both the Genesis machine and the CD-ROM drive, a large-capacity RAM buffer, advanced biaxial rotation and zoom functions, and eight-channel digital stereo sound source should add up to supersonic game action, CD-quality audio, arcade-style sound effects, and graphics to the max.

Sega's biggest game news was *Sonic the Hedgehog*. Faster than a speeding bullet and sure to gain the quick allegiance of arcade gamers everywhere, *Sonic* is reason enough for anyone to buy the Genesis machine. *Sonic the Hedgehog* replaces *Altered-Beast* as the game packaged with Genesis machines.

By year's end, Sega plans to have 17 new Genesis games out. Those include *Toe Jam & Earl*, featuring two very cool, rhythmically inclined, junk-food-loving aliens from the planet Funkatron; *Fantasia*, taken from the Walt Disney classic; and the underwater military simulation *688 Attack Sub*.

Digital stereo sound, multiple scrolling screens, three-dimensional graphics, and a palette of 32,768 colors blast through Nintendo's Super NES, scheduled to reach store shelves this September. Despite the troubled economy, Nintendo predicted it will sell more than 2 million Super NES units by year's end, priced around \$200 each, and 6 million games for the ma-

chine, most of which will cost around \$50 apiece. Nintendo has no plans to abandon either its 8-bit Nintendo Entertainment System or the popular hand-held Game Boy machine.

The company also announced that it would work with N. V. Philips to develop a CD-ROM accessory for the Super NES that would be compatible with both the new video game system and CD-I. Nintendo also intends to pursue its work with Sony on a separate CD-based game system.

NEC dropped the price of its TurboGrafx-



16 system to \$99.99 and concentrated its efforts on the TurboGrafx-CD player, which sells now for \$299. For \$149.99, a new version of the TurboGrafx-16 system, called Bonk SuperSet, is packaged with two TurboPad controllers, a TurboTop adaptor that allows for up to five players at once, and NEC's most popular game, *Bonk's Adventure*.

NEC also sealed a deal with Paramount Pictures to release ICOM Simulations' CD-ROM version of *The Addams Family*. Based on the popular sixties television show, the movie is scheduled to premiere in November. Also in NEC's new CD-ROM library, *Sherlock Holmes, Consulting Detective*, based on the renowned clever guy, uses digitized movie footage of live actors. For *J.B. Harold Murder Club*, digitized still photos blended with voices will be used.

For an educational tour through prehistoric times, *Magical Dinosaur Tour* is an animated encyclopedia featuring 200 types of dinosaurs. The games will retail for \$61.99 each.

SNK attracted more players to its pricey, but graphically superior, NEO GEO system with 12 new action games ranging from sports to fantasy.

For sports buffs, there's *Top Players Golf*, which gives players a bird's-eye view of the course and then lets them "stand" behind the onscreen golfer to drive the ball with real-life perspective. *League Bowling*'s multilink capability adds more zest than real lanes can offer. *Riding Hero* puts gamers in the fast lane of motorcycle racing, whizzing around mountain curves and barreling down ocean straightaways. Baseball buffs should delight over *Baseball Stars Professional*, with real-voice announcers and umpires making the calls for over 20 different teams.

For the combat thirsty, there's the fast-reflex action of *Ninja Combat*, dog-fights galore in the enemy-filled air zones of *Ghost Pilots*, and bloody jungle battles as veterans return to Vietnam in *NAM-1975*. James Bond wannabes go up against a formidable terrorist group in *The Super Spy*.

Sci-fi fanatics get the challenge of a lifetime trying to destroy the super computer that controls thousands of lunatic androids in SNK's *Cyber-Lip*. Fantasy lovers can wreak havoc on cities while wrestling monsters in *King of the Monsters*.

In *Magician Lord*, players assume the role of Elta, a young magician able to assume new identities while searching for books of wisdom and magic in four uncanny dimensions—a real treat for fantasy arcade fans. Rounding out the selection, fast-action arcade game fans should love the challenge of jumping Blue through a host of strange cities in *Blue's Journey*.

JILL CHAMPION, CHANTELE OLIGSCHLAEGER, ERIN RICHTER

Champions (\$59.95), a multipart adventure with more than 20 villains to conquer. *The Killing Cloud* (\$49.95) has you fighting an organized gang in San Francisco. For the more fantastically oriented, *Riders of Rohan* (\$49.95) gives players a chance to build their own saga in true Tolkien flavor. If Middle Earth doesn't appeal to you, perhaps outer space does. Try *Spacewrecked: 14 Billion Light Years From Earth* (\$49.95). Or venture into inner space in the ancient thriller *Bloodwych* (\$39.95). For couch potatoes, *Mission: Impossible* (\$49.95) combines action, adventure, and role-playing—if you choose to accept it.

Two Konami simulations include *Team Suzuki* (\$39.95) and *Top Gun*

Head-to-Head Dogfighting Simulator (\$49.95). Action gamers can test their roller derby skills in the high-contact game *RollerBabes* (\$39.95). *Speedball 2* (\$39.95) is a futuristic sport featuring armor and weaponry.

LucasArts Entertainment

Guybrush Threepwood is back in a swashbuckling adventure called *The Secret of Monkey Island II: LeChuck's Revenge* (\$59.95). Visit new puzzle-packed islands with many of the zany characters from the first game. And look for an original game not based on a movie in *Indiana Jones and the Fate of Atlantis* (\$59.95). Indy is drawn into the ancient mysteries of the fascinating and legendary undersea world.

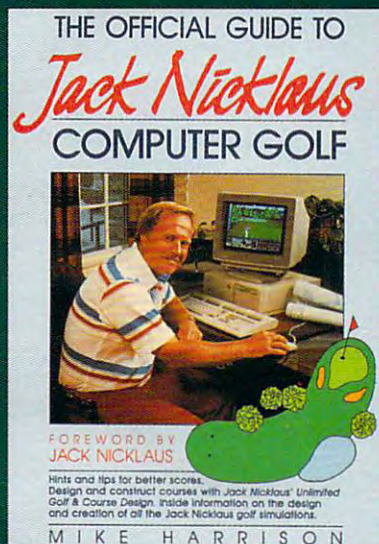
Maxis

This fall's oddest game just might be *SimAnt* (price unavailable), an ant colony simulation (no kidding) complete with rival bands of black and red ants, a hungry spider, a nosy kid with a mean garden hose, and a pesky dog. Try to get your colony inside the house, where the really good food is.

MicroProse

MicroProse has a large slate of products scheduled for fall and spring releases. Topping the list is Sid Meier's *Civilization* (price unavailable). This simulation begins in 4000 B.C. and players must develop an entire civilization from a small, nomadic tribe. By balancing economics, politics, and defense,

WHETHER IT'S GOLF, AIR COMBAT, OR ADVENTURE COMPUTE HAS THE OFFICIAL GUIDE



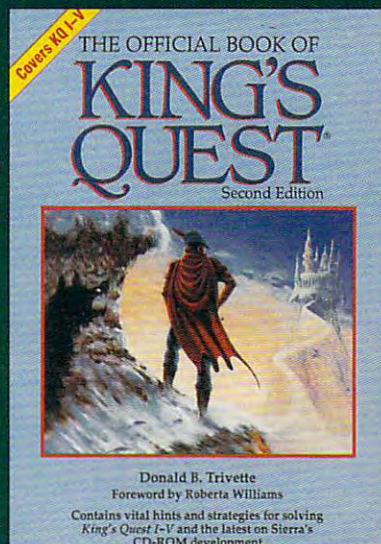
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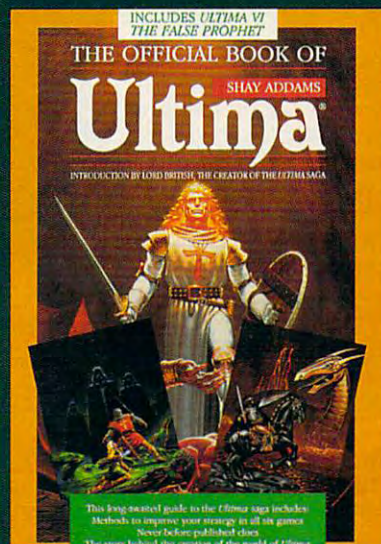


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it's possible for the tribe to evolve into a civilization of tomorrow. The game may be played for an entire 6000-year span or in 100-year periods—not real time, of course.

Flight simulator fans can fly in nine worlds in *F-117A* (\$69.95). Look for enhanced graphics, replay options, night views, sprite explosions, and more.

The spring of 1992 will bring MicroProse's first fantasy role-playing game. Live in fifteenth century Germany, a violent time of three popes, powerless emperors, gangster nobles, and venal clergymen. *Darklands* emphasizes people's belief in witches, magic, alchemists, and dragons. Guide your party of four on a quest for fame, fortune, and immortality in the Dark Ages.

Also slated for future release from MicroProse and its Paragon subsidiary are *Codename: White Shadow* (price unavailable), *Flames of Freedom* (\$49.95), and *Twilight 2000* (\$59.95).

Origin

Once again Richard "Lord British" Garriott and Origin have plans to transport you to another world in the popular Ul-

tima series. Look for improved technology and better narrative elements in *Ultima VII: The Black Gate* (\$79.95), scheduled for release in December.

The popular sword and sorcery elements combine with more screen detail, 256-color VGA graphics, new methods of conversing and interacting with



characters, and sounds so real that you can actually hear rivers flowing and crickets chirping.

Another eagerly awaited release is *Wing Commander II: Vengeance of Kilrathi* (\$79.95). This starfighter sequel offers exciting 3-D VGA graphics set on digitized backgrounds and will take advantage of speech synthesis that employs the speech chip in the CMS

Sound Blaster. Also, another step in the Wing Commander series is Chris Roberts' *Strike Commander* (\$79.95). This time you are part of a mercenary squad, flying a fine line between right and wrong, profit and loss. You must determine the viability of missions from a moral as well as a logistical standpoint. Pilot a staggering array of aircraft from a P38 to an F22 Lightning 2 as you engage rival squadrons and renegade Third World dictators.

Spectrum HoloByte

Wordtris (\$39.95) is a must buy for any fan of word games and puzzle challenges. Manipulate falling letter blocks so that they spell words either horizontally or vertically on the screen.

The Cyrillic connection continues with *Crisis in the Kremlin* (\$59.95), in which you assume the role of Soviet President. Guide the U.S.S.R. out of its present economic quagmire and inherent instability, or risk social disintegration.

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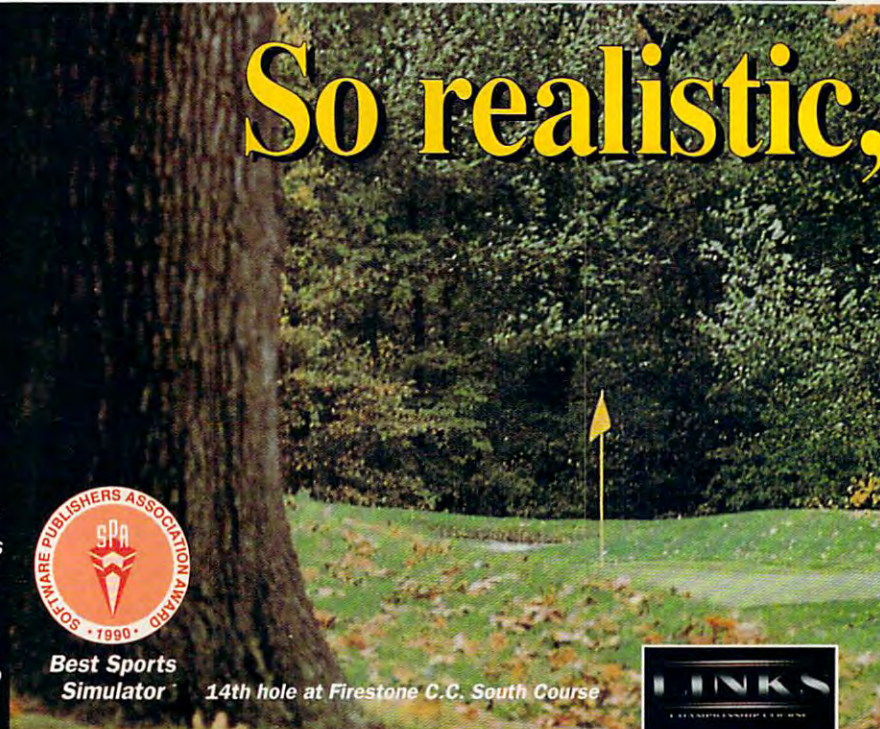
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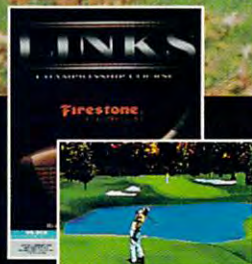
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with several of their more popular games slated for CD-ROM release. They include *Space Quest IV*, *Leisure Suit Larry I*, and *King's Quest V*. All of the CD-ROM titles are priced at \$59.95 and are designed for the IBM PC.

On the MS-DOS disk side, you'll be seeing *Mixed Up Fairy Tales* (\$49.95), *Castle of Dr. Brain* (\$49.95), *EcoQuest: The Search for Cetus* (\$59.95), *Leisure Suit Larry 5: Passionate Patti Does a Little Undercover Work* (\$59.95), *The Laffer Utilities* (\$34.95), *Conquests of the Longbow: The Legend of Robin Hood* (\$59.95), and *Police Quest 3: The Kindred* (\$59.95).

Sierra's Dynamix subsidiary will bring *Nova 9* (\$34.95), a sequel to *Stellar 7*, and *Adventures of Willy Beamish* (\$59.95) to the PC screen this fall and winter.

Strategic Simulations

SSI introduced its first IBM sports game, *Tony La Russa's Ultimate Baseball* (\$49.95). Every essential detail of major league baseball is provided; play a whole season or one game in a variety of levels. As current as today's headlines, *Conflict: Middle East*

(\$59.95) is a new strategy war game focusing on desert combat. SSI also has a new AD&D "goldbox" game, *Gateway to the Savage Frontier* (\$49.95).

Three-Sixty

Three-Sixty's fall lineup includes two war games and a sports package. *The-*



atre of War (\$49.95) is a strategy war game boasting a 3-D filled-polygon environment. *Patriot* (\$59.95) is a land-based war game. The *ABC Wide World of Sports Winter Olympics 1992* (\$49.95) gets the events down cold.

UBI Soft

In *Battle Isle* (\$49.95) your goal is to capture the most terrain possible in a

world made of islands. For sports fans, *Pro Tennis Tour II* (\$49.95), improves on the original by including female opponents, the choice of strong or weak points of your player, doubles play, a training mode, improved graphics and better music. Here's your chance to improve your net play.

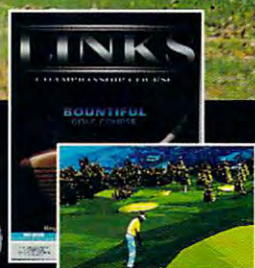
Virgin Games

Fantasy and flight fill the bill here. *Conan the Cimmerian* (\$49.99) puts you in the role of Conan. You must avenge the deaths of your family and friends who were massacred by the ravaging hordes of Thoth Amon, high priest of the vile cult of Set. If that sounds like a little too much fun, you can get down to business with *Corporation* (\$59.99), an action game that has you tracking

down a mutant robot.

If flying is more in your line, then *Thunderhawk* (\$49.99) puts you in the seat of the AH-73M Thunderhawk helicopter gunship. *Shuttle* (\$59.99) is designed as an accurate simulation of NASA's Space Shuttle. During play you'll be asked to perform various feats like repairing satellites, maneuvering your spacecraft, and—oh yes—landing. □

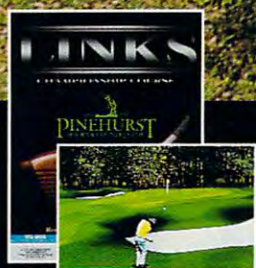
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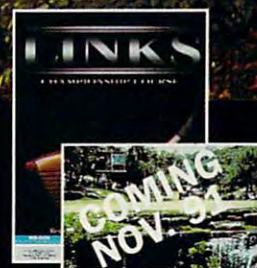
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64/128 VIEW

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Tom Netsel

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We are excited about this new venture. We may not have every feature up and running on opening day, but we expect the Gazette section to be a valuable online resource for 64 and 128 users. If you're not familiar with QuantumLink or you're not yet a member, check elsewhere in this issue for a special introductory Q-Link offer. When online, feel free to say hello or send some E-mail. My handle is Gaz. □

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TOO VALUABLE TO WASTE

JOHN ELLIOTT



**SCHOOLS IN NOVA SCOTIA
PUT 64S TO WORK,
DESPITE A MOVE TOWARD IBMS.**



One Commodore 64 sits at the back of an elementary classroom. That's the way it is in many Canadian schools now. The 64 is used only as a reward for students who have completed their work. During those moments of use, the computer becomes an arcade-style game machine. Commodore 8-bit computers are a largely underutilized resource in Canadian schools, and a number of boards of education are replacing the 64s with IBM-compatible PCs at a cost many times that of the 64s. I am told at educational technology conferences that this is a common situation throughout North America.

I teach at Nova Scotia Teachers College. The college is located in the city of Truro (population 14,000), about 50 miles north of Halifax, Nova Scotia. While many of the people in this province speak English and are of Scottish and Loyalist descent, significant minorities speak Micmac (an Indian language), French, or Gaelic. The campus is the academic center for 600 students who practice their teaching throughout Nova Scotia. As a member of the faculty, I meet with student teachers and get to see how they and other teachers utilize computers in their classrooms. With school budgets being what they are, not everyone has made the switch to PCs. In many cases teachers and learners are employing existing equipment to further current curricular aims. This means using the 64 for something more useful than playing arcade games. Here are some examples of what I've found.

Word Processing

Grade 1 children are using a word processor (*SpeedScript*) to compose two-page stories. In this case they work with a battery of six 64s in the central computer room. During their language period they may be found either in their classroom or working on the 64s. At one point while the teacher and I were chatting, we were politely interrupted. A child wanted to know how to format his paragraphs.

As my teachers in training entered the province's classrooms, they learned the benefits of using an idea organizer to prepare before composing their documents. An idea organizer such as *Thinking Cap* allows a writer to brainstorm, switch sequences, easily erase, and do most word processing tasks. The outline automatically organizes the document into appropriate categories. Most students are eager to begin writing, and they resist preparing an organizing outline before composing a document, but *Thinking Cap's* ease of use usually placates their objections.

Word Processing Enhancements

My teaching interns have learned a number of other computer techniques that they can share with the children they teach. Once they use a spelling checker on their files, they then use a frequency check and a thesaurus program to deal with excessively used words. Since the 64's memory is limited, separate programs must be loaded sequentially.

The *Write Stuff* word processor for the 64 has an auditory option that, when activated, will say letters, words, or sentences with different intonations. There are educational possibilities with such features that can benefit both the visually impaired and students who are learning to touch-type.

Classroom Newspapers

Some elementary classes are preparing school newspapers with *Newsroom* publishing software. This is an effective way of providing a means for communicating both within a school and with the community. Students also get a good idea of the different aspects of newspaper production, from writing to publishing.

Modems allow both text and images to be shared between buildings or between a 64 and a PC as long as they both are working with *Newsroom*. The possibility remains for an electronic newspaper that can be read exclusively from the monitor.

Electronic Communications

Several elementary classes are communicating between buildings via modem. They either link up directly or leave messages on a local bulletin board. In the latter case they are also in contact with members of the general public who have a wide range of backgrounds and ages. Many smaller schools do not use modems because administrators are reluctant to tie up their one voice line. If an electronic bulletin board is used, messages can be composed and saved to disk before the destination is dialed. This keeps telephone tie-up time short. Now that 1200-baud modems for the 64 cost less than \$50, message sending and capturing times should be very short. Received messages can be read from disk or buffer after the phone is hung up.

The One-Computer Classroom

A few schools manage to block out weekly computer time during which a class may visit the school computer lab for an extended period of time. However, most of computer activities I have described work with one 64 in each classroom. Many of these activi-

ties occur during language period and are consistent with the whole philosophy of language instruction.

The single-computer classroom can also use a student-controlled database. Students select the topics under which information about several events, places, or people will be entered. As they do their research, they enter the appropriate categories in the database. Higher level thinking begins when comparisons are made among entries under the same category.

Classroom Management

Much of the software recommended here can effectively help teachers equally as well as students. The word processor can be used to compose student handouts. The idea organizer can help plan a unit of work. *Newsroom* can be used to develop a parent-teacher newsletter. Some teachers use short BASIC programs to alphabetize a class list, enter and average grades (or marks), and rank the class by grade.

I allow my student teachers the option of submitting papers on disk. Using the insert option of the word processor, I place comments where they are relevant. The authors make their alterations and resave the document, with or without the insertions.

For classroom display purposes, I use a scroll program that rolls my comments from the top to the bottom of the screen. It permits a choice of screen and text colors and accompanying melodies. For my convenience, I videotape these sequences and take them into any class that has access to a VCR. These tapes help me demonstrate points during lectures.

Student Programming

Many of my teachers in training have taught young children to program in BASIC. These elementary students can develop simple multiple choice tests or programmed learning sequences for each other. It takes them about an hour to learn the required BASIC commands. As the children develop quizzes, they gain a sense of control over the machine, while analyzing the content of the test material itself.

Both student teachers and children learn to develop sequences in which a wrong answer causes the program to suggest what kind of thinking could have led to the correct answer. If the answer is correct, an explanation appears as to why it is correct.

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I look forward to demonstrating my SID Symphony stereo cartridge and accompanying program to those of my college and elementary classes who are

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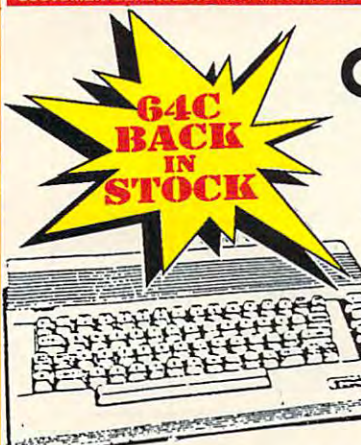
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interested in music. While the 64 normally allows three simultaneous music channels, the stereo cartridge doubles this range. Much of today's popular music is composed and performed via multi-track computers. Most students would benefit from gaining some experience and understanding of this process.

I purchased a Voice Master Jr. digitizer that allows my 64 to recognize spoken words. Handicapped students or those who simply wish to limit their keyboard contact can benefit from this input device.

Elementary Economics

All of the hardware and software I have described here would cost \$300 at most. A full-featured word processor for any of the PC compatibles could easily cost that much. The 64s are already in place in many of our classrooms. For as little as \$30 each, these computers could be effectively utilized with one or two pieces of productivity software. For a couple of hundred dollars more, a school could share all of the other hardware and software I have mentioned.

I'd like to make a final point about making effective use of what you have, and this is true whether you're a school administrator or an individual computer owner. A friend of mine

found some PETs in a school store-room. He had his elementary children compose their documents with *Paperclip* loaded on these older machines. They then loaded their compositions into *Paperclip III* on a 64 for final formatting and printing. The point is that the children learned about writing and they were able to take copies of their completed papers home to show their parents. The children didn't care how old the computers were or how much they cost.

As I write this article with *SpeedScript* on a VIC 20 with 24K expansion, my wife is organizing a report employing *Thinking Cap* on our 64. I will later port this article via cassette to the 64 for word counting, word use analysis, spelling check, formatting, and printing.

In our family, the 64 and VIC 20 get used almost daily, handling a variety of sophisticated chores and projects. With very little additional expenditure of time, energy, or money, we should be able to use the 64 and its ancestors in our classrooms to expand our students' learning experiences. These resources are too valuable to waste.

John Elliott teaches both curriculum and research paper courses at Nova

Scotia Teachers College. He also directs workshops regarding the classroom use of computers. □

PRODUCT LIST

Not all of the products John Elliott mentions in his article are readily available. Some titles are out of print, and some of the publishers have gone out of business. Many of the items can be found at larger software retailers, such as Software Support International, (800) 356-1179. The following products, however, should still be available at the addresses given.

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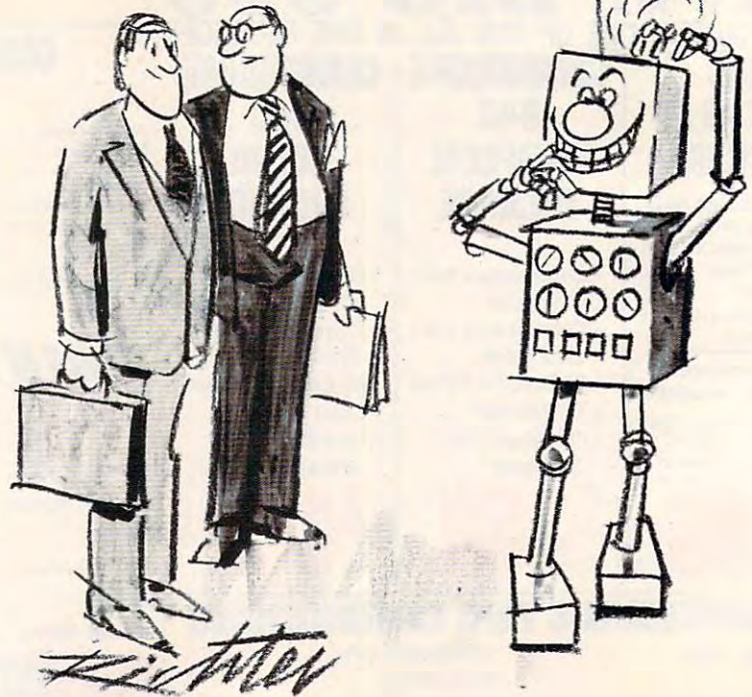
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BIBLE SEARCH

"The apple of his eye" and "Escaped with the skin of my teeth." Recognize these phrases? They are two of the most common clichés—the kind that got you into trouble with your high school English teacher. Do you know what else they have in common? Their origin is the Bible, and now they can also be found on disk for your 64 or 128.

"Let all the people say, 'Amen,'" is another commonly used phrase.

SOGWAP Software presents *Bible Search* 3.1 in which Michael Miller has achieved the remarkable by offering the complete King James Version of the Bible on four double-sided 1541/71 disks, with an exhaustive cross-referenced concordance on two more. The program itself uses one disk.

Bible Search can search for and display words or verses easily and swiftly, even allowing for disk swaps. This speed allows you to spend more of your time meditating on scripture rather than looking for it.

The program opens with a setup menu that allows you to manipulate screen colors. In addition, you can alter the colors that indicate italics, the words of Christ, basic Bible text, the computer prompts, and the user's responses. After you have set your colors, pressing Return takes you into the program, where you can request to see a specific verse or begin a search for a word or specific phrase.

When a verse is displayed, you can view it in context with the verses that immediately precede and follow it. You can scroll forward and backward through surrounding text or skip to the first verse of the previous or

next chapter. You can request a range of verses, too. Output can be directed to screen, disk, or printer. By successive moves you could print out the entire Bible straight from the program or save it to disk for use with a word processor, which would allow you to customize your printout.

Bible Search will find sin-

less than three minutes. Pressing f3 displays the first verse that contains the search words. Press f3 repeatedly to bring up more verses with matching words.

Bible Search utilizes a compressed database composed of eight relative (REL) files. It has the complete text of the King James Version of the Bible and an exhaustive

program on our 64 with two FSD Excelerator Plus drives and a Star NX-1000 printer with MW350 interface in Commodore emulate mode. The two drives made the program quite comfortable to use, but with the various drive configurations it offers, *Bible Search* provides a good excuse to buy more hardware.

Generally, churches, Bible study groups, and Bible scholars don't have much money. Miller himself says that students for whom money is no concern should equip themselves with a PC and the IBM version of his program. For many people this is not a viable alternative. For them, the 64 version of *Bible Search* is a handy tool. It's fast, thorough, and easy to use. In fact, for some people, it would be worthwhile to buy a 64 just to run this program. Use it for Bible trivia quizzes. Print out passages of scripture to be highlighted, picked apart, criss-crossed, and written on. With a word processor's special fonts, you can print out cards or posters of your favorite Bible quotes.

The manual is clear and well written. It even has a glossary that includes the definition of SOGWAP. Like many programs, *Bible Search* suggests you make and use a backup copy. A reasonably good copy program is included. Because of their size, however, the cross-reference disks cannot be copied on a 1541. There is a warning to this effect—but the suggestion to copy disks is on page 3, and the warning about the reference disks is buried on page 18.

We found only two other problems with the program. You have to pound Run/Stop-Restore to get a response (its function is to reset the program to the first



Locate any phrase in the Bible in less than two minutes.

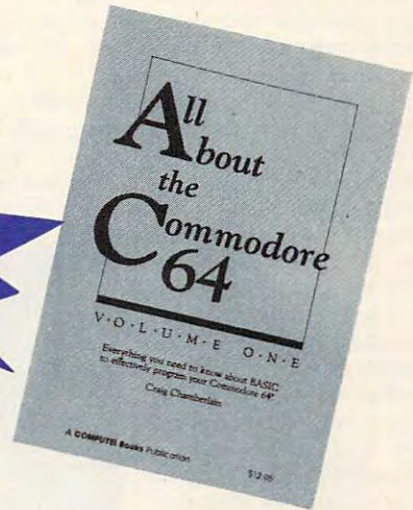
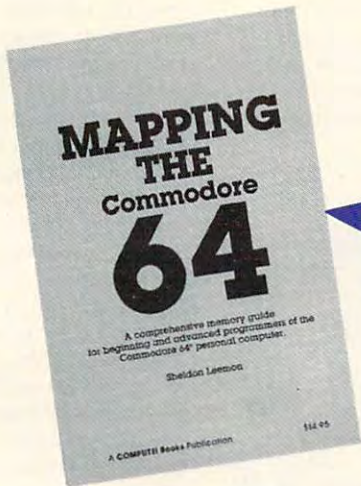
gle words or groups of words. It divides the Bible into four sections (hence the four disks) and searches one section at a time. Being a smart program, it not only tells you when you have inserted the wrong disk or side in the drive but also tells you which one to put in. When it has found all the verses in the section that contain the search word(s), it informs you of how many there are. You can display the reference list of verses in a search buffer. A screen dump allows you to print out the list.

For example, the word *judge* appears in 170 verses. To search the entire Bible for this information and print out the list of verses took

English concordance of 12,800 words and 700,000 indexed verses. A single-disk word search takes five seconds. Miller has noted a worst-case word-search time, using the 1541, of two minutes for the whole Bible. This is believable, judging by our experience.

This program will run on several hardware configurations. The 128 version of *Bible Search* 3.1 supports REU and has an 80-column screen option. It is Fast Load/JiffyDOS compatible, although they aren't really needed. *Bible Search* 3.5 (not reviewed) is available for the 1581 and hard drives. This version reputedly can search the entire Bible in five seconds. We ran the pro-

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menu). And where is the Revised Standard Version of the Bible? The King James Version and New International Version are currently available; a Revised Standard Version would be a welcome addition to this series.

Bible Search is one of those programs so deceptively simple to use that its sophistication is overlooked. You have to think about the scope of what you're searching to appreciate just how good this program is. Michael Miller has transcribed the Word of God onto a new medium. As a Christian, he could not have spread God's Word better than he has by making use of his programming talents this way. Bible students, Christian or not, can be thankful he did.

Oh, yes. Our Bible references? "The apple of his eye" is found in Zechariah 2:8 and in Deuteronomy 32:10. "Escaped with the skin of my teeth" is from Job 19:20, and "Let all the people say, 'Amen'" is from Psalms 106:48.

DAVE and ROBIN MINNICK

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STAR CONTROL

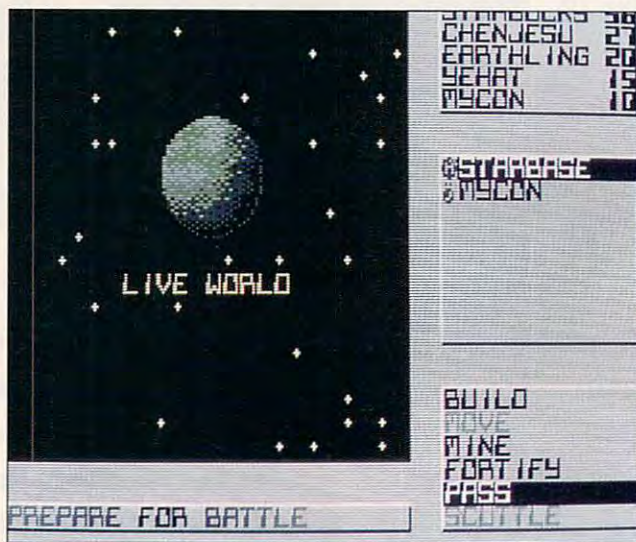
The time: the twenty-seventh century. The place: outer space. The Ur-Quan Hierarchy, a confederation of intergalactic slave traders, is on a deadly rampage.

Held at bay for centuries by the Alliance of Free Stars, the Hierarchy is now on the verge of grinding the Alliance into space dust. Earth, formerly judged too weak to be part of the Alliance, is

called upon for assistance in stemming the tide of the Ur-Quan menace. Is it a case of too little too late, or will the Alliance's newest member be up to the challenge? Blending strategic elements with arcade-style action, *Star Control* pits you (commanding either the Alliance's or Hierarchy's forces) against a hu-

er, for example, fires heat-seeking tactical nuclear weapons and, for its special power, has a primarily defensive laser that also acts as a short-range offensive weapon. On the downside, the Cruiser is both slow and vulnerable.

Each player may operate one fleet of seven ships.



Star Control is an outer space blend of strategy and action.

man or computer opponent in a fight for control of the other's star base. Initially, it's difficult to coordinate both strategic and combat elements, but you can have the computer do the thinking or fight the battles for you.

From your Fleet Command View—a gridlike, planet-filled screen—you and your adversary send ships out from your star bases. Your objectives are to develop colonies, build mines and fortifications, and attack the enemy or defend yourself.

All of the four Alliance and four Hierarchy races fly their own distinctive aircraft, each with unique weaponry, special powers, maneuvering characteristics, and weaknesses. The Earthling Cruis-

er, for example, fires heat-seeking tactical nuclear weapons and, for its special power, has a primarily defensive laser that also acts as a short-range offensive weapon. On the downside, the Cruiser is both slow and vulnerable.

Each player may operate one fleet of seven ships. These may be replaced as long as there is money to pay for them. The prices of spacecraft vary, so deciding whether to buy a less expensive but weaker ship immediately or risk possible annihilation while waiting for the cash to purchase the best is a strategic choice.

Colonies, mines, and fortifications, though equally important, provide different benefits. Colonies are recruiting areas for new members and quick routes for ship movement. Mine production earns you star bucks, which may be spent at the star base to purchase new ships. Fortifications make it difficult for your opposition to destroy your mines and colonies and reach your strate-

gically important star base. Because you can perform only three actions per turn, determining whether to construct a ship, move a piece, build a mine or fortification, develop a colony, or attack an enemy requires an accurate reading of the situation. To further complicate matters, you can't build on or develop some planets.

After a player has completed a turn and has placed a ship on one or more planets containing enemy craft, the screen shifts from the Fleet Command View to the Combat Transition Screen. In this mode all opposing ships occupying the same sector go at each other until a victor emerges.

Most combat screens consist of a star-laden canvas occupied by a pair of ships. Two gauges—one measuring crew strength and the other fuel usage—fill the bottom quarter of the screen. Your crew is depleted with every hit you take; however, it's possible to recruit new members. Fuel is expended by firing weapons or by using special powers and is replenished when your ship stops moving. Unfortunately, the more you stand still, the more vulnerable you are.

At first there are no pushovers among the competition, so you'll need to build to the challenge slowly. For this reason it's best to begin in the practice mode and in the easiest of three difficulty levels. Without having to worry about the strategy required in the full game, you can set your mind to inflicting destruction on enemy spacecraft.

When you've tired of practicing, you may engage in a melee with the enemy fleet. This pits your four ships against your adversary's four, one pair at a time. The

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winner of each dogfight continues against another from the loser's roster until one side has eliminated all opposing vessels.

Though fast moving and exciting, the battle sequences are a throwback to the early days of electronic gaming. In fact, the graphics, animation, joystick control, and play action are reminiscent of that venerable videogame antique *Asteroids*—except now asteroids shoot back.

Graphically, the strategic screen is less sophisticated than the combat screen. Star bases, ships, mines, and the like are represented by simple, two-dimensional shapes. Stars are represented by simple dots.

Documentation consists of a 30-page illustrated manual that does a good job of setting forth the rules and describing the races of participants and their spacecraft.

As a solo contest, *Star Control* is a disappointment. Even with the difficulty settings favoring the computer, you'll soon find it relatively easy to outwit and outfight it. The game shines in the two-player mode, where equals can battle it out or mismatched opponents can balance the odds by playing at different difficulty settings.

The bad news about *Star Control* is that it has little to offer anyone looking for something new or original. The good news about it is that players who like an outer space setting, a capture-the-flag-style challenge, and an emphasis on action and strategy will not be disappointed.

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DRAGONS OF FLAME

Imagine an Advanced Dungeons & Dragons session coming to life on the computer screen, and you'll have *Dragons of Flame*. It's an exciting combination of magic and might.

Strategic Simulations' role-playing epics in the gold boxes take a traditional approach to role-playing games (RPGs). They present an overhead view of the landscape and a side view of the action during combat. Silver box action games, such as *Dragons of Flame*, rely heavily on arcade combat in addition to the skills, magic, and monsters found in other RPGs.

Unlike its predecessor, *Heroes of the Lance*, *Dragons of Flame* is not too difficult and, as a result, is a lot more enjoyable. Other features and changes make *Dragons* the better of the two and an example for the future.

The appeal of *Dragons* and *Heroes* is the quick action found in both games. When you play AD & D on paper, there is no way to see the results of slaying a giant spider or defeating a hobgoblin. The gold box AD & D games show combat, but it's not controlled by a joystick. *Dragons* brings to life the imagined action and adds a lot of neat elements to round out the adventure. This is no arcade game, and you'll have the large amount of time spent solving the game as proof.

The goal of *Dragons* is to rescue a number of slaves held by the evil Draconians in the fortress of Pax Tharkas. Along the way, you'll befriend the elves of Qualinesti and travel through the wilderness and caves of Sla-Mori.

This game is based on the second AD & D Dragonlance game module and reflects the thought and preparation that goes into these modules. The wilderness maze is large and keeps you from reaching the fortress and caves. Many challenges await before you must tackle the maze, so don't feel lost if you don't find it immediately.

More than half of the screen is filled by the action window. It can show either the wilderness view or combat view. The overhead wilderness view depicts your immediate surroundings and helps to guide you through the landscape. This view is new to *Dragons*.

When enemies draw near, it's necessary to switch to the combat view. You view combat from the side and only see the leader of your party and the opponent. Using the joystick and the keyboard for spells, you battle it out with the monster. This is the fun part of the game. It's very rewarding to take out a monster and watch it disappear after a few well-placed blows. It makes all those years spent playing arcade games worthwhile.

The other parts of the game screen are a collection of icons for up to ten members of your party and a compass rose that indicates the party's current orientation. The icons indicate player status and damage. You can rearrange the party at any time except during battles. Rearranging your party becomes necessary at times because only certain characters have the abilities, skills, or magic to defeat particular monsters. You have to exercise your brainpower to decide on the proper leader, but these decisions in real-time are exactly what would

happen if the AD & D world actually came to life.

You use the joystick to move the party icon around the landscape or to fight battles. The space bar activates other options and commands, such as Take, Drop, Open, Shut, and Save Game. It takes no time at all to learn the game system. The game relies heavily on how quickly you can make decisions, win battles, and complete miniquests. *Dragons* will send you to many locations to look for special objects and weapons. Major goals reveal themselves at the appropriate time.

Graphics in *Dragons* are very nice, particularly in the combat view. This side view shows a lot of detail, both indoors and outdoors. The monsters move well, although a lot of them are the same size as your party leader. The wilderness view accurately reflects the overall map found on the back of the game manual. You won't need this view for much more than orientation. The animation of the monsters and characters is smooth. You'll need to move quickly to defeat your opponents.

Sounds and music are not extensive in *Dragons*, but they keep the atmosphere of the game ominous. After seeing this game on more powerful computers, I was surprised with the power that the designers pulled out of the 64. SSI does the machine justice.

Once again, SSI's manual in *Dragons* serves as an example of fine documentation. Unlike other AD & D computer games, there is not a lot to read. The bulk of the manual is for background information and character descriptions. Game commands and controls are on a quick-start card. The end re-

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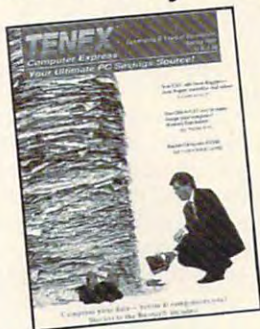
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REVIEWS

sult is that you'll be playing *Dragons* shortly after you open the package, and the blend of action and adventure will make you forget about your pen-and-paper AD & D sessions. *Dragons of Flame* takes the spirit of AD & D adventures and the action of imaginative battles and colorfully blends them on your computer's screen.

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Circle Reader Service Number 346

CENTAURI ALLIANCE

As a member of the rebel coalition, you must complete a series of dangerous missions in *Centauri Alliance*. Michael Cranford, designer of *Bard's Tale*, has set this role-playing adventure in the Star Wars-like world of the twenty-third century. Missions entail journeying to various planets, where you will negotiate mazes, combat menacing aliens, encounter deadly traps, and locate valuable items.

You assemble a party of eight individuals from six races of beings. Friendly aliens and mechanoids you meet along the way may also join your party. Characters differ not only racially but in terms of their attributes (strength and IQ, for example) and disciplines.

The four disciplines are an expertise in weapons and fighting, skills in maintaining and repairing biological and mechanical systems, metamorphic ability (being able to change shapes), and psionic talent (the ability to focus brain waves to achieve desired ends).

Most interesting are the over 80 psionic skills. Some are as simple as being able to slow down an opponent. Others are more exotic, such as encasing enemy forces in shifting sheets of rubble or bringing on earthquakes that affect only your adversaries.

No single race is competent in all four disciplines. Donsai, for instance, are capable warriors; Praktors are the only beings able to change shape. As a result of this specialization, it is essential that you assemble a well-balanced team, if you hope to succeed.

Initially, a character is skilled in one aspect of a single discipline. For example, a warrior might be adept at hurling weapons or using explosives but not at close-quarter fighting in a melee. Only by gaining experience can a character become trained in other disciplines.

Gameplay is made easy by a series of menus accessed via joystick, keyboard, or mouse. The game's combat system is also uncomplicated—if uninspired. A single figure representing your party and one or more enemy figures are placed on a small hex grid. From this position you can attack, move to an adjoining space, or flee. Before attacking, you may command individuals to engage in a melée, fire a weapon, dodge, or use psionic or metamorphic powers. After all options are chosen, the message screen displays the results of the battle.

You travel through and view your surroundings in either the first-person perspective, 3-D mode, or from overhead. Although the 3-D perspective is more attractive, the top view is more practical. It provides a better overall sense of your location and includes an automapping feature. Unfortunately, when you move to another maze, the program does not retain your previous map for later use. Fortunately, you can save a game in progress.

Centauri Alliance comes on three double-sided disks, so players will spend dozens of hours with the game. Less worthwhile is the time spent waiting for each battle to load. Use those occasions to study the lengthy manual and field guide, which do a good job of providing atmosphere and explaining the rules. The manual itself is an entertaining addition to this software package.

Before long, some players will grow tired of searching rooms, traveling between planets, increasing weaponry, and fighting battles. Diehard fans of role-playing games, however, will consider *Centauri Alliance* a solid addition to their software libraries.

LEN POGGIALI

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SCREEN-PRO 64

If you're looking for a useful program to help you design screens and simple animated sequences, consider *Screen-Pro 64*. You'll find it handles these chores easily.

One of its many features is that *Screen-Pro 64* allows you to save load screens you have designed. BASIC doesn't give you this freedom. In addition, it lets you copy screens so that minimal changes are required when chaining together screens for animation. *Screen-Pro* augments the editing commands that are built into the 64 and makes them easier to use.

Screen-Pro 64 comes

packaged with two disks. One is for the different color modes available on the 64 and the other is for single color only. The color version lets you chain a maximum of 17 screens in an animation sequence. The monotone version lets you use 34.

Demonstration programs show how to design for a 3-D effect, change colors of key screen elements, and other effects. The program is great for creating dynamic and colorful title screens.

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Questions and answers about previous programs, printer ribbons, and more

Bug-Swatter

SpeedScript users who've been editing their dictionaries with the *SPEEDCHECK.DM* program have been seeing SYNTAX ERROR IN 260. The problem is the part of program line 260 which follows the colon and looks like this:

```
IFSTORFTHENRETURN
```

Commodore BASIC tries to make sense of it with the interpretation

```
IF S TO RF THEN RETURN
```

Since this statement is meaningless in BASIC it results in a SYNTAX ERROR. It's a textbook illustration of the danger of running together the elements of a BASIC instruction, even though the 64 and 128 allow you to do so. The actual logic should read:

```
IF ST OR F THEN RETURN
```

To make the correction, just load *SPEEDCHECK.DM* like any other BASIC program, list line 260, make the change above by adding spaces, and save the program back again. If you have any uncertainty about how to do any of these steps, either experiment with a copy of the *SpeedScript* disk or ask someone who is certain.

Several readers have written to complain that William Chin's *Memo Card* program (September 1989 and the 1991 *Gazette PowerPak* disk) will not reload data from disk without an occasional STRING TOO LONG ERROR appearing. The problem can easily be fixed by replacing line 1350 in the *Memo Card* BASIC program with the following and adding some additional code.

```
1350 INPUT#1,HR
```

```
1352 FOR I=0 TO HR:T$=""
1354 GET#1,A$:IF A$=CHR$(13)
THEN 1358
1356 T$=T$+A$:GOTO 1354
1358 IF T$="←"THEN T$=""
1359 M$(I)=T$
```

I would like to commend the author of *CoilCalc*, which ran in the June 1991 issue. It is a fine program that will be of interest to many electronic hobbyists. However, the program will not function in Option 1 because of errors in lines 580 and 585. Here are the corrections that should fix the problem.

```
580 IN=INT(100*((.5+VAL(CDS))
↑2)*((TN(GA)*VAL(CL))↑2))
585 IN+INT(IN/((4.5*VAL(CDS))+
(10*VAL(CL))))
```

ROLAND BURGAN
HANCOCK, MI

More Niche Programs

Robert Marcus' *CoilCalc* (June 1991) is one of the best and most useful programs you've published in years. In the user group of which I am a member (and "stuckee" called the president), a substantial percentage of members are radio amateurs, technicians, or engineers. Many of us are photographers, pilots, rebuilders of elderly automobiles, model airplane flyers, chemists, and otherwise technically interested in the world around us. How about some more niche programs of interest to any or all of the above?

B. CHANDLER SHAW (WA6EWY)
GRANADA HILLS, CA

We'll be happy to consider such programs. So how about it, readers? Do you use your 64 with some hobby or avocation? If you've written a program that helps you get more enjoyment out of some other activity, send a copy of it with instructions on disk to the Gazette Submissions Reviewer

for possible publication. We pay for programs we publish.

Graphs Wanted

There is a program called *128 Graph Designer* written by Danny Komaromi in the July 1987 issue. I would like to see it written for the 64.

RUSSELL WRIGHT
MILWAUKEE, WI

128 Graph Designer is a good program that lets users create pie charts, bar graphs, and line charts on the 128, but there is no 64 version. If a bar chart will fill your need, Tim Ruiz wrote a program called EZ Bar Charter (September 1989) that works with either the 64 or 128. It plots up to eight items on a vertical bar chart and prints the resulting graph to screen or printer. If someone would like to submit a good chart program for the 64, we'll consider it for publication.

Printer Ribbons

Where can I obtain ribbons for my VIC 1525 printer? I understand the printer is no longer made.

DON SYWASSINK
SIERRA VISTA, AZ

Try Ramco Computer Supplies, P.O. Box 475, Manteno, Illinois 60950; (800) 522-6922. Canadian readers can call (800) 621-5444. Ramco has them in stock, but call for the latest prices and shipping information.

Printer Plug Revisited

In July's "Feedback" Bob Chalfant said he was looking for a 36-pin plug so he could print documents in Epson mode with his SR 2000 Dual Interface printer. Radio Shack stocks a connector that they apparently use for their own printers. It might work. It's called a 36-Position Male Printer Connector and the catalog number is 276-1533.

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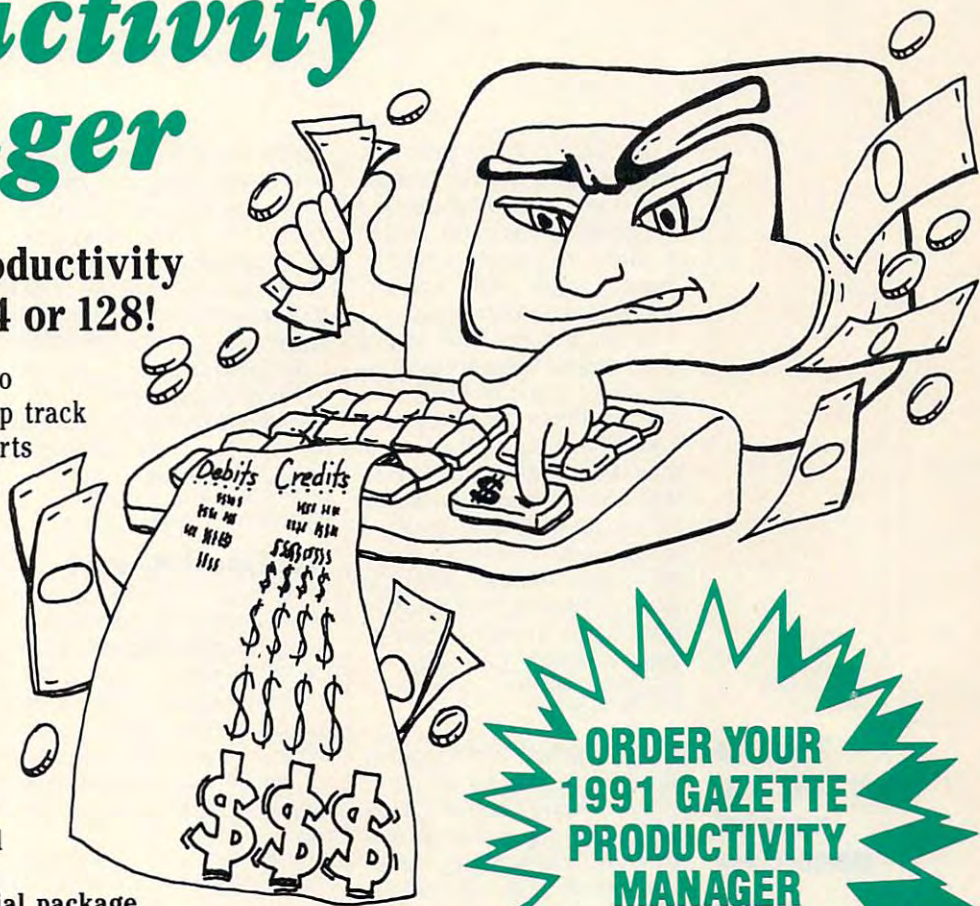
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My only quarrel with it is that the back shell is plastic. This is no good for shielding if the connector is to be used in a radio frequency environment, such as around amateur radio equipment.

A second solution would be to contact Newark Electronics about a line of Amphenol "Micro-Ribbon" connectors. These have metal shells and may be obtained in styles that come straight out of the connector or at right angles. I am not sure if there is a Newark store in Mr. Chalfant's town of Renton, Washington, but I know there are two of them in nearby Bellevue.

WALTER C. WARMAN
S. BURLINGTON, VT

Questions about calendars, expanded memory, and static

If Bob Chalfant is still looking for a 36-pin plug for his printer, he doesn't need it. Leave the printer connected as it is now for Commodore mode, then turn off all the DIP switches except for number 8.

This works because the necessary interface is already built into the printer and it would be the same as connecting a serial cable to an interface, then running a 36-pin cable to the printer.

In my opinion the SR 2000 is one of the best 9-pin dot matrix printers available because of this dual interface. If some utility program requires a Commodore printer, you can change back by turning on DIP switches 3, 6, and 8. Any time you change the DIP switches, you must turn the printer off and on again for the changes to take effect, otherwise the printer will continue to operate in whatever mode it was in before you changed them.

JACK STANTON
MARTINEZ LAKE, AZ.

More Calendar Comments

Apparently Gazette's most famous lament has become *Monthly Calendar* (March

1989). For the record, here's one more change. If you are using the program from *Gazette Disk* with a Panasonic KX-P1090 printer with a PPI serial to parallel interface (CBM 801 equivalent), you will get a scrambled calendar printout. Line 1280 is one character too long. Delete one Shifted * from the end of line 1280 and insert one at the beginning of line 1290's string.

PETER KUBISCHTAL
FOUNTAIN VALLEY, CA

Why Expand Memory?

What exactly is the purpose of expanding the 64's memory, using cartridges such as the 1750? On an IBM, certain amounts of memory are required to use certain software. Is there any software for the 64 that requires more memory than what the 64 has?

JOHN VEILLEUX
ORRINGTON, ME

There's no software that we know of that requires a 64 to have more memory than was built into it. On the other hand, several software packages, such as GEOS, can make use of RAM expansion if it's available. And many programs—games particularly—use the disk drive for virtual storage when either the program or its data is too large to be loaded and maintained in memory all at one time.

Games are one example of why more memory is better, but here are some others. Business applications can use larger spreadsheets and data bases. Programmers can write larger programs which allow for more highly-developed code and more sophisticated interpreters or compilers.

Extra memory can help graphics when several scenes must reside in memory at once for smooth screen updates. A computer can do great things with digitized

sound, but a lot of storage space is needed to contain reasonable sound samples

Where speed isn't a critical factor, disk drives are a practical means of extending the 64's 64K limit. But where speed and quick responses are needed, more memory is very handy indeed.

Monitor Static

I've noticed that whenever I put my hand near the screen of my 1701 monitor I can feel the hairs on the back of my hand stand up. Is this something I should be worried about?

GEORGE W. BLACK
ATLANTA, GA

What you feel helps your monitor's screen to glow, but it won't induce the same effect in humans. You're feeling static electricity, a natural phenomenon produced on every monitor. You can also feel the same tingling sensation by touching the back of your hand to a television screen. An electron tube in a TV or monitor fires a beams of electrons at the screen which causes portions of it light up, producing the image you see. This process causes a static electric charge to build up on the screen and this charge acts like a magnet, either attracting or repelling the hairs on your arm. It won't harm you, but static electricity can damage semiconductor materials. That's why it's a good idea to touch something metal to drain away the charge before you touch any computer chips or components.

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

MACHINE LANGUAGE

Jim Butterfield

SIX COMMANDS ARE KEYS TO INPUT/OUTPUT

Input and output are easy from BASIC—the authors of BASIC made it that way. Trying to comprehend them in machine language, however, can make a grown programmer cry.

It doesn't have to be that hard. Commodore made it confusing by including several Kernal jump locations that are generally only used by the Kernal itself—calls like UNTALK and UNLISTEN. Most programmers could code for a career and never use them. Why? Because you can do almost all your ML input and output with just six Kernal calls. You might need a little help from the BASIC language, which is always in place on the 8-bit machines; but it's not hard to learn six system calls. The programmers' manuals often list dozens of calls, but most of them are rarely needed. That's confusing to a beginner. CHROUT or BSOUT (\$FFD2) sends a character to the output stream. GETIN (\$FFE4) gets a character from the input stream. STOP (\$FFE1) scans the Run/Stop key. CHKIN (\$FFC6) switches the input stream to a logical file. CHKOUT or CKOUT (\$FFC9) switches the output stream. CLRCHN or CLRCH (\$FFCC) restores input/output streams to defaults.

Mnemonics vary among the manuals, but the routines' locations—and their jobs—are the same for all Commodore 8-bit machines. You'll even find them on the original PET computer from clear back in 1977.

To use these call addresses, all you need to do is set up any needed registers and then make the call with a JSR instruction. Some of these calls destroy the contents of

your registers; you'll need to know about this and preserve the register contents if you need to use them later.

To output a character, load the ASCII character code into the A register, and JSR \$FFD2. The character will go to the output stream (the screen, if you haven't changed things by using \$FFC9). All three data registers (A, X, and Y) have their values preserved.

To get an ASCII character into the A register from the input stream, use JSR \$FFE4. If you haven't changed the input stream (with \$FFC6), the character will come from the keyboard input buffer. This call will not wait; it always returns immediately. If there's no character available (often the case when you're reading the keyboard), A will contain a value of binary 0. When reading data files (with the input stream switched via \$FFC6), system call \$FFCF, CHRIN, performs an identical action to that of GETIN. All three data registers may have their contents changed by this call. Save these values to memory if you will need them.

To check Run/Stop, use \$FFE1. If the Run/Stop key is being pressed at this instant, the call will return with the Z flag set. A BEQ (Branch Equal) instruction allows you to take appropriate action, such as stopping the program. A machine language program will not respond to a press of the Run/Stop key unless you include calls to \$FFE1 in your code. The contents of registers A and X will be affected by this call. You'll find that register A contains information about a few other important keys.

Switch your computer's input/output streams with \$FFC6 and \$FFC9. Load the logical file number into the X register, and then call \$FFC6

to switch the input stream or \$FFC9 to switch the output stream. The stream should be restored to its default later by means of a call to \$FFCC. The logical file number means that the file should previously have been opened; this may be done from machine language, but you'll find that it's often easier to use the BASIC OPEN command.

Once the file is open, you may switch the input or output stream to it as many times as you wish.

When you're finished with the file, you must always remember to close it. If you have both input and output streams switched at the same time, it would cause confusion on the serial bus. All three data registers may be changed by this call. Save their contents in memory if you expect to need them later.

Restore default input/output streams with \$FFCC. This command sets the input stream to the keyboard input buffer and the output stream to the screen. It takes care of all necessary cleanup work. For example, devices on the serial bus may be told to untalk or unlisten. Registers A and X will be affected by this call.

To demonstrate how this procedure operates, here's a short program to enter that accepts input characters from the keyboard and then processes them. If you tap the B key, the letter A will print, tap the C key and B will print, and so on. A will transform to Z.

```
GO      JSR   $FFE4
        CMP   #$41
        BNE   NEXT
        LDA   #$5B
NEXT    BCC   PASS
        SBC   #$01
PASS    JSR   $FFD2
        CMP   #$0D
        BNE   GO
        RTS
```

Manuals list dozens of machine language calls, but you can handle most input and output requirements with six Kernal calls.

BEGINNER BASIC

Larry Cotton

CRASHPROOF DATA ENTRY PART 2

Last month we started working on a way to make the most user-friendly programs ever written. This subroutine would let computer novices enter data into your programs without a chance of their crashing them or being presented with a cryptic REDO FROM START.

Continuing with the crashproof program, let's have another look at line 150.

```
150 IFA$<CHR$(32)ORAS>  
CHR$(95)ORAS=CHR$(34)  
THEN120
```

**Make your
programs so friendly
that even
beginners can input
data without
strife or hassle.**

We want to restrict the user's input to numbers, letters and certain punctuation. The above line will do just that. Here's how to analyze what it will and will not accept.

Refer either to your computer's *User's Guide* or *Programmer's Reference Guide* for an ASCII and CHR\$ Code chart. This list shows what characters will show on your TV or monitor screen if you type PRINT CHR\$(X), for most of the values of X from 0 to 255.

Conversely, the list also shows the values which would be obtained by typing PRINT ASC("X"), where X is any keyboard character. Type in a few examples of each in immediate mode.

As mentioned last month, each character has a unique ASCII value. The ASCII value of E, for instance, is 69.

GET A\$ in line 120 waits for user input. If he or she types E, A\$ could be thought of as either E or CHR\$(69); likewise 6 can be treated as either 6 or CHR\$(54).

ASCII values 32-47 and 58-64 print a space and most of the punctuation. Values 48-57 print the numbers,

while 65-90 cover the capitalized alphabet. You could cut it off there, but I included five more printable characters with ASCII values 91-95.

The symbols < (less than) and > (greater than) are usually used to compare numeric values; for example, IF A < 5 THEN . . . means if the value of A is less than five, then some action is taken. You can also use < and > to compare strings' CHR\$ values.

Thus IFA\$ < CHR\$(32) OR A\$ > CHR\$(95) THEN 120 means if the ASCII value of the entered character is less than 32 or greater than 95, then program control jumps back to line 120 for another GET. If the value falls in the range 32-95, the character will be accepted, and control will fall to the next line.

We don't want the cursor to move if the user enters a quotation mark, thus the statement ORAS=CHR\$(34) near the end of line 150. The routine will accept apostrophes.

Also, we don't want the cursor to move if the first character entered on a line is a space, so we add this line:

```
160 IFA$=CHR$(32)THENIFL=0  
THEN120
```

L is line length, which is set to zero in line 100—the cursor appears in the leftmost screen position. If it's there when the space bar is pressed, program control just goes back for another GET. If the ASCII value of the entered character falls within the range 33-95, inclusive, control passes to the next line.

```
170 PRINTD$A$;B$=B$+A$;L=L+1:  
IFL=80THENPRINTCHR$(32);:  
GOTO190
```

This rather long BASIC line first deletes the cursor, then prints the entered character with PRINTD\$A\$. Note the

semicolon, which keeps the printed information on the same line.

B\$ will be the sum of all the individual A\$s until the Return key is pressed. It starts out life as nothing, then begins lengthening as the A\$ characters are added. L increments by 1 as the line gets longer. The IF-THEN tests for an arbitrary maximum line length of 80 characters (two screen-width lines). If L becomes 80, a space is printed and control is passed to a line which waits for either the Return or Del key to be pressed.

After the character is printed to the screen, we want to advance the cursor one position to the right and wait for another character to be typed. Go back to line 110.

```
180 GOTO110
```

The next line was called from line 170. Two full screen lines have been entered without a press of the Return key; L is 80. The only two things we want the user to press are the Return key itself or the Del key.

```
190 GETA$:IFA$< >R$AND  
A$< >D$THEN190
```

This line will loop indefinitely until one of the above-mentioned keys is pressed, in which case control passes to the next line:

```
200 IFA$=D$THENGOSUB210:  
GOTO110
```

Pay close attention now. If the Del key is pressed (defined in line 20 as D\$), we call a subroutine to take the necessary action.

If the Return key is pressed (A\$=R\$), control just falls through to line 210 or 220, which then becomes the end of the subroutine called in line 30.

The last two lines are the

subroutine for pressing the Del key.

```
210 IFL=0THENPRINT$;:RETURN
220 PRINT$A$;:L=L- 1:B$=LEFT$(B$,L)
:RETURN
```

The first line checks to see if L=0. If so, the cursor is at its beginning position, it's deleted, and control returns to 110.


If L is anything but zero, line 220 kicks in, prints two deletes and decrements L. B\$ becomes the L-length left end of B\$ and control returns to line 110 (sent there by line 140 or 200).

Try running the program now. A nonblinking horizontal-line cursor will greet you. Try typing anything, randomly, as fast as possible, including spaces, deletes, and so on. Just don't press the Shift Lock key. After typing several characters, press Return.

Then, in immediate mode, type PRINT X\$. You should see an exact clone of the originally input characters. X\$ is the input string, with which you may do as you wish.

Remember, any key repeats. The routine accepts all capital letters, all numbers, and most punctuation except double quotes. It will not accept lower case letters, cursor control characters, and so forth. Once you've hit Return, there's no going back. □

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PROGRAMMER'S PAGE

Randy Thompson

SYS CALLS, UNTIMELY BUGS, AND MORE

Towering stacks of "Programmer's Page" submissions are taking over my computer room. It must be time for another column of reader tips (cleaning my room wouldn't hurt, either).

SYS 128

SYS calls such as the ones below are an important addition to any programmer's bag of tricks. The following are specific to the Commodore 128.

SYS Command	Function
SYS 42977	Calls the ARE YOU SURE? message and returns the ASCII code of the key pressed in the accumulator
SYS 57416	Goes directly to 64 mode (does not collect \$200)
SYS 51069	Cancels quote mode and reverse mode
SYS 51328	Switches to lowercase mode
SYS 51346	Switches to uppercase mode
SYS 51598	Rings bell
SYS 50341,,x	Clears screen line x (0-24)
SYS 51794	Clears the current screen line
SYS 51830	Clears from cursor to the end of the line
SYS 51851	Clears from the start of the line to the cursor
SYS 51871	Clears from the cursor to the end of the screen
SYS 51900	Scrolls the screen up one line
SYS 51954	Enables block cursor
SYS 51966	Enables underline cursor

ROD BENNETT
BALTIMORE, MD

Strange Swap

Here's a trick that's sure to make you think—think about how it works, that is. It's an unusual way to swap the values of two variables, something that's quite common in sorting algorithms. What's unique about this method is that it doesn't use a third variable. It uses the XOR function instead. Here's how the swap works in BASIC 7.0 on a 128:

```
10 INPUT "A = ";A
20 INPUT "B = ";B
30 A = A XOR(A,B)
40 B = A XOR(A,B)
50 A = A XOR(A,B)
60 PRINT "A = ";A
70 PRINT "B = ";B
```

Since the 64 lacks an exclusive OR (XOR) function, here's how the program can be entered on that computer:

```
10 INPUT "A = ";A
20 INPUT "B = ";B
30 A=(A OR B) AND NOT(A AND B)
40 B=(A OR B) AND NOT(A AND B)
50 A=(A OR B) AND NOT(A AND B)
60 PRINT "A = ";A
70 PRINT "B = ";B
```

This program takes advantage of the fact that (A OR B) AND NOT(A AND B) produces the same result as A XOR B.

MARK LINTON
BALTIMORE, MD

What Time Is It?

Shortly after completing August's column, I received a letter that further explains the inconvenient CIA chip midnight bug documented in that column. This letter, sent by Anthony Garza of Creative

Specialties, has been edited slightly for size:

As you know, the 64 contains two 6526 CIA chips, each having an independent TOD clock. Each clock's hour register has an a.m./p.m. flag that's controlled by bit 7. You clear bit 7 when it's a.m. and set bit 7 when it's p.m. When setting one of the hour registers, I noticed that bit 7 is reversed whenever you select a time within the hour of 12:00. A simple cure for this is to set the a.m./p.m. flag to the incorrect value when choosing times between 11:59 and 1:00. For example, if you set the time to 12:47 p.m., you must set the hour register to a decimal 18 (that's 12 in binary coded decimal) instead of 146 (18 + 128). Interestingly, if you read the hour register after setting it to 18, the CIA chip returns the desired value of 146! This a.m./p.m. flag reversal occurs only during the hour of 12:00.

I thought that this quirk in the TOD chip might be a problem with my 64, but the a.m./p.m. bug occurs on a backup 64 that I use as well as seven other machines that belong to some of my friends and associates. Programmers should add this information to their *Commodore 64 Programmer's Reference Guide*, since it's not mentioned in that book or in any other book that I can find.

Thanks for all the great tips, guys. It's always a pleasure to share such useful information as this with our readers.

"Programmer's Page" is interested in your programming tips and tricks. Send all submissions to *Programmer's Page*, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We pay \$25-\$50 for each tip we use. □

Here are some tips from readers about 128 SYS calls, the midnight bug, and more.

Steve Vander Ark

FIGHTING THE JAGGIES

A friend of mine recently commented that he could spot a *GEOS* document a mile away. With those blocky fonts, he jeered, there wasn't one yet he'd care to use for his own correspondence.

As a bona fide *GEOS* fanatic, I felt compelled to impart a little of the gospel according to Berkeley, to share with him the delight one can experience from a proportional font coming off a 9-pin printer.

A 9-pin printer is capable of some truly remarkable printouts. Then why is it necessary for *GEOS* to use such a jaggy print routine?

The *GEOS* system does all its work, whether graphics or text, on an internal hi-res "screen" in RAM. This bitmapped image is larger than the screen displayed by *geoPaint* or *geoWrite*; the only way to see it all is with a preview option. The printer routine puts a dot on the page wherever there was one on this internal screen, producing a faithful dot-for-dot image of what was created with the application.

Two factors affect the resulting printout from any application: the printer doing the printing and the software telling it how to do it. A laser printer can print astoundingly clear images, but it will still have the jaggies unless you use one of the ten or so *GEOS* laser fonts. A 24-pin printer has built-in fonts as crisp and clean as any you'll see from a daisy-wheel printer or fancy typewriter, but *GEOS* can't use them. Your best bet, actually, is still a 9-pin Epson-compatible dot-matrix printer, using a new ribbon for nice dark printing. The rest of the responsibility then lies with the software. In *GEOS*'s case, the job is assigned to printer drivers.

Perhaps an explanation is in order as to what drivers really do. The world of computers has never settled on a standard way of doing things in the way that video recorders have pretty much settled on VHS. Each device comes preset with its own set of codes and commands for operation; each piece of software has to know them all if it wants to communicate with all these different devices. This is true of hard drives, light pens, and printers. The code one printer uses to initialize itself might switch on the boldface option for another model.

GEOS was designed to be as generic as possible, whether you use an Okidata or an Epson printer. It's up to you to customize *GEOS* with the translation routine it needs for your particular setup. Those routines are called device drivers—input drivers for light pens and joysticks, printer drivers for printers. Each driver contains the needed codes for *GEOS* to tell the device what to do. In the case of printers, it's supposed to put dots on paper wherever there are dots on the screen.

Those jaggies, which are the stairstep pattern along any diagonal line or curve in a dot-matrix printout, are the necessary product of creating lines out of individual dots. Of course, the closer the dots can be squished together, the cleaner the printout should look, but a *GEOS* screen contains dot location information for only 60 or 80 dots per inch, no more. The fancier fonts some packages offer get their slick appearance simply from having more dot data for each area of the page. Since *GEOS* has no such capability, we are out of luck.

But we can cheat. Instead of putting a dot for each screen dot and leaving it at that, we can go back over

those dots with another set that's just a little bit off from where we printed on the first pass. This process will smooth out the printing by filling some of the jaggies with extra dots. Printer drivers which tell the printer to print the image more than once, each time offset by a fraction of an inch, are called multistrike drivers. There are a number of them available for *GEOS*. Most are double-strike drivers, which add one set of dots to the original set. There are also quad-strike drivers, which produce a total of four dot images, each slightly offset.

There is even a six-pass driver called EX-800 available for Epson and compatible printers. It's a program by Kevin McConnell that's available for downloading from QuantumLink and many BBSs. Its printouts are impressive, sometimes rivaling a laser printer's for clarity, especially on smaller fonts. The extra dots take a while to print, so printing time is noticeably longer.

It is also possible to turn the printing chore over to a program called *Lasermatrix*, which interprets the page as it prints it. You have to customize the basic driver with a number of technical details related to your printer for it to do the job, but the resulting printout is very clean with a minimum of jaggies.

Lasermatrix comes with an elaborate and rather technical customizer routine for use with your particular printer. The procedure takes some time and requires a careful reading of your printer manual, but the results are worth it. If you use an Epson compatible, which includes the Panasonic line, there is a *Lasermatrix* version already worked out for you. This ingenious shareware program is available on QuantumLink and on local bulletin boards. □

Here are some tips to help you eliminate the jaggies from your *GEOS* documents.

D'IVERSIONS

Fred D'Ignazio

VIRTUAL REALITY HITS THE SHOPPING MALLS

Recently I was a speaker at the National Educational Computing Conference (NECC) in Phoenix, Arizona. While at the conference, I stopped at the Commodore booth and saw the Mandala Exhibit.

Mandala is a virtual music studio, complete with several virtual (computer-synthesized) instruments that you play by whisking your hands through thin air. By making the right movements, you can play instruments that only exist on a mosaic of computer screens—and in your imagination.

I immediately saw a use for Mandala-type exhibits in the entranceways of large stores at shopping malls. There already are touchscreen kiosks inside all major department stores that tell you where to buy jewelry, china, wedding dresses, and blue jeans. A Mandala-style kiosk would go one step further. It would let you select items in the store for possible purchase, then try them on in virtual space. You could combine your image with that of anything in the store. You could try on new hats, shoes, coats, and coiffures.

Smaller virtual-space kiosks could also be inside retail stores in the mall. Virtual dressing rooms would let customers see themselves in clothing much faster than having to enter a real room, take off old and try on new garments. There would be no more twisting and turning in front of mirrors, trying to see how a garment looks from all directions.

Virtual-reality kiosks and rooms in the mall's stores would attract customers for their novelty value and for the sheer convenience of being able to see yourself in the

store's products in a fraction of the time it would normally take to try things on.

Game arcades at the mall would be revolutionized by Mandala-style videogames. The small boxes that attract kids and their quarters would be replaced by game walls where one or more players or combatants would stand, ready to be blasted into a virtual game world where they could interact with objects appearing on the game wall's picture screens.

Other kids would prefer renting bodysuits that included virtual sunglasses. These glasses would actually be tiny flat-screen computer monitors that let you see, in color and 3-D, the game world that you had paid to enter. Each time you moved in your body suit, you'd see that movement reflected in your player's position inside the computer's virtual game world. You would literally see the world through the eyes of a player inside that world!

Down the road I see Kinko's photocopying stores transformed into virtual-reality service bureaus. Who could resist the opportunity to enter a store and experience a thrilling vacation in the Himalayas or a hang-gliding journey over the Smoky Mountains or a white-water rafting expedition down the Colorado River?

These stores could shape a reality for you that is so vivid, so multisensory, so complete that you would swear you were there—where *there* could be anywhere from the driver's seat of a souped-up Ferrari to the helm of Donald Trump's yacht. You could replace J.R. on the TV soap "Dallas" and be surrounded by beautiful stars, or have Arnold Schwarzenegger's body with your head on it.

Virtual-reality copy stores would feature cut-and-paste re-

alities that you could sample in the store; copy onto videotape, disk, or CD; and take home to show your friends.

You want to sing like Madonna, Sting, or Pavarotti? You could go to a virtual-reality copy store and create a videotape of you singing in the Houston Astrodome or the Toronto Skydome, where your stage high jinks and your favorite singer's voice would ignite a crowd of thousands.

Like the Kinko's of today, many of the virtual-reality workstations would be self-service. You could pop in a videotape, disk, or optical disc and make several virtual-reality copies. Virtual-reality copy stations could be a hit with people looking for a gift to give someone on their birthday, wedding, graduation, or other special occasion. They would also be used to create virtual-reality postcards, letters, and multimedia faxes to family and friends in distant locations. Show them the fun you're having.

Virtual-reality kiosks, arcades, and copy stores might be a hit in future malls. The only danger is that they would be too delicious and seductive ("Create a new reality in ten minutes for only \$9.95!") that those people who drop in to a new virtual reality may elect to drop out of their dreary, humdrum real reality.

Chain-hopping from reality to reality may become a new social disease. Reality hoppers may eventually become as ubiquitous as today's drug addicts and panhandlers.

"Can you just spare two bucks?" pleads the wild-eyed reality hopper to a passerby in a late 1990s shopping mall. "I was on the Orient Express racing across Europe toward Istanbul, and my quarter ran out. I've got to get back on that train, man. Someone committed a murder, and only I can figure it out." □

Try on
a new coat, a
hairstyle,
or even a new
life at a
virtual reality
kiosk.

PROGRAMS

SPEEDWAY

Daniel Lightner

Speedway is a *SpeedScript* file reader and disk management program. You can view any information that may be in a *SpeedScript* file while you are writing a BASIC program or even while another program is running.

Speedway also gives you access to a command window that allows you to enter disk commands or view a disk directory.

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

Starting address: CA71

Ending address: CFB8

Be sure to save a copy of the program before exiting *MLX*.

Put It to Use

To use *Speedway*, load it with the .8,1 extension. After it has loaded, type NEW and press Return. Then type SYS 51825 to activate the program. Right away you'll see a prompt for a *SpeedScript* file. To view a file, place the proper disk in drive 8, enter the filename, and press Return. The listing can be halted for easy reading by pressing any key. Then press any key to continue. A listing can be aborted by pressing the Run/Stop key. This will also return you to BASIC. Enter SYS 51825 to activate the program again at any time.

To activate the disk command window when the program is asking for a *SpeedScript* file, enter \$ and press Return. You'll then be presented with a menu of seven commands.

1. Directory
2. Scratch
3. Rename
4. Copy
5. Validate
6. Format
7. Quit disk

Simply enter the number of the command. To see a directory, press 1.

Should a directory have more files than can be displayed on one screen, press any key to halt the listing and press any key to restart it.

Press 2 to scratch a file. If you change your mind after making this selection, simply enter a name that doesn't exist on the disk.

The Copy and Rename commands will ask you for new and old filenames. For example, to rename COMPUET to COMPUTE, press 3, enter COMPUTE as the new name, and press Return. Enter COMPUET (the old name) and press Return again. The Copy function works in a similar manner.

The Format command will format a disk, asking first for a disk name and then an ID. If you should accidentally enter Format, Rename, or Copy, just enter an asterisk (*) at the first prompt to abort the command.

Press 6 to validate a disk in drive 8.

The Quit option will return you to the *SpeedScript* filename prompt. To abort this screen and return to BASIC, enter an asterisk and press Return.

SPEEDWAY

```

CA71:A0 00 A9 00 8D 20 D0 8D A8
CA79:21 D0 A9 93 20 D2 FF A9 38
CA81:9A 20 D2 FF 20 D0 CB 20 C2
CA89:AC CB A0 00 B9 A9 CF 20 B0
CA91:D2 FF C8 C0 0C D0 F5 20 65
CA99:BE CB 20 49 CB AD 35 03 9C
CAA1:C9 24 F0 07 C9 2A F0 09 95
CAA9:4C B3 CA 20 DE CB 4C 71 DD
CAB1:CA 60 AC 34 03 A2 00 BD FD
CAB9:B5 CF 99 35 03 EE 34 03 E3
CAC1:C8 E8 E0 05 D0 F1 CE 34 82
CAC9:03 AD 34 03 A2 35 A0 03 31
CAD1:20 BD FF A9 02 A2 08 A0 CC
CAD9:02 20 BA FF 20 C0 FF A2 76
CAE1:02 20 C6 FF 20 CF FF 20 B9
CAE9:CF FF A0 00 20 42 CB A5 C2
CAF1:CB C9 40 D0 37 20 CF FF CE
CAF9:C9 1B B0 0D 18 69 40 4C 55
CB01:0A CB C9 5B B0 0A 18 69 C6
CB09:10 C9 1F F0 17 20 D2 FF EC
CB11:20 B7 FF C9 00 D0 03 4C D8
CB19:F0 CA A2 00 20 C6 FF A9 F5
CB21:02 4C C3 FF A9 0D 20 D2 D9
CB29:FF 4C 11 CB A5 CB C9 3F E1
CB31:F0 E8 20 42 CB A5 CB C9 F9
CB39:40 F0 FA 20 42 CB 4C F0 59
CB41:CA A5 CB C9 40 D0 FA 60 59
CB49:A0 00 A9 00 8D 34 03 20 C9
CB51:E4 FF C9 00 F0 F9 C9 14 AB
CB59:F0 38 C9 0D F0 20 C9 7B 98
CB61:B0 ED C9 20 90 E9 C9 22 E9
CB69:F0 E5 C9 2C F0 E1 AC 34 8B
CB71:03 C0 14 F0 DA 20 D2 FF 49
CB79:20 89 CB 4C 50 CB AC 34 01

```

```

CB81:03 C0 00 F0 CA 4C D2 FF 07
CB89:AC 34 03 99 35 03 EE 34 46
CB91:03 60 AC 34 03 C0 01 B0 69
CB99:03 4C 50 CB 20 D2 FF 38 11
CBAL:AD 34 03 E9 01 8D 34 03 C5
CBA9:4C 50 CB A9 0D 20 D2 FF 1E
CBB1:20 D2 FF A9 12 20 D2 FF 5F
CBB9:A9 96 4C D2 FF A9 9A 20 EF
CBC1:D2 FF 20 D2 FF A9 9A 20 EF
CBC9:D2 FF A9 3E 4C D2 FF A0 32
CBD1:00 B9 5B CF 20 D2 FF C8 55
CBD9:C0 4E D0 F5 60 EA A0 00 CE
CBEL:B9 8F CE 20 D2 FF C8 C9 08
CBE9:00 D0 F5 20 66 CE 20 E4 0A
CBF1:FF A5 CB C9 38 F0 1E C9 94
CBF9:3B F0 20 C9 08 F0 22 C9 1E
CC01:0B F0 28 C9 10 F0 2E C9 68
CC09:13 F0 30 C9 18 F0 03 4C E1
CC11:EF CB 4C E4 FF 20 6F CD 9A
CC19:4C DF CB 20 42 CC 4C DF 0A
CC21:CB A9 01 85 FB 20 77 CC 9F
CC29:4C DF CB A9 00 85 FB 20 23
CC31:77 CC 4C DF CB 20 F5 CC D8
CC39:4C DF CB 20 0F CD 4C DF 94
CC41:CB 20 E4 FF A9 0D 20 D2 F9
CC49:FF 20 20 CE 20 49 CB A0 3A
CC51:00 B9 51 CF 99 48 03 C8 3D
CC59:C0 03 D0 F5 A0 00 B9 35 3B
CC61:03 99 4B 03 C8 CC 34 03 61
CC69:D0 F4 18 AD 34 03 69 03 0A
CC71:8D 34 03 4C 02 CE 20 E4 74
CC79:FF A9 0D 20 D2 FF 20 3C 34
CC81:CE 20 49 CB AD 35 03 C9 82
CC89:2A F0 68 A5 FB C9 01 D0 B5
CC91:10 A0 00 B9 57 CF 99 48 6C
CC99:03 C8 C0 03 D0 F5 4C AF D5
CCA1:CC A0 00 B9 54 CF 99 48 C2
CCA9:03 C8 C0 03 D0 F5 A0 00 DE
CCB1:B9 35 03 99 4B 03 C8 CC 34
CCB9:34 03 D0 F4 AD 34 03 85 61
CCC1:FE A9 0D 20 D2 FF 20 2E 6C
CCC9:CE 20 49 CB A0 00 A6 F0 07
CCD1:A9 3D 9D 4B 03 E8 B9 35 5C
CCD9:03 9D 4B 03 E8 C8 CC 34 2E
CCE1:03 D0 F3 8A 8D 34 03 18 B3
CCE9:AD 34 03 69 03 8D 34 03 18
CCF1:4C 02 CE 60 20 E4 FF A0 47
CCF9:00 B9 4E CF 99 48 03 C8 85
CD01:C0 03 D0 F5 A0 00 A9 03 92
CD09:8D 34 03 4C 02 CE 20 E4 0E
CD11:FE A9 0D 20 D2 FF 20 4A DB
CD19:FE 20 49 CB AD 35 03 C9 1C
CD21:2A F0 D0 A0 00 B9 4B CF 7F
CD29:99 48 03 C8 C0 03 D0 F5 3A
CD31:A0 00 B9 35 03 99 4B 03 BF
CD39:C8 CC 34 03 D0 F4 AD 34 0D
CD41:03 85 FB A9 0D 20 D2 FF 68
CD49:20 58 CE 20 49 CB A6 FB A9
CD51:A9 2C 9D 4B 03 E8 A0 00 32
CD59:B9 35 03 9D 4B 03 E8 C8 5A
CD61:C0 03 D0 F4 18 8A 69 03 48
CD69:8D 34 03 4C 02 CE A9 0D A9
CD71:20 D2 FF A9 01 A2 5A A0 54
CD79:CF 20 BD FF A9 02 A2 08 5F
CD81:A0 00 20 BA FF 20 C0 FF 1F
CD89:A2 02 20 C6 FF A9 9A 20 63
CD91:D2 FF A0 00 20 CF FF 20 0B
CD99:CF FF 20 CF FF 8D B0 02 B7
CDA1:20 CF FF 0D B0 02 F0 49 CA
CDA9:20 CF FF AA 20 CF FF 20 54

```

```

CDB1:CD BD A9 20 20 D2 FF 20 47
CDB9:CF FF F0 26 20 D2 FF 4C 56
CDC1:B8 CD A5 CB C9 3F F0 29 F4
CDC9:C9 40 F0 1E 20 DC CD A5 10
CDD1:CB C9 40 F0 FA 20 DC CD BC
CDD9:4C EB CD A5 CB C9 40 D0 81
CDE1:FA 60 A9 0D 20 D2 FF 4C B1
CDE9:C3 CD A9 00 85 C6 4C 9B 8B
CDF1:CD A5 CB C9 40 F0 FA A9 59
CDF9:00 20 C6 FF A9 02 4C 3 28
CE01:FF A9 0F A2 08 A0 0F 20 16
CE09:BA FF AD 34 03 A2 48 A0 D0
CE11:03 20 BD FF 20 C0 FF A9 9D
CE19:0F 20 C3 FF 4C CC FF A0 F4
CE21:00 B9 2C CF 20 D2 FF C8 C4
CE29:C0 07 D0 F5 60 A0 00 B9 A1
CE31:16 CF 20 D2 FF C8 C0 0B AE
CE39:D0 F5 60 A0 00 B9 21 CF CB
CE41:20 D2 FF C8 C0 0B D0 F5 F9
CE49:60 A0 00 B9 33 CF 20 D2 C6
CE51:FF C8 C0 0C D0 F5 60 A0 B9
CE59:00 B9 3F CF 20 D2 FF C8 5F
CE61:C0 0C D0 F5 60 20 CC FF F8
CE69:A5 BA 20 B4 FF A9 6F 85 E2
CE71:B9 20 96 FF A9 0D 20 D2 5B
CE79:FF A9 20 D2 FF 20 D2 31
CE81:FF 20 A5 FF C9 0D D0 F6 F6
CE89:20 D2 FF 4C AB FF 93 0D 42
CE91:20 44 49 53 4B 20 43 4F 5F
CE99:4D 4D 41 4E 44 20 4D 45 C0
CEA1:4E 55 0D 20 31 20 2E 62
CEA9:2E 2E 2E 2E 20 53 43 77
CEB1:43 54 4F 52 59 0D 20 32 86
CEB9:20 2E 2E 2E 2E 20 53 43 77
CEC1:52 41 54 43 48 0D 20 33 81
CEC9:20 2E 2E 2E 20 52 45 87
CED1:4E 41 4D 45 0D 20 34 20 56
CED9:2E 2E 2E 2E 20 43 4F 50 BF
CEE1:59 0D 20 35 20 2E 2E 2E 0B
CEE9:2E 20 56 41 4C 49 44 41 D6
CEF1:54 45 0D 20 36 20 2E 2E 6B
CEF9:2E 2E 20 46 4F 52 4D 41 42
CF01:54 0D 20 37 20 2E 2E 2E C9
CF09:2E 20 51 55 49 54 20 44 67
CF11:49 53 4B 0D 00 20 4F 4C CF
CF19:44 20 4E 41 4D 45 20 3E BE
CF21:20 4E 45 57 20 4E 41 4D 8C
CF29:45 20 3E 20 4E 41 4D 45 94
CF31:20 3E 20 44 49 53 4B 20 07
CF39:4E 41 4D 45 20 3E 20 55 DD
CF41:4E 49 51 55 45 20 49 44 5B
CF49:20 3E 4E 30 3A 56 30 3A 1B
CF51:53 30 3A 43 30 3A 52 30 61
CF59:3A 24 0D 54 48 45 20 53 F0
CF61:50 45 45 44 57 41 59 0D E6
CF69:43 4F 50 59 52 49 47 48 AC
CF71:54 20 31 39 39 31 20 43 0F
CF79:4F 4D 50 55 54 45 0D 50 95
CF81:55 42 4C 49 43 41 54 49 8B
CF89:4F 4E 53 20 49 4E 54 4C 49
CF91:20 4C 54 44 0D 41 4C 4C 75
CF99:20 52 49 47 48 54 53 20 D5
CFA1:52 45 53 45 52 56 45 44 35
CFA9:53 50 45 45 44 20 46 49 7C
CFB1:4C 45 20 3F 2C 50 2C 52 0E
    
```

Daniel Lightner lives in Sidney, Montana. He is the author of *Plotter*, which was published in September. □

MOB MOVER

Brian Schkerke and Dave Farquhar

Have you ever tried to position sprites onscreen? At best it is a tedious and frustrating process, and you can waste hours in a futile attempt to use direct POKEs to position them. Even 128 owners with built-in sprite commands at their fingertips face an uphill battle.

To alleviate this problem and reduce the time required for this vital but difficult task from hours to minutes, we give you *MOB Mover*.

MOB Mover allows programmers to position and manipulate up to eight sprites onscreen; then it prints the BASIC code required to duplicate the screen for use in other programs. The program even lets you enter text and position the sprites around the text.

Every sprite register can be manipulated, and the program is packed with features! The coordinates of each sprite are displayed onscreen, and upon quitting the program, you are given all the necessary commands (POKEs in the 64 version and various others in the 128) to achieve the same effects that you had before exiting.

Typing It In

Both *MOB Mover 64* and *MOB Mover 128* are written in BASIC. To avoid typing mistakes, use *The Automatic Proofreader* to type them in. See "Typing Aids" elsewhere in this section. When you've finished, save the program to disk before running.

Note to 128 owners: You can type in either version of the program in 128 mode, but it requires the following direct mode command after running *The Automatic Proofreader*.

POKE 828,173

This command sets the function keys to return the same values as in 64 mode. To return the keys to their previous definitions, enter POKE 828,183.

Using the Program

Before loading and running *MOB Mover*, you should consider several things. First, if you wish to use your own sprite definitions, you must load them with a binary load (,8,1), define them by using direct POKEs, or use a

sprite editor, such as *Sprite Magic*, which resides out of the way of BASIC memory. (Owners of 128s should use the BLOAD command or use the built-in sprite editor.)

If you wish to use a custom character set, load and activate it, also. *MOB Mover* doesn't clear the sprite definition area unless so commanded, so your sprite definitions will remain safe in memory, and unless your character set lies on a page of memory you command *MOB Mover* to fill, it should also be in no danger of being overwritten.

A Few Terms

Some terms used within the program need explaining. The active sprite is the sprite which is currently being moved and whose data line appears in reverse video. The header is made up of the topmost two screen lines and is where all prompts appear. The operating screen is the screen which is normally seen, and the display chart is the table of numbers on the left side of the screen. In the 64 version only, an asterisk that appears before a sprite's data line signifies that the sprite is beyond x-coordinate 255 onscreen and must have the MSB X set for it. No need to worry—the POKEs given when you exit the program will tell you how to set that.

After loading and running *MOB Mover*, you'll see the title screen briefly, and then the operating screen will appear. In the 64 version, sprite 0 will be set to the middle of the screen and appear as garbage unless page 192 is the location where you defined your sprites.

In the 128 version, if sprite 1 is activated, it will be black (and thus invisible) and will "hide" all sprites below it. Sprite 0 is the only sprite currently on, so only its data line is displayed. The numbers in the data line represent the sprite number, x-coordinate, and y-coordinate, respectively.

Help is available at any time by pressing the H key. As a convenience to 128 owners, help screens are also printed to the 80-column screen. This screen is otherwise unused by the program and can be activated by simply switching your display. For those of you who don't have an 80-column display, the H command is still available.

Commands

The first command to learn is how to move a sprite. This is done by using either the cursor keys or a joystick in port 2. In the 128 version, the keypad may also be used. This moves the sprite by one pixel at a time. Because this could become tedious, the step value may be increased. Press S and enter the new value you wish to have sprites move by. You can also press I and directly enter x- and y-coordinates for the sprite. However, using this method, you cannot move the sprite beyond the first 255 positions onscreen; you must do this manually. (The 128 version, due to its sprite commands, doesn't have this limitation.)

To change the active sprite, press A. You'll be prompted to enter a number from 0 to 7 (1 to 8 in the 128 version), and that sprite will then be switched on. Due to its coordinates, definition, and/or color, this sprite may not be visible onscreen. Any sprite whose data line appears onscreen is activated, however.

If you wish to center all sprites, press the Up Arrow key. This will position all sprites onscreen at the original location of sprite 0.

Turn On, Fill, and Cycle

To turn on all sprites, press the Asterisk key. This will instantly turn on all eight sprites, which again may not be visible due to no definition, screen coordinates, or color.

If you want to fill a sprite, press F. This will turn the active sprite into a solid single-color box, making it visible.

Hit B to cycle through the available background colors. To cycle through the foreground colors, press C. *MOB Mover* will not allow these two colors to be the same. To change sprite color, press the space bar. This, too, will cycle through the available colors. To cycle through multicolors one and two, press < and > respectively. Sprite colors are not limited in any way by this program's parameters.

Chart, Poke, and Multicolor

To toggle the display chart on and off (and have full use of typing on the screen), press D. If the display chart is off, OFF will appear in the header. Otherwise, the position is empty.

If for some reason you need to poke to a location in direct mode, you can use the Back Arrow key. This will allow you to poke any number from 0-255 into any location from 1-65535. While values outside these boundaries are ignored, no other error checking is done, so use this command with caution.

Multicolor mode can be toggled by using the f1 key. Nothing noticeable will happen if you have filled the sprites in; however, it may have a very noticeable effect if you have your own sprite definitions in memory.

Use f3 and f5 to toggle x- and y-expansion, respectively. These affect only the active sprite, as does f1.

If your sprite definition lies at a page other than 192, you can use the P command to set the pointer to the location of your own definitions. To reset all sprite pointers to their default values, press Clr/Home.

Enter Text

To type onscreen, you can use the T command. This will allow you to type on the screen as necessary. If, however, you type over the display chart without first turning it off, your text will be damaged when the chart is updated. To exit this mode, press Shift-Return.

Turning sprites on and off is done by using the Plus and Minus keys. Note that when you switch to a sprite, it's automatically turned on.

Toggle sprite priority is achieved by pressing the Equal Sign. This allows you to determine whether the foreground or sprite has display priority. Thus, you can decide whether a sprite will appear on the plane in front of (default) or behind the text screen. Due to the limitations of the VIC-II, lower-numbered sprites always appear in front of higher-numbered sprites, regardless of priority.

When you want to exit the program, press E. You'll be asked whether you want the necessary commands to duplicate the screen you have just created to be sent to the screen or printer. Press P for a hardcopy or any other key for screen output. Remember to first turn on your printer before selecting this option. After the program finishes, it will exit to BASIC with your sprite definitions unaffected.

Hints and Tips

When all eight sprites are onscreen at once, chart updates can slow down the program's responsiveness. To avoid this, turn the display chart off except when needed. *MOB Mover* is relatively unaffected by fast loaders, RAM disks, ML monitors, extensions, and other similar memory-resident programs. However, to be safe, test *MOB Mover* with your favorite set of utilities before attempting anything important.

MOB MOVER 64

```
AS 0 CLR
KP 5 REM COPYRIGHT 1991 - COMP
    UTE PUBLICATIONS INTL LTD
    - ALL RIGHTS RESERVED
PJ 10 POKE53280,,:POKE53281,,:
    PRINT "{N}{WHT}{CLR}
    {10 DOWN}";:PRINTTAB(13)
    "{M}{RVS} MOB MOVER!
    {OFF}{G}
AE 20 FORX=1T01000:NEXT:V=5324
    8:B1=2040:B2=192:PRINT"
    {CLR}{N}";:GOSUB40
KA 30 GOSUB850:GOSUB90:GOSUB13
    30:GOTO30
CQ 40 C(1)=.:C(2)=1:FORX=.TO7:
    S(X)=.:FORY=1TO2:CO(X,Y)
    =V+(X*2+C(Y)):NEXTY,X
XH 50 SV=1:BC=.:CC=1:S(.)=1:AS
    =.:FORX=.TO7:POKE(B1+X),
    (B2+X):NEXT
MM 60 SP$=" {40 SPACES}":POKEV+
    21,1:POKEV+16,
HA 70 FORX=.TO7:ID$(X)=" ":NEX
    T
SQ 80 POKEV+21,1:POKEV+28,,:PO
    KEV+23,,:POKEV+29,,:RETU
    RN
SM 90 PRINT "{HOME}{RVS}MOB
    {SHIFT-SPACE}MOVER!{OFF}
    {2 DOWN}";:IFCO=1THENPRI
    NT"{2 UP}{10 SPACES}OFF"
    :RETURN
XB 110 PRINT:FORX=.TO7:IFAS=XT
    HENPRINT"{RVS}";
DF 120 IFS(X)=1THENPRINTID$(X)
    ;X;" ";STR$(PEEK(CO(X,1
    ))) /";STR$(PEEK(CO(X,
    2)));
BD 130 IFS(X)=1THENPRINT"{OFF}
    {5 SPACES}"
MM 135 PRINT"{OFF}";:NEXT:RETU
    RN
QS 140 BC=BC+1:IFBC=16THENBC=.
    FG 150 IFBC=CCTHENBC=BC+1
HP 160 POKE53280,BC:POKE53281,
    BC:RETURN
HF 170 CC=CC+1:IFCC=16THENCC=.
    PK 180 IFCC=BCTHENCC=CC+1
QE 190 POKE646,CC:RETURN
RE 200 MSG$="NEW STEP VALUE":G
    OSUB820:INPUTA$:SV=VAL(
```

PROGRAMS

```

A$):IFSV<=.THENS=1
SD 210 RETURN
EJ 220 MSG$="FILL SPRITE #"+ST
R$(AS)+": [Y/N]":GOSUB8
20:GOSUB870
JD 230 IFA$="Y"THEN250
MF 240 RETURN
BF 250 SP=(PEEK(B1+AS))*64:FOR
X=.TO63:POKESP+X,255:NE
XT:RETURN
KD 260 PRINT"{RVS} {OFF}{LEFT}
";GETA$:IFA$="{DOWN}"O
RA$="{UP}"ORA$="{RIGHT}
"ORA$="{LEFT}"THEN320
EB 270 IFA$="{HOME}"THENPRINT"
";PRINTA$;GOTO260
MC 280 IFA$=CHR$(13)THEN310
KP 290 IFA$=CHR$(141)THENPRINT
";RETURN
PD 300 PRINTA$;GOTO260
JF 310 PRINT" ";PRINTA$;GOTO
260
KM 320 PRINT "{LEFT}";PRINTA$
;GOTO260
JE 330 MSG$="CHANGE ACTIVE SPR
ITE'S POINTER TO":GOSUB
820:INPUTA$
RE 340 A=VAL(A$):IFA<=.THENRET
URN
ME 350 POKEB1+AS,A:RETURN
BP 360 MSG$="CHANGE TO SPRITE
{SPACE}# [0-7]":GOSUB82
0:GOSUB870:A=VAL(A$)
QD 370 IFA>7THENA=AS
AE 380 AS=A:S(AS)=1:POKEV+21,P
EEK(V+21)OR(2↑AS):RETUR
N
DG 390 MSG$="INPUT X COORDINA
TE":GOSUB820:INPUTI$:C1
=VAL(I$)
JE 391 IFC1<0ORC1>255THENRETUR
N
BJ 400 GOSUB850:MSG$="INPUT Y
{SPACE}COORDINATE":GOS
UB820:INPUTI$:C2=VAL(I$)
RF 410 IFC2<0ORC2>255THENRETUR
N
GG 420 POKECO(AS,1),C1:POKECO(
AS,2),C2:RETURN
SK 650 POKEV+21,PEEK(V+21)OR(2
↑AS):RETURN
AF 660 POKEV+21,PEEK(V+21)AND(
255-2↑AS):RETURN
SB 670 FORX=.TO7:POKEB1+X,B2+X
:RETURN
KR 680 MV=PEEK(CO(AS,1)):IFMV-
SV<0ANDXP(AS)=1THEN710
QK 690 IFMV-SV<0THENRETURN
QX 700 MV=MV-SV:POKE(CO(AS,1))
,MV:RETURN
FH 710 POKE(V+16),PEEK(V+16)AN
D(255-(2↑AS)):ID$(AS)="
":MV=(MV-SV)+255:XP(S)
=.
QJ 720 POKE(CO(AS,1)),MV:RETUR
N
FE 730 MV=PEEK(CO(AS,1)):IFMV+
SV>255ANDXP(AS)=.THEN76
0
EK 740 IFMV+SV>255THENRETURN
MQ 750 MV=MV+SV:POKE(CO(AS,1))
,MV:RETURN
ME 760 POKE(V+16),PEEK(V+16)OR
(2↑AS):MV=MV+SV:MV=MV-2
55:POKECO((AS,1)),MV:XP
(AS)=1
QP 770 ID$(AS)="*":RETURN
GE 780 MV=PEEK(CO(AS,2)):IFMV-
SV<0THENRETURN
AG 790 MV=MV-SV:POKE(CO(AS,2))
,MV:RETURN
GM 800 MV=PEEK(CO(AS,2)):IFMV+
SV>255THENRETURN
FH 810 MV=MV+SV:POKE(CO(AS,2))
,MV:RETURN
SK 820 PRINT"{HOME}";SP$;SP$;
SD 830 FORX=1TO40:PRINT"-";NE
XT
MH 840 PRINT"{HOME}";MSG$;:RET
URN
HB 850 PRINT"{HOME}";SP$;SP$;S
P$;SP$
RQ 860 PRINT"{HOME}";:RETURN
GH 870 POKE198,.:WAIT198,1:GET
A$:RETURN
PM 880 SC=(PEEK(V+39+AS)):SC=S
C+1:IFSC=256THENSC=.
MX 890 POKE((V+39)+AS),SC:RETU
RN
MF 900 IFMC(AS)=.THENMC(AS)=1:
POKEV+28,PEEK(V+28)OR(2
↑AS):RETURN
SK 910 IFMC(AS)=1THENMC(AS)=.:
POKEV+28,PEEK(V+28)AND(
255-2↑AS):RETURN
GX 920 IFXE(AS)=.THENXE(AS)=1:
POKEV+29,PEEK(V+29)OR(2
↑AS):RETURN
CA 930 IFXE(AS)=1THENXE(AS)=.:
POKEV+29,PEEK(V+29)AND(
255-2↑AS):RETURN
JF 940 IFYE(AS)=.THENYE(AS)=1:
POKEV+23,PEEK(V+23)OR(2
↑AS):RETURN
AG 950 IFYE(AS)=1THENYE(AS)=.:
POKEV+23,PEEK(V+23)AND(
255-2↑AS):RETURN
AK 960 IFPR(AS)=.THENPR(AS)=1:
POKEV+27,PEEK(V+27)OR(2
↑AS):RETURN
AH 965 IFPR(AS)=1THENPR(AS)=.:
POKEV+27,PEEK(V+27)AND(
255-2↑AS):RETURN
JH 970 IFCO=.THENCO=1:RETURN
QE 980 IFCO=1THENCO=.:RETURN
JC 990 FORX=.TO7:FORY=1TO2:POK
ECO(X,Y),.:NEXTY,X:RETU
RN
XD 1000 MC=PEEK(V+37):MC=MC+1:
IFMC>256THENMC=.
SQ 1010 POKEV+37,MC:RETURN
AS 1020 MC=PEEK(V+38):MC=MC+1:
IFMC>256THENMC=.
ES 1030 POKEV+38,MC:RETURN
DQ 1040 MSG$="LOCATION TO POKE
":GOSUB820:INPUTA$:LO=
VAL(A$)
HX 1050 IFLO<=.ORLO>65535THENR
ETURN
ES 1060 GOSUB850:MSG$="NUMBER
{SPACE}TO POKE":GOSUB8
20:INPUTA$:NU=VAL(A$)
XK 1070 IFNU<0ORNU>255THENRETU
RN
ED 1080 POKELO,NU:RETURN
EF 1090 IFAO=.THENAO=1:POKEV+2
1,255:FORX=.TO7:S(X)=1
:NEXT:RETURN
GJ 1100 IFAO=1THENAO=.:POKEV+2
1,.:FORX=.TO7:S(X)=0:N
EXT:PRINT"{CLR}":RETUR
N
EH 1110 FORX=.TO7:POKECO(X,1),
155:POKECO(X,2),130:NE
XT:RETURN
RP 1120 MSG$="SCREEN OR PRINTE
R?":GOSUB820:WAIT198,1
:GETA$
FA 1121 IFA$<>"P"THENS=1
DE 1122 OPEN4,(4-S),7
EC 1123 PV=PEEK(V+21):POKEV+21
,.:PRINT#4,"{CLR}LOCA
TION","POKE","OBJECTIVE
"
CM 1130 PRINT#4,V+21,PV,"TURNS
ON SPRITES
XJ 1140 FORX=.TO7:IFS(X)=.THEN
NEXT:GOTO1160
AH 1150 PRINT#4,B1+X,PEEK(B1+X
),"SPRITE"X"POINTER":N
EXT
FB 1160 FORX=.TO7:IFS(X)=.THEN
NEXT:GOTO1180
SE 1170 PRINT#4,(PEEK(B1+X))*6
4,"DATA","SPRITE"X"DAT
A":NEXT
RG 1180 IFSTHENPK$="{2 DOWN}PR
ESS ANY KEY TO CONTINU
E":PRINTPK$:GOSUB870
DG 1190 IFSTHENPRINT"{CLR}LOCA
TION","POKE","OBJECTIV
E
QQ 1200 FORX=.TO7:IFS(X)=.THEN
NEXT:GOTO1220
PB 1210 PRINT#4,(V+39+X),PEEK(
V+39+X),"SPRITE"X"COLO
R":NEXT
SC 1220 IFPEEK(V+28)THEN1250
DX 1230 PRINT#4,(V+28),PEEK(V+
28),"SET MULTICOLOR MO
DE
RC 1240 PRINT#4,(V+37),PEEK(V+
37),"MULTICOLOR 1"
PG 1245 PRINT#4,V+38,PEEK(V+38
),"MULTICOLOR 2
RX 1250 PRINT#4,V+29,PEEK(V+29
),"SPRITES X EXPAND
EC 1260 PRINT#4,V+23,PEEK(V+23
),"SPRITES Y EXPAND
FE 1270 IFSTHENPRINTPK$:GOSUB8
70
MD 1280 IFSTHENPRINT"{CLR}LOCA
TION","POKE","OBJECTIV

```


PROGRAMS

Be sure to save a copy of the program before exiting *MLX*.

Add Check loads and runs like a BASIC program. Provide the program name and make sure the disk with that file is in drive 8; then hit Return.

Add Check checks the disk and drive to make sure they're ready; then it reads the file and returns the starting address and the ending address plus 1. The number of bytes is then displayed. If you wish to check another program, just type RUN again and press Return.

ADD CHECK

```

0801:0B 08 0A 00 9E 32 30 36 2E
0809:32 00 00 00 00 A9 00 8D 66
0811:20 D0 8D 21 D0 8D B2 02 4D
0819:A9 93 20 D2 FF 20 D7 09 4D
0821:20 E5 09 A0 00 B9 52 0A 7B
0829:20 D2 FF C8 C0 0B D0 F5 54
0831:20 F3 09 20 73 09 A9 03 87
0839:A2 93 A0 0A 20 BD FF A9 D5
0841:0F A2 08 A0 0F 20 BA FF FA
0849:20 C0 FF AC 34 03 A2 00 57
0851:BD 96 0A 99 35 03 EE 34 88
0859:03 C8 E8 E0 05 D0 F1 CE 66
0861:34 03 AD FF FF FF FF FF 02
0869:FF FF 7B 11 E2 FF FF FF 91
0871:FF FF FF 7F 11 FF AF 11 72
0879:F2 FB FF FF 11 FF F1 FF 6E
0881:BC 11 FF B1 11 FF FF 11 E8
0889:FF B1 11 FF FF 10 B3 FF CF
0891:FF FB FF B1 11 FF FF 10 54
0899:B2 FB FF F6 FF FF FF F3 65
08A1:10 3B FF FF FF 3C FF 17 90
08A9:48 08 FF 66 F8 FF 08 00 1E
08B1:88 6A 66 81 9A 6F FF 7C 94
08B9:FF 76 81 9A 6F FF FF FF BC
08C1:7B FF 88 FF 58 08 FF 5C DF
08C9:01 88 80 81 9A 6F FF 17 4E
08D1:58 00 FF 8C FF 58 01 17 51
08D9:5C 00 FF 88 FF 5C 08 FF 22
08E1:8E 76 FF 8C FF 77 8E 7A 15
08E9:FF 88 FF 7A 81 4E 6F FF E7
08F1:81 F8 0C 9F FF FF 08 80 0D
08F9:88 6A 67 FF 02 20 C3 FF ED
0901:A9 0F 20 C3 FF A5 FB 8D 08
0909:BC 02 A5 FC 8D BD 02 A9 8F
0911:0D 20 D2 FF AD B2 02 C9 12
0919:FF F0 56 A0 00 B9 5D 0A E7
0921:20 D2 FF C8 C0 13 D0 F5 6E
0929:A6 FB A5 FC 20 CD BD A9 6F
0931:0D 20 D2 FF 20 D2 FF A0 19
0939:00 B9 70 0A 20 D2 FF C8 7D
0941:C0 11 D0 F5 A6 FD A5 FE E8
0949:20 CD BD A9 0D 20 D2 FF BF
0951:20 D2 FF A0 00 B9 81 0A 26
0959:20 D2 FF C8 C0 12 D0 F5 A2
0961:AD BB 02 AE BA 02 20 CD 50
0969:BD A9 0D 20 D2 FF 20 D2 12
0971:FF 60 A0 00 A9 00 8D 34 4C
0979:03 20 E4 FF C9 00 F0 F9 DB
0981:C9 14 F0 39 C9 0D F0 20 B3

```

```

0989:C9 7B B0 ED C9 20 90 E9 2E
0991:C9 22 F0 E5 C9 2C F0 E1 50
0999:AC 34 03 C0 14 F0 DA 20 B5
09A1:D2 FF 20 B4 09 4C 7A 09 E3
09A9:AC 34 03 C0 00 F0 CA 20 05
09B1:D2 FF 60 AC 34 03 99 35 1A
09B9:03 EE 34 03 60 AC 34 03 E0
09C1:C0 01 B0 03 4C 7A 09 20 39
09C9:D2 FF 38 AD 34 03 E9 01 A9
09D1:8D 34 03 4C 7A 09 A0 00 16
09D9:B9 06 0A 20 D2 FF C8 C0 76
09E1:4C D0 F5 60 A9 0D 20 D2 A7
09E9:FF 20 D2 FF A9 96 20 D2 19
09F1:FF 60 A9 0D 20 D2 FF 20 8E
09F9:D2 FF A9 9A 20 D2 FF A9 4A
0A01:3E 20 D2 FF 60 0D 41 44 94
0A09:44 2E 20 43 48 45 43 4B 2C
0A11:0D 43 4F 50 59 52 49 47 59
0A19:48 54 20 31 39 39 31 20 AE
0A21:43 4F 4D 50 55 54 45 0D EC
0A29:50 55 42 4C 49 43 41 54 F5
0A31:49 4F 4E 53 20 49 4E 54 D3
0A39:4C 20 4C 54 44 0D 41 4C 6F
0A41:4C 20 52 49 47 48 54 53 B9
0A49:20 52 45 53 45 52 56 45 45
0A51:44 46 49 4C 45 20 4E 41 8F
0A59:4D 45 20 3F 96 53 54 41 49
0A61:52 54 49 4E 47 20 41 44 43
0A69:44 52 45 53 53 20 9A 96 F8
0A71:45 4E 44 49 4E 47 20 41 E9
0A79:44 44 52 45 53 53 20 9A 22
0A81:96 4E 55 4D 42 45 52 20 DF
0A89:4F 46 20 42 59 54 45 53 F8
0A91:20 9A 49 2F 4F 2C 50 2C 70
0A99:52 00 00 00 00 00 00 00 D6

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Daniel Lightner, a frequent contributor, lives in Sidney, Montana. □

SONG MACHINE

Daniel Lightner

You don't have to know anything about musical theory in order to make music with this program and a 64. *Song Machine* is a program for designing sound and music or for entering music out of songbooks and playing it back. With the 64's three voices, you can enter chords as well, producing some rather sophisticated arrangements.

Song Machine is written in machine language. To enter it, use *MLX*, our machine language entry program. See "Typing Aids," found elsewhere in this section. When *MLX* prompts, respond with the following values.

Starting address: 0801

Ending address: 2277

Be sure to save a copy of the program before exiting *MLX*.

Making Music

When you're ready to use *Song Machine*, load and run it as you would a BASIC program. Two staves, a bass clef, and a treble clef will appear on the screen. Up the left side of the screen are the names of the notes that correspond to the various lines and spaces of the musical staves. These notes represent the range of pitch for each level of the staff.

On the right side of the screen is an area that is framed off from the rest of the staff. This is where you edit notes. At the top of this area, you will see a note with two little flags extending from its stem. This is a sixteenth note. Press the N key, and you can scroll through the whole range of nine notes, five rests, and the flat and sharp accidentals. Hold the Shift key down as you press N to scroll back through them. Now scroll back to the sixteenth note.

Below the staves you'll see a line indicating which of the 64's three voices you are editing and the instrument that the voice is set to emulate. Press O to toggle the voice on and off. Turn the voice on now.

Play a Note

Use the cursor key to move the note up and down the staff. Make sure the volume on your monitor is turned up; then press P to hear what the note sounds like. Move the note and try again. Now use the N and P keys to scroll through the notes while playing them. Notice the different time values for the different types of notes; these time values and pitch values are based on figures found in *Commodore 64 Programmer's Reference Guide*.

When you first run the program, you'll see the number 0 at the top left of the screen. This indicates the number of the note being edited. Using the Cursor Right key, move the note off the work area. The note now being edited is number 1. There are 999 places per voice reserved for notes, from 0-998.

Now, using the steps mentioned above, adjust the note and move it off the work area. Repeat this process several more times. Hold down the Shift key and press P. The notes will play up to the last one before the work area. Use the Cursor Left key to move back

a few notes and play them again. Press the space bar if you wish to abort playing. There are seven different instruments from which to select. Press the I key to change them.

To move to another voice, press V. Remember that you cannot hear a voice until you turn it on and that if another voice is still on, you'll hear it, too. The voices will play only up to the number of notes indicated for each voice.

Sharps and Flats

There is no time lapse when using the sharp and flat accidentals. If a sharp, for instance, is placed on any F line, then all the notes on any F line will become sharp. Should *Song Machine* encounter another sharp accidental on the F line, notes on these lines will be returned to normal. To return the F to sharp, another sharp accidental must then be entered. Flats toggle on and off the same way.

When played, rests are silent, but their values correspond with those of notes of the same length. For example, a quarter rest will hold for the same length of time as a quarter note. A half rest will hold for the same length as a half note, and so on.

Copy a Range

Music quite often is repetitive, using the same range of notes again and again. Rather than having to reenter repetitive passages manually, you can use *Song Machine's* special command for copying them. To enter the Copy mode, press the Shift key and the C key simultaneously. Below the staffs a prompt appears indicating that the computer is ready for input.

First, enter a V and then either a 1, 2, or 3 for the voice that you'll be copying from. Next, press the colon (:) followed by a number less than 999 to indicate the note where you'll begin copying. Then press the Minus key (-) followed by another number less than 999 to indicate the last note in the copy range. Now enter TOV and the number 1, 2, or 3 for the voice that you want the range to be copied to. Then type another colon followed by a number to indicate where you want the range to start. The press Return.

The following example is how a typical copy line might look.

The Song Machine notes, rests, and accidentals	
	Thirty-second note
	Sixteenth note
	Eighth note
	Dotted eighth note
	Quarter note
	Dotted quarter note
	Half note
	Dotted half note
	Whole note
	Whole rest
	Half rest
	Quarter rest
	Eighth rest
	Sixteenth rest
	Sharp
	Flat

V1:0-467TOV3:734

This example copies the range of notes 0-467 of voice 1 and places them in voice 3 starting at note 734.

To copy a range of notes within the same voice, you might have a line that looks something like the following.

V3:0-15TOV3:16

Type a \$ at any time to list the disk directory. Pause the listing by hitting any key. The Run/Stop key aborts a listing.

Hold Shift and press S or L to enter the Save or Load mode. Just give the desired filename and press Return. The program saves the same amount of memory each time whether it's used or not.

To clear the current voice, press Clr/Home. Press Shift-Clr/Home to clear all the voices. When you're ready to stop, press Shift-Q to quit the program.

COMMAND TABLE

N and Shift-N	Scroll through notes
V	Change voices
I	Change instruments
P	Play edit note
Shift-P	Play string of notes
O	Toggle voice on/off
Space bar	Abort Play mode
Shift-C	Copy mode
Shift-S	Save file
Shift-L	Load file
Clr/Home	Clear active voice
Shift-Clr/Home	Clear all voices
\$	Directory
Cursor Up/Down	Move notes up/down staff
Cursor Left/Right	Move note pointer left/right
V2:0-15TOV2:16	Copy format
Shift-Q	Quit

SONG MACHINE

```

0801:22 08 0A 00 9E 32 30 38 BB
0809:38 20 53 4F 4E 47 20 4D B9
0811:41 43 48 49 4E 45 20 31 29
0819:39 39 31 20 20 20 20 1E
0821:00 00 00 EA 19 00 80 AD 57
0829:24 08 8D B2 02 AD 25 08 43
0831:8D B3 02 AD 26 08 85 FD 6A
0839:AD 27 08 85 FE A9 8E 85 84
0841:FB A9 08 85 FC 18 A5 FB A2
0849:6D B2 02 8D B4 02 A5 FC CB
0851:6D B3 02 8D B5 02 A0 00 15
0859:B1 FB 91 FD 18 A5 FB 69 0C

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PROGRAMS

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0861:01 85 FB A5 FC 69 00 85 40
0869:FC 18 A5 FD 69 01 85 FD EA
0871:A5 FE 69 00 85 FE A5 FB B0
0879:CD B4 02 F0 03 4C 88 08 4F
0881:A5 FC CD B5 02 F0 03 4C DE
0889:59 08 6C 26 08 D8 AD 18 4F
0891:D0 29 F0 69 0C 8D 18 D0 A0
0899:78 A5 01 29 FB 85 01 A0 9A
08A1:00 B9 00 D0 99 00 30 B9 14
08A9:FF D0 99 FF 30 B9 FE D1 59
08B1:99 FE 31 B9 FD D2 99 FD 7C
08B9:32 B9 FC D3 99 FC 33 B9 0E
08C1:FB D4 99 FB 34 B9 FA D5 4C
08C9:99 FA 35 B9 F9 D6 99 F9 FF
08D1:36 C0 FF F0 04 C8 4C 14 2C
08D9:80 A5 01 09 04 85 01 58 D4
08E1:A9 80 85 FB A9 32 85 FC 75
08E9:A0 00 B9 2D 95 91 FB C8 08
08F1:C0 48 D0 F6 A9 00 8D E5 4C
08F9:03 A9 00 8D 21 D0 8D 20 56
0901:D0 AD 14 03 8D 11 03 AD F9
0909:15 03 8D 12 03 78 A9 23 A9
0911:8D 14 03 A9 84 8D 15 03 71
0919:58 20 49 83 A9 00 8D BF E8
0921:02 8D C0 02 8D C1 02 8D D4
0929:B7 02 8D B8 02 8D F3 03 06
0931:A0 00 A9 00 99 21 4E C8 7F
0939:C0 06 D0 F6 A0 00 A9 00 0F
0941:99 00 D4 C8 C0 19 D0 F6 4A
0949:20 20 8F A0 00 A9 C0 99 31
0951:F8 07 C8 C0 08 D0 F6 A0 D8
0959:00 A9 07 99 27 D0 C8 C0 1F
0961:08 D0 F6 A0 00 A9 46 99 61
0969:01 D0 C8 C8 C0 10 D0 F5 B3
0971:A0 00 A2 00 BD D5 95 99 32
0979:00 D0 C8 C8 E8 E0 09 D0 13
0981:F3 A0 00 B9 DE 95 99 A7 79
0989:02 C8 C0 C0 D0 F5 A9 01 5A
0991:8D C2 02 8D C3 02 A9 02 5F
0999:8D C4 02 A9 03 8D C5 02 5A
09A1:20 DD 8E 20 66 83 20 39 C9
09A9:8F A9 0D 20 D2 FF 20 D2 3B
09B1:FF 20 D2 FF A0 00 B9 ED 8C
09B9:94 20 D2 FF C8 C0 40 D0 13
09C1:F5 A0 00 20 A0 84 20 E4 35
09C9:FF A9 1D F0 5F C9 9D F0 4F
09D1:5E C9 11 F0 60 C9 91 F0 F4
09D9:59 C9 4E F0 5B C9 CE F0 74
09E1:5A C9 56 F0 5C C9 49 F0 FA
09E9:5B C9 4F F0 39 C9 50 F0 97
09F1:56 C9 D0 F0 49 C9 C3 F0 B4
09F9:54 C9 13 F0 1D C9 93 F0 42
0A01:1F C9 D3 F0 0F C9 CC F0 CA
0A09:0E C9 24 F0 46 C9 D1 F0 18
0A11:18 4C 39 81 4C 66 82 4C D0
0A19:8F 82 20 05 83 4C 36 81 25
0A21:20 49 83 4C 36 81 4C F7 15
0A29:89 4C E2 FC 4C 87 88 4C 1F
0A31:25 89 4C C9 89 4C CF 89 07
0A39:4C 0B 8B 4C B2 8A 4C C3 88
0A41:8C 4C 9A 8A 4C 47 8A 20 5F
0A49:69 8B 4C 36 81 20 2D 8F 58
0A51:4C 36 81 20 CC FF A5 CB C8
0A59:C9 49 D0 FA A9 00 8D 15 A9
0A61:D0 A0 01 8D F3 03 A9 93 D3
0A69:20 D2 FF A9 01 A2 08 A0 20
0A71:00 20 BA FF A9 24 8D 35 13
0A79:03 A9 01 A2 35 A0 03 20 16
0A81:BD FF 20 C0 FF A2 01 20 31
0A89:C6 FF 20 60 82 20 52 82 C6
0A91:F0 37 A5 CB C9 40 F0 13 A1
0A99:A5 CB C9 3F F0 2B A5 CB EB
0AA1:A8 C4 CB F0 FC A5 CB C9 A3
0AA9:40 F0 FA A9 0D 20 D2 FF A2
0AB1:20 E4 FF AA 20 E4 FF 20 6E
0AB9:23 87 A9 20 20 D2 FF 20 E4
0AC1:E4 FF F0 C9 20 D2 FF D0 20
0AC9:F6 A9 01 20 C3 FF 20 CC 11
0AD1:FF A5 CB C9 40 F0 FA A9 CA
0AD9:00 8D F3 03 4C 16 81 20 DD
0AE1:E4 FF 85 FB 20 E4 FF 05 72
0AE9:FB 60 20 60 82 20 E4 FF 7C
0AF1:4C E4 FF 20 39 8F A0 00 B0
0AF9:B9 E7 94 20 D2 FF C8 C0 62
0B01:06 D0 F5 20 60 8F 20 52 E2
0B09:8F A0 00 B9 C6 02 99 21 3D
0B11:4E C8 C0 06 D0 F5 20 C0 58
0B19:82 4C E3 82 20 39 8F A0 CD
0B21:00 B9 E1 94 20 D2 FF C8 40
0B29:C0 06 D0 F5 20 60 8F 20 5C
0B31:52 8F 20 C0 82 20 FC 82 75
0B39:A0 00 B9 21 4E 99 C6 02 51
0B41:C8 C0 06 D0 F5 A9 00 8D 9D
0B49:F3 03 4C 36 81 20 CC FF 2D
0B51:A9 00 8D 15 D0 85 9D A9 C0
0B59:00 A2 08 A0 01 20 BA FF 21
0B61:AD 34 03 A2 35 A0 03 20 38
0B69:BD FF A9 01 8D F3 03 60 46
0B71:A9 B0 85 FB A9 36 85 FC 27
0B79:A9 FB A2 29 A0 4E 20 D8 A1
0B81:FF A9 00 8D F3 03 4C 36 55
0B89:81 A9 00 A2 FF A0 FF 4C C3
0B91:D5 FF A0 00 AE C2 02 CA F5
0B99:8D 99 95 85 FB BD 9C 95 A5
0BA1:85 FC A9 19 91 FB 18 A5 D2
0BA9:FB 69 01 85 FB A5 FC 69 6A
0BB1:00 85 FC A5 FB DD 9F 95 4F
0BB9:F0 03 4C 15 83 A5 FC DD 6E
0BC1:A2 95 D0 DE BD A5 95 85 CB
0BC9:FB BD A8 95 85 FC A9 00 2F
0BD1:91 FB C8 91 FB 60 AD C2 61
0BD9:02 48 A9 01 8D C2 02 20 E3
0BE1:05 83 EE C2 02 05 83 83 83
0BE9:EE C2 02 02 05 83 68 8D FE
0BF1:C2 02 60 20 12 84 A9 1F 0D
0BF9:20 D2 FF A9 0D 20 D2 FF 0D
0C01:20 D2 FF 20 D2 FF 20 FE B5
0C09:83 A9 0D 20 D2 FF 20 FE C6
0C11:83 A0 00 A9 BE 85 FB A9 5B
0C19:04 85 FC 85 FE A9 C1 85 34
0C21:FD A9 78 85 30 A9 04 85 BF
0C29:31 A9 78 85 32 A9 D8 85 1B
0C31:33 A2 00 BD FC 93 91 FB BC
0C39:BD 09 94 91 FD BD 82 95 9F
0C41:91 30 A9 A0 91 32 C8 BD A8
0C49:75 95 91 30 A9 0E 91 32 91
0C51:88 18 A5 FB 69 28 85 FB 1B
0C59:A5 FC 69 00 85 FC 18 A5 A6
0C61:FD 69 28 85 FD A5 FE 69 1E
0C69:00 85 FE 18 A5 30 6B FF 09
0C71:FF FF FF FF C2 FF FF FF 9F
0C79:63 FF FF C3 FF FF FF FF 9F
0C81:FF C2 FF FF FF FF FF FB 46
0C89:AF F3 FF FF FF FF FF 6D
0C91:90 81 60 6F FF FF FF 0A
0C99:FF FF 98 FF F1 A6 90 88 98
0CAL:9B FF 88 81 FF EB FF 27 87
0CA9:FF C1 01 02 FF FF 1D 22 0B
0CB1:57 FF FF 7F FF FF 22 2D 1B
0CB9:03 FF 77 CA FF 22 2E A2 76
0CC1:AE 77 00 FF 22 2E A2 66 84
0CC9:77 40 FF 22 2E A2 FF 31 FC
0CD1:70 16 FF F0 52 A5 13 31 37
0CD9:FF 16 FF 22 52 A5 16 77 66
0CE1:CA FF 22 2F FF 31 42 57 37
0CE9:CA FF 22 2F FF 36 77 00 66
0CF1:FF 22 2F 06 26 CA 8E D8 2B
0CF9:02 E0 00 F0 1E AE D9 02 BB
0D01:E0 00 F0 20 CA 8E D9 02 F1
0D09:E0 00 F0 18 AE EF 02 6C D8
0D11:11 03 AE D4 02 8E 04 D4 BE
0D19:4C 61 84 AE D5 02 8E 0B 0C
0D21:D4 4C 70 84 AE D6 02 8E 72
0D29:12 D4 4C 7F 84 20 B8 84 9D
0D31:20 5E 85 A9 00 8D F1 02 5A
0D39:20 B9 85 20 32 85 20 D8 45
0D41:86 20 6B 87 60 AD C2 02 CD
0D49:C9 01 F0 29 C9 02 F0 4A BB
0D51:AD CA 02 8D C0 02 AD CB A3
0D59:02 8D CD 02 AD AF 02 8D 6F
0D61:B3 02 AD B0 02 8D B4 02 48
0D69:AD B1 02 8D B5 02 AD B2 A3
0D71:02 8D B6 02 60 AD C6 02 30
0D79:8D CC 02 AD C7 02 8D CD D7
0D81:02 AD A7 02 8D B3 02 AD 0A
0D89:A8 02 8D B4 02 AD A9 02 91
0D91:8D B5 02 AD AA 02 8D B6 2A
0D99:02 60 AD C8 02 8D CC 02 F0
0DA1:AD C9 02 8D CD 02 AD AB 9B
0DA9:02 8D B3 02 AD AC 02 8D 70
0DB1:B4 02 AD AD 02 8D B5 02 EA
0DB9:AD AE 02 8D B6 02 60 AD 9B
0DC1:C2 02 C9 01 F0 0E C9 02 5C
0DC9:F0 14 AD C1 02 C9 01 F0 5D
0DD1:17 4C 15 87 AD BF 02 C9 0F
0DD9:01 F0 0D 4C 15 87 AD C0 F9
0DE1:02 C9 01 F0 03 4C 15 87 99
0DE9:4C 07 87 A9 10 85 D6 A9 65
0DF1:00 85 D3 20 6C E5 20 FA 20
0DF9:86 A9 10 85 D6 A9 00 85 FE
0E01:D3 20 6C E5 A0 00 B9 94 08
0E09:93 20 D2 FF C8 C0 06 D0 77
0E11:F5 AD C2 02 C9 01 F0 12 52
0E19:C9 02 F0 1C A0 00 B9 EC DF
0E21:93 20 D2 FF C8 C0 07 D0 91
0E29:F5 60 A0 00 B9 E2 93 20 0D
0E31:D2 FF C8 C0 05 D0 F5 60 93
0E39:A0 00 B9 E7 93 20 D2 FF 1E
0E41:C8 C0 05 D0 F5 60 AD C2 EE
0E49:02 C9 01 F0 0A C9 02 F0 74
0E51:0C AD C5 02 4C D3 85 AD 22
0E59:C3 02 4C D3 85 AD C4 02 0D
0E61:C9 01 F0 18 C9 02 F0 27 A1
0E69:C9 03 F0 36 C9 04 F0 45 32
0E71:C9 05 F0 54 C9 06 F0 63 C2
0E79:C9 07 F0 72 A9 AE 85 30 C4
0E81:A9 93 85 31 A9 16 85 32 FD
0E89:A9 94 85 33 4C 71 86 A9 62
0E91:A7 85 30 A9 93 85 31 A9 42
0E99:1C 85 32 A9 94 85 33 4C 73
0EAL:71 86 A9 9A 85 30 A9 93 CA
0EA9:85 31 A9 22 85 32 A9 94 09
0EB1:85 33 4C 71 86 A9 B5 85 C9
0EB9:30 A9 93 85 31 A9 28 85 29
0ECL:32 A9 94 85 33 4C 71 86 80
0EC9:A9 C0 85 30 A9 93 85 31 76
0ED1:A9 2E 85 32 A9 94 85 33 FF
0ED9:4C 71 86 A9 CB 85 30 A9 62
0EE1:93 85 31 A9 34 85 32 A9 AF
0EE9:94 85 33 4C 71 86 A9 D4 AA

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0EF1:85 30 A9 93 85 31 A9 3A C9	1121:F0 60 AD CB 02 C9 03 F0 74	1351:02 85 FB AD B2 02 6D CD 7A
0EF9:85 32 A9 94 85 33 20 9A B7	1129:03 4C B1 88 AD CA 02 C9 05	1359:02 85 FC 4C F6 8A 18 AD 06
0F01:86 A0 00 B1 32 91 FB C8 3E	1131:E7 90 0B A9 00 8D CB 02 37	1361:A9 02 6D CC 02 85 FB AD 23
0F09:C0 05 D0 F7 B1 32 A0 00 F9	1139:8D CA 02 4C 36 81 18 AD 6F	1369:AA 02 6D CD 02 85 FC 4C 5C
0F11:91 FD AD F1 02 C9 01 F0 76	1141:CA 02 69 01 8D CA 02 AD CF	1371:F6 8A 18 AD AD 02 6D CC B0
0F19:0D B1 30 C9 2A F0 07 20 10	1149:CB 02 69 00 8D CB 02 4C EA	1379:02 85 FB AD AE 02 6D CD 82
0F21:D2 FF C8 4C 8C 86 60 AD 73	1151:36 81 AD C7 02 C9 03 F0 4F	1381:02 85 FC A0 00 B1 FB C9 3C
0F29:C2 02 C9 02 F0 15 C9 03 F4	1159:03 4C E1 88 AD C6 02 C9 2B	1389:00 F0 08 38 B1 FB E9 01 C2
0F31:F0 22 A9 02 85 FB A9 D4 E9	1161:E7 90 0B A9 00 8D C6 02 5D	1391:4C 61 8B A9 0F 4C 61 8B 3A
0F39:85 FC A9 D4 85 FD A9 02 55	1169:8D C7 02 4C 36 81 18 AD DE	1399:AD C2 02 C9 01 F0 18 C9 E9
0F41:85 FE 60 A9 09 85 FB A9 88	1171:C6 02 69 01 8D C6 02 AD ED	13A1:02 F0 28 18 AD B1 02 6D 31
0F49:D4 85 FC A9 D5 85 FD A9 D7	1179:C7 02 69 00 8D C7 02 4C 09	13A9:CC 02 85 FB AD B2 02 6D D0
0F51:02 85 FE 60 A9 10 85 FB 4C	1181:36 81 AD C9 02 C9 03 F0 9F	13B1:CD 02 85 FC 4C 4F 8B 18 8E
0F59:A9 D4 85 FC A9 D6 85 FD B3	1189:03 4C 11 89 AD C8 02 C9 59	13B9:AD A9 02 6D CC 02 85 FB AD
0F61:A9 02 85 FE 60 A9 02 85 A8	1191:E7 90 0B A9 00 8D C8 02 91	13C1:AD AA 02 6D CD 02 85 FC FE
0F69:D6 A9 00 85 D3 20 6C E5 93	1199:8D C9 02 4C 36 81 18 AD 8F	13C9:4C 4F 8B 18 AD AD 02 6D 72
0F71:20 FA 86 A9 02 85 D6 A9 47	11A1:C8 02 69 01 8D C8 02 AD 27	13D1:CC 02 85 FB AD AE 02 6D E8
0F79:00 85 D3 20 6C E5 AE CC 9A	11A9:C9 02 69 00 8D C9 02 4C 42	13D9:CD 02 85 FC A0 00 B1 FB 4C
0F81:02 AD CD 02 4C 23 87 A0 84	11B1:36 81 20 3E 88 AD C2 02 B9	13E1:C9 0F F0 08 18 B1 FB 69 38
0F89:00 A9 20 20 D2 FF C8 C0 01	11B9:C9 01 F0 36 C9 02 F0 64 1F	13E9:01 4C 61 8B A9 00 91 FB F4
0F91:20 D0 F6 60 A0 00 B9 F3 45	11C1:AD CB 02 C9 00 F0 03 4C A0	13F1:8D B8 02 4C 36 81 18 AD A7
0F99:93 20 D2 FF C8 C0 04 D0 06	11C9:51 89 AD CA 02 C9 01 B0 43	13F9:B5 02 6D CC 02 85 FB AD C1
0FA1:F5 60 A0 00 B9 F7 93 20 DB	11D1:0D A9 03 8D CB 02 A9 E7 BF	1401:B6 02 6D CD 02 85 FC 18 C7
0FA9:D2 FF C8 C0 05 D0 F5 60 0E	11D9:8D CA 02 4C 36 81 38 AD 50	1409:AD B3 02 6D CC 02 85 FD 83
0FB1:8E E3 03 8E E2 03 A2 09 4A	11E1:CA 02 E9 01 8D CA 02 AD 80	1411:AD B4 02 6D CD 02 85 FE D4
0FB9:8E E4 03 A0 B0 AD E2 03 C7	11E9:CB 02 E9 00 8D CB 02 4C 9B	1419:A0 00 AD C2 02 C9 01 F0 9D
0FC1:DD 8E 95 AD E3 03 FD 8F B6	11F1:36 81 AD C7 02 C9 00 F0 E9	1421:40 C9 02 F0 24 AD C1 02 88
0FC9:95 90 0F 8D E3 03 AD E2 FA	11F9:03 4C 83 89 AD C6 02 C9 10	1429:C9 01 D0 25 AD D9 02 C9 85
0FD1:03 FD 8E 95 8D E2 03 C8 E2	1201:01 B0 0D A9 03 8D C7 02 ED	1431:01 B0 19 A0 00 A2 00 B9 77
0FD9:D0 E3 98 CA F0 11 C9 B0 29	1209:A9 E7 8D C6 02 4C 36 81 49	1439:AB 95 95 30 E8 C8 C0 08 46
0FE1:F0 03 8D E4 03 2C E4 03 CE	1211:38 AD C6 02 E9 01 8D C6 EA	1441:F0 10 C0 0E D0 F1 4C 19 DE
0FE9:30 05 AD E5 03 F0 05 29 84	1219:02 AD C7 02 E9 00 8D C7 F4	1449:8C 4C F8 8B A9 01 8D F0 FF
0FF1:7F 20 D2 FF CA 10 C4 60 B2	1221:02 4C 36 81 AD C9 02 C9 9A	1451:02 60 A2 10 4C B5 8B A2 DA
0FF9:AD CD 02 C9 00 D0 0A AD 44	1229:00 F0 03 4C B5 89 AD C8 A6	1459:10 4C F1 8B A2 10 4C 15 96
1001:CC 02 C9 07 B0 03 4C 7E 5A	1231:02 C9 01 B0 0D A9 03 8D 96	1461:8C AD BF 02 C9 01 D0 E9 31
1009:87 A9 07 8D CE 02 AC CE B7	1239:C9 02 A9 E7 8D C8 02 4C 56	1469:AD D7 02 C9 01 B0 DD A0 62
1011:02 B9 4F 93 8D 15 D0 18 3E	1241:36 81 38 AD C8 02 E9 01 E5	1471:00 A2 00 B9 B9 95 95 30 5D
1019:AD B5 02 6D CC 02 85 FB 0A	1249:8D C8 02 4C C9 02 E9 00 AB	1479:E8 C8 C0 08 F0 D9 C0 0E 5F
1021:AD B6 02 6D CD 02 85 FC 5B	1251:8D C9 02 4C 36 81 20 3E E9	1481:D0 F1 4C 19 8C AD C0 02 48
1029:38 A5 FB ED CE 02 85 FB B2	1259:88 4C D5 89 20 3E 88 4C 7F	1489:C9 01 D0 C5 AD D8 02 C9 EB
1031:A5 FC E9 00 85 FC 18 A9 9A	1261:E6 89 B1 FB C9 01 90 08 CC	1491:01 B0 B9 A0 00 A2 00 B9 EB
1039:D0 85 27 18 AD B3 02 6D 37	1269:38 E9 01 91 FB 8D B7 02 E4	1499:C7 95 95 30 E8 C8 C0 08 B4
1041:CC 02 85 FD AD B4 02 6D 8A	1271:4C 36 81 B1 FB C9 16 F0 B8	14A1:F0 9A C0 0E D0 F1 A0 00 79
1049:CD 02 85 FE 38 A5 FD ED B3	1279:F7 18 69 01 91 FB 8D B7 2C	14A9:B1 FD AA BD CA 94 A8 B1 07
1051:CE 02 85 FD A5 FE E9 00 E6	1281:02 4C 36 81 AD C2 02 C9 DE	14B1:30 C9 01 F0 28 B1 32 C9 C9
1059:85 FE 38 A9 FF ED CE 02 F4	1289:01 F0 1B C9 02 F0 2E AD 48	14B9:01 F0 31 A0 00 BD 40 94 DA
1061:85 30 A9 07 E9 00 85 31 81	1291:C1 02 C9 01 F0 08 A9 01 5C	14C1:91 34 BD 57 94 91 36 B1 F5
1069:AC CE 02 A2 00 A1 FB C9 46	1299:8D C1 02 4C 36 81 A9 00 05	14C9:FB AA C9 09 0B 2D BD 36 50
1071:19 F0 48 18 69 80 81 30 65	12A1:8D C1 02 4C 36 81 AD BF D4	14D1:93 A0 00 91 40 18 B1 42 0D
1079:18 A5 FB 69 01 85 FB A5 E0	12A9:02 C9 01 F0 08 A9 01 8D E6	14D9:69 01 91 44 60 A0 00 BD B0
1081:FC 69 00 85 FC 18 A5 30 96	12B1:BF 02 4C 36 81 A9 00 8D 63	14E1:6E 94 91 34 BD 85 94 91 9A
1089:69 01 85 30 A5 31 69 00 17	12B9:BF 02 4C 36 81 AD C0 02 71	14E9:36 4C 9A 8C A0 00 BD 9C 6D
1091:85 31 B9 57 93 85 26 A1 0E	12C1:C9 01 F0 08 A9 01 8D C0 D6	14F1:94 91 34 BD B3 94 91 36 74
1099:FD C9 19 F0 26 AA 18 A5 0F	12C9:02 4C 36 81 A9 00 8D C0 0A	14F9:4C 3A 8C 8A 48 A9 00 F1 8B
10A1:FD 69 01 85 FD A5 FE 69 81	12D1:02 4C 36 81 AD C2 02 C9 2F	1501:34 91 36 F1 FB C9 0E F0 9F
10A9:00 85 FE 0D 5F 93 A2 00 75	12D9:01 F0 1C C9 02 F0 30 18 27	1509:09 C9 0F B0 24 68 AA 4C 7F
10B1:81 26 C0 01 90 04 88 4C 36	12E1:AD C5 02 69 01 8D C5 02 F0	1511:41 8C B1 FD AA BD CA 94 8B
10B9:DE 87 60 AD B8 02 81 FB DE	12E9:C9 08 F0 03 4C 36 81 A9 2B	1519:A8 B1 30 C9 01 F0 0B A9 32
10C1:4C E6 87 AD B7 02 81 FD 54	12F1:01 8D C5 02 4C 36 81 18 29	1521:01 91 30 A9 00 91 30 4C C7
10C9:4C 10 88 AD C2 02 C9 01 B2	12F9:AD C3 02 69 01 8D C3 02 84	1529:80 8C A9 00 91 30 4C 80 52
10D1:F0 18 C9 02 F0 28 18 AD CF	1301:C9 08 F0 03 4C 36 81 A9 44	1531:8C B1 FD AA BD CA 94 A8 63
10D9:AF 02 6D CC 02 85 FB AD 98	1309:01 8D C3 02 4C 36 81 18 02	1539:B1 32 C9 01 F0 0B A9 01 1A
10E1:B0 02 6D CD 02 85 FC 4C D1	1311:AD C4 02 69 01 8D C4 02 DF	1541:91 32 A9 00 91 30 4C 80 5C
10E9:82 88 18 AD A7 02 6D CC 38	1319:C9 08 F0 03 4C 36 81 A9 5C	1549:8C A9 00 91 32 4C 80 8C 8D
10F1:02 85 FC AD A8 02 6D CD C4	1321:01 8D C4 02 4C 36 81 18 3A	1551:AD B3 02 8D DA 02 AD B4 47
10F9:02 85 FC 4C 82 88 18 AD F4	1329:AD C2 02 69 01 8D C2 02 73	1559:02 8D DB 02 AD B5 02 8D 59
1101:AB 02 6D CC 02 85 FB AD BF	1331:C9 04 F0 03 4C 36 81 A9 73	1561:DE 02 AD B6 02 8D DF 02 A4
1109:AC 02 6D CD 02 85 FC A0 4D	1339:01 8D C2 02 4C 36 81 AD A7	1569:AD C2 02 8D E0 02 AD CC 6B
1111:00 A2 00 60 20 3E 88 AD 9A	1341:C2 02 C9 01 F0 18 C9 02 10	1571:02 8D E1 02 AD CD 02 8D 92
1119:C2 02 C9 01 F0 34 C9 02 54	1349:F0 28 18 AD B1 02 6D CC 0D	1579:E2 02 20 8F A9 00 A0 5F

PROGRAMS

```

1581:00 99 E3 02 C8 C0 09 D0 DA 17B1:00 99 4C 03 C8 C0 2A D0 6E 19E1:91 8E 86 FF A2 A2 A2 D8
1589:F8 A9 00 8D F0 02 AD E3 42 17B9:F6 60 20 39 8F 20 60 8F 60 19E9:A3 FF FF 73 FF FF 3A 32 CB
1591:02 CD C6 02 F0 06 20 29 32 17C1:20 99 90 4C 52 8F A9 13 74 19F1:FF FF A2 AB FF FF FF 33
1599:8E 4C 25 8D AD E4 02 CD 6E 17C9:85 D6 A9 00 85 D3 20 6C CD 19F9:FF FF 26 FF 22 FF FF 02
15A1:C7 02 F0 06 20 29 8E 4C BD 17D1:E5 20 FA 86 A9 13 85 D6 3E 1A01:FF FF 22 FF FF 0F 71 73 0C
15A9:25 8D A9 01 8D E9 02 4C 73 17D9:A9 00 85 D3 4C 6C E5 A9 54 1A09:FF FF B2 FF AF FF A3 73 CB
15B1:3D 8D AD F0 02 C9 01 F0 CC 17E1:13 85 D6 A9 00 85 D3 20 4E 1A11:FF FF B3 C4 F8 FF FF 40 10
15B9:11 18 AD E3 02 69 01 8D AB 17E9:6C E5 4C FA 86 20 E4 FF 7F 1A19:F0 88 FF 44 F0 4E 91 17 27
15C1:E3 02 AD E4 02 69 00 8D A5 17F1:A0 00 A9 3E 20 D2 FF A9 7F 1A21:0D 08 FF FF 05 17 FF 08 6A
15C9:E4 02 A9 00 8D F0 02 AD FD 17F9:9A 20 D2 FF A9 00 8D 34 74 1A29:FF FF 05 17 FF 08 FF DF 6F
15D1:E5 02 CD C8 02 F0 06 20 B5 1801:03 20 E4 FF C9 00 F0 F9 81 1A31:05 17 18 08 FF FF 0C 97 E0
15D9:65 8E 4C 66 8D AD E6 02 3D 1809:C9 14 F0 40 C9 7B B0 F1 D4 1A39:91 FF 17 1C 08 FF FF 05 20
15E1:CD C9 02 F0 06 20 65 8E BE 1811:C9 11 F0 ED C9 13 F0 E9 CD 1A41:17 8F 08 FF FF 05 17 1F 47
15E9:4C 66 8D A9 01 8D EA 02 36 1819:C9 1D F0 E5 C9 22 F0 E1 8C 1A49:08 FF DF 05 17 19 08 FF FA
15F1:4C 7E 8D AD F0 02 C9 01 92 1821:C9 2C F0 DD C9 0D F0 10 B1 1A51:FF FC 97 91 FF 17 0F 08 17
15F9:F0 11 18 AD E5 02 69 01 C9 1829:AC 34 03 C0 14 F0 D2 20 53 1A59:FF FF 05 17 C8 08 FF FF 06
1601:8D E5 02 AD E6 02 69 00 9A 1831:D2 FF 20 B5 8F 4C 74 8F 50 1A61:05 17 CC 08 FF DF 05 17 98
1609:8D E6 02 A9 00 8D F0 02 AA 1839:AC 34 03 C0 00 F0 C2 4C CE 1A69:48 08 FF FF 04 81 FF FF E9
1611:AD E7 02 CD CA 02 F0 06 71 1841:D2 FF AC 34 03 99 35 03 9F 1A71:FF 16 F1 18 FF 16 E9 04 1B
1619:20 A1 8E 4C A7 8D AD E8 0C 1849:EE 34 03 60 AC 34 03 C0 61 1A79:B6 FD 08 FF 75 16 ED 04 6D
1621:02 CD CB 02 F0 06 20 A1 DC 1851:01 B0 03 4C 74 8F 20 D2 48 1A81:B6 69 08 FF FF FF 16 FF 98
1629:8E 4C A7 8D A9 01 8D EB D5 1859:FF 38 AD 34 03 E9 01 8D DF 1A89:04 B6 FD 08 FF 77 16 FF B7
1631:02 4C BF 8D AD F0 02 C9 41 1861:34 03 4C 74 8F 4C 20 93 BE 1A91:04 B6 69 08 FF 7B 88 81 A3
1639:01 F0 11 18 AD E7 02 69 40 1869:AD 7E 03 C9 01 F0 09 C9 B4 1A99:FF FF 05 FF EF 0C FF FF 1E
1641:01 8D E7 02 AD E8 02 69 EC 1871:02 F0 14 C9 03 F0 4F 60 D8 1AA1:FF 05 F0 F9 9F 55 FF 91 B8
1649:00 8D E8 02 AD E9 02 C9 F8 1879:A9 00 8D F6 02 AD 7F 03 68 1AA9:1F FF 0C FF FF 04 81 FF 02
1651:01 F0 0A 20 F2 8D C9 0D EB 1881:38 E9 30 8D F5 02 60 AD 4D 1AB1:FF FF 16 F0 68 FF 16 E9 11
1659:F0 2F 4C FC 8C AD EA 02 16 1889:7F 03 38 E9 30 A8 A9 00 57 1AB9:04 B6 FD 08 FF C1 16 ED FE
1661:C9 01 F0 0A 20 F2 8D C9 23 1891:8D F6 02 8D F5 02 C0 00 98 1AC1:04 B6 69 08 FF 0C FF 16 9C
1669:0D F0 1E 4C 3D 8D AD EB 48 1899:F0 16 18 AD F5 02 69 0A 3A 1AC9:FF 04 B6 FD 08 FF 41 16 8E
1671:02 C9 01 F0 14 20 F2 8D D4 18A1:8D F5 02 AD F6 02 69 00 C3 1AD1:FF 04 B6 69 08 FF 45 80 BF
1679:C9 0D F0 0D 4C 7E 8D A5 D9 18A9:8D F6 02 88 C0 00 D0 EA B9 1AD9:00 B9 89 03 99 7F 03 C8 77
1681:CB C9 3C F0 01 6E 0A 9D 86 18B1:AD 80 03 38 E9 30 18 6D 6A 1AEL:CC 88 03 D0 F4 AD 88 03 7E
1689:60 AD DA 02 8D B3 02 AD B9 18B9:F5 02 8D F5 02 AD F6 02 2D 1AE9:8D 7E 03 20 D8 8F C9 0D 8C
1691:DB 02 8D B4 02 AD DC 02 AB 18C1:69 00 8D F6 02 60 AD 7F 34 1AF1:F0 4F 18 AD 7A 03 6D F5 01
1699:8D B5 02 AD DF 02 8D B6 ED 18C9:03 38 E9 30 A8 A9 00 8D 43 1AF9:02 85 34 AD 7B 03 6D F6 AB
16A1:02 AD E0 02 8D C2 02 AD 9F 18D1:F5 02 8D F6 02 C0 00 F0 A2 1B01:02 85 35 18 AD 7C 03 6D 94
16A9:E1 02 8D CC 02 AD E2 02 54 18D9:16 18 AD F5 02 69 64 8D 3C 1B09:F5 02 85 36 AD 7D 03 6D A5
16B1:8D CD 02 4C 36 81 AD A7 D7 18E1:F5 02 AD F6 02 69 00 8D F5 1B11:F6 02 85 37 18 AD 7A 03 6D
16B9:02 8D B3 02 AD A8 02 8D 82 18E9:F6 02 88 C0 00 D0 EA AD F9 1B19:69 E7 8D 7A 03 AD 7B 03 20
16C1:B4 02 AD A9 02 8D B5 02 CC 18F1:80 03 38 E9 30 A8 C0 00 6E 1B21:69 03 8D 7B 03 18 A5 30 2A
16C9:AD AA 02 8D B6 02 A9 01 A2 18F9:F0 16 18 AD F5 02 69 0A 9A 1B29:69 01 85 30 A5 31 69 00 CC
16D1:8D C2 02 AD E3 02 8D CC 9F 1901:8D F5 02 AD F6 02 69 00 25 1B31:85 31 A5 FC C5 31 B0 03 52
16D9:02 AD E4 02 8D CD 02 AD 84 1909:8D F6 02 88 C0 00 D0 EA 1B 1B39:4C BB 92 A5 FC C5 31 F0 83
16E1:BF 02 C9 01 D0 47 A9 01 AF 1911:AD 81 03 38 E9 30 18 6D 0C 1B41:01 60 A5 FB C5 30 B0 F9 CE
16E9:8D F1 02 20 B9 85 20 69 29 1919:F5 02 8D F5 02 69 00 6D FB 1B49:A0 00 B1 FB 91 34 B1 FD 84
16F1:8B 60 AD AB 02 8D B3 02 1C 1921:F6 02 8D F6 02 A9 AD 34 91 1B51:91 36 18 A5 FB 69 01 85 48
16F9:AD AC 02 8D B4 02 AD AD F7 1929:03 C9 0C 90 13 C9 13 B0 70 1B59:FB A5 FC 69 00 85 FC 18 55
1701:02 8D B5 02 AD AE 02 8D 24 1931:0F AD 36 03 C9 31 F0 09 4B 1B61:A5 FD 69 01 85 FD A5 FE 95
1709:B6 02 A9 02 8D C2 02 AD 91 1939:C9 32 F0 20 C9 33 F0 37 31 1B69:69 00 85 FE 18 A5 34 69 1E
1711:E5 02 8D CC 02 AD E6 02 C7 1941:60 AD A7 02 8D 76 03 AD 1E 1B71:01 85 34 A5 35 69 00 85 3F
1719:8D CD 02 AD C0 02 C9 01 3F 1949:A8 02 8D 77 03 AD A9 02 9D 1B79:35 18 A5 36 69 01 85 36 F8
1721:D0 0B A9 01 8D F1 02 20 18 1951:8D 78 03 AD AA 02 8D 79 95 1B81:A5 37 69 00 85 37 A5 FC D6
1729:B9 85 20 69 8B 60 AD AF 19 1959:03 4C 02 91 AD AB 02 8D 27 1B89:C5 31 F0 0A A5 34 CD 7A C1
1731:02 8D B3 02 AD B0 02 8D 1C 1961:76 03 AD AC 02 8D 77 03 48 1B91:03 F0 0C 4C BD 92 A5 FB 4B
1739:B4 02 AD B1 02 8D B5 02 CC 16 1969:AD AD 02 8D 78 03 AD AE D0 1B99:C5 30 F0 0D 4C FF 92 A5 DA
1741:AD B2 02 8D B6 02 A9 03 20 1971:02 8D 79 03 4C 02 91 AD A2 1BAL:35 CD 7B 03 F0 03 4C 06 B7
1749:8D C2 02 AD E7 02 8D CC 39 1979:AF 02 8D 76 03 AD B0 02 4F 1BA9:93 60 A9 0D 60 A0 00 B9 07
1751:02 AD E8 02 8D CD 02 AD 7E 1981:8D 77 03 AD B1 02 8D 78 BC 1BB1:7F 03 C9 30 90 F4 C9 3A CA
1759:C1 02 C9 01 D0 CF A9 01 4C 1989:03 AD B2 02 8D 79 03 AD 25 1BB9:B0 F0 C8 CC 7E 03 D0 EF FB
1761:8D F1 02 20 B9 85 20 69 A2 1991:35 03 C9 56 D0 AA AD 37 81 1BC1:4C DB 8F 08 10 18 20 30 D8
1769:8B 60 A0 00 A9 00 85 FB DD 1999:03 C9 3A D0 A3 A0 00 B9 6D 1BC9:40 61 80 04 80 04 20 10 1E
1771:A9 20 85 FC A9 EA 85 FD FE 19A1:35 03 C9 3A F0 09 C8 CC 16 1BD1:08 00 00 00 00 00 00 00 0C
1779:A9 95 85 FE B1 FD 91 FB 27 19A9:34 03 F0 94 4C 12 91 C8 B4 1BD9:00 00 00 00 80 C0 E0 F0 C9
1781:18 A5 FB 69 01 85 FB A5 F6 19B1:A2 00 B9 35 03 C9 2D F0 4A 1BEL:F8 FC FE FF 0F 0D 0B 09 7F
1789:FC 69 00 85 FC 18 A5 FD 7A 19B9:0E 9D 7F 03 E8 C8 CC 34 B2 1BE9:07 05 03 01 46 4A E2 52 9F
1791:69 01 85 FD A5 FE 69 00 41 19C1:03 F0 03 4C 25 91 60 8E 95 1BF1:56 5A 5E 62 66 6A 6E 72 08
1799:85 FE A5 FB C9 00 F0 03 F1 19C9:7E 03 C8 A2 00 B9 35 03 93 1BF9:76 7A 7E 82 86 8A 8E 92 10
17A1:4C EF 8E A5 FC C9 24 F0 66 19D1:C9 54 F0 0D 9D 84 03 E8 DA 1C01:96 9A 9E 11 1E 20 20 20 E1
17A9:03 4C EF 8E 60 A0 00 A9 82 19D9:C8 CC 34 03 F0 E8 4C 40 5E 1C09:20 20 20 20 20 20 20 20 41

```


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,LB: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.

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Bruce M. Bowden
Greensboro, NC

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TYPING AIDS

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

If you don't have access to a back issue or to one of our disks, write to us, and we'll send you free 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.

REVIEWS

Get a head start on Headline Harry's Great Paper Race, take a look at the sequel to Elvira, and scrutinize an abundance of other evaluations.

HEADLINE HARRY AND THE GREAT PAPER RACE

You have only three hours left before your deadline. Miss it and Marvin Muckraker's devious reporters will print their falsified stories on the front page of the *Diabolical Daily*. Not only will you have to face your angry editor, Headline Harry, but the public will never learn the true story. Such is the life of a reporter in *Headline Harry and the Great Paper Race*, a game that combines lessons in modern history, geography, and problem-solving.

Both older children and adults will enjoy sifting through the abundant facts when they join Headline Harry's crusade to stop the presses of the scheming competition. Choose the region of the United States that you most want to tackle and decide which historical event from that area warrants a lead story. File the story before your deadline arrives. To make matters more difficult, you might lose time traveling, discovering information, or falling prey to one of Marvin Muckraker's reporters.

The animated adventures include digitized speech and music, and are available in 16- or 256-color versions. Players can only explore 12 stories, but the upcoming teachers' edition will allow for three times that many. A convenient save-game feature allows you to save stories in progress.

Headline Harry doesn't promise that scooping the *Diabolical's* reporters will be easy; it takes perseverance. But students, especially, will find this fact-chasing mission a welcome break from clunky history books. Com-

plex, but not frustrating, *Headline Harry* is good news for rookie reporters looking to build their problem-solving skills.

CHANTELLE OLIGSCHLAEGER

Scheduled for release: August 1991
IBM PC and compatibles, 512K RAM
(640K for MCGA and VGA 256 col-



Your interstate journey begins in Headline Harry's office where he assigns you a front-page story.



Elvira II: The Jaws of Cerberus will curdle your blood and raise your hackles with its strikingly morbid graphics.

or); CGA, EGA, MCGA, VGA, Tandy 16-color, and Hercules; requires hard drive; supports Ad Lib, Sound Blaster, PS/1 sound cards; supports mouse—\$49.95 for 16-color version, \$59.95 for 256-color version

DAVIDSON & ASSOCIATES
3135 Kashiwa St.
Torrance, CA 90505
(213) 534-4070

Circle Reader Service Number 312

ELVIRA II: THE JAWS OF CERBERUS

As a horror movie queen, Elvira seems to encounter more than her share of problems. In this impressive se-

Somewhere in the studios of Black Widow Productions, on one of three sound stages, you'll find the kidnapped Elvira. Whether she's prisoner within the traditionally haunted Victorian house, the spider-infested catacombs, or the foreboding graveyard, as her rescuer you can expect to encounter chilling special effects and surprises, including some decomposing corpses. Accolade intended *Elvira II: The Jaws of Cerberus* to out-shock and out-creep every other adventure game on the market and they succeed. The detailed, macabre sets and horrific, animated monsters engender an atmosphere of perfectly delightful dread.

As in the first game, you'll find the controls necessary to explore Elvira's world on screen at all times. New and notable, however, is a clever health icon in the shape of a human body that clearly indicates your character's status, including number of hit points per body part. This indicator becomes skeletal as you take damage. Eerie!

Better than a horror double feature, *Elvira II: The Jaws of Cerberus* will test the mettle of experienced adventurers. And while Elvira herself might offer some moments of comic relief, this frightfest packs more gasps than laughs.

DAVID SEARS

Scheduled for release: October 1991

IBM PC and compatibles, 512K RAM; CGA, EGA, VGA, or Hercules; supports Ad Lib, Game Blaster, Roland MT-32, and Sound Blaster; supports mouse and joystick—\$59.95

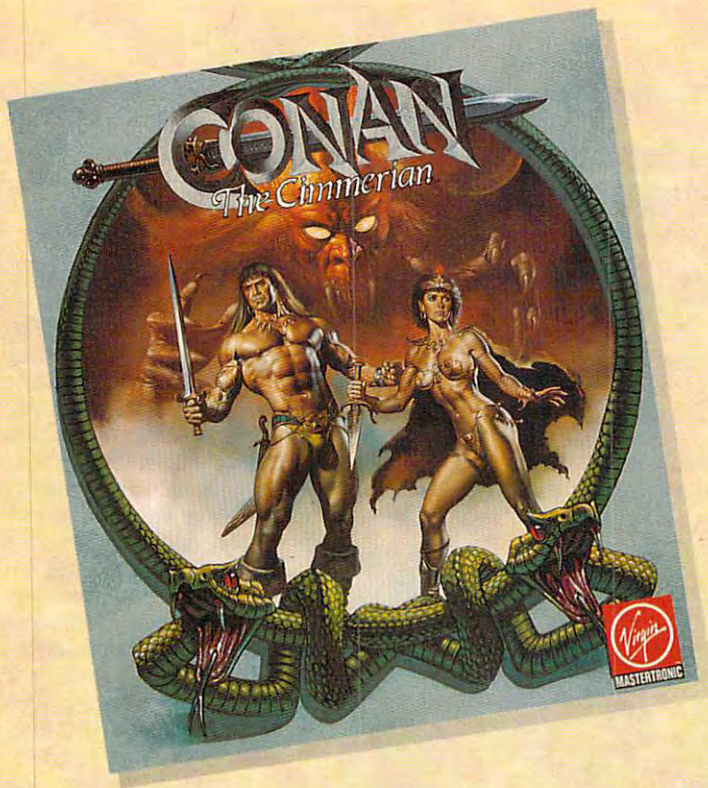
Also available for Amiga—\$59.95 and Atari ST—\$59.95

ACCOLADE
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San Jose, CA 95128
(408) 985-1700

Circle Reader Service Number 313

quel to the first Elvira adventure game, the demonic, three-headed Cerberus kidnaps our favorite delicate creature and makes off with her to a darksome location. As always, your job entails saving the day using your wits, a full complement of spells, and persistence.

SOME OF



The greatest hero for the Hyborean Age was a fierce barbarian born of the harsh northlands,

CONAN THE CIMMERIAN

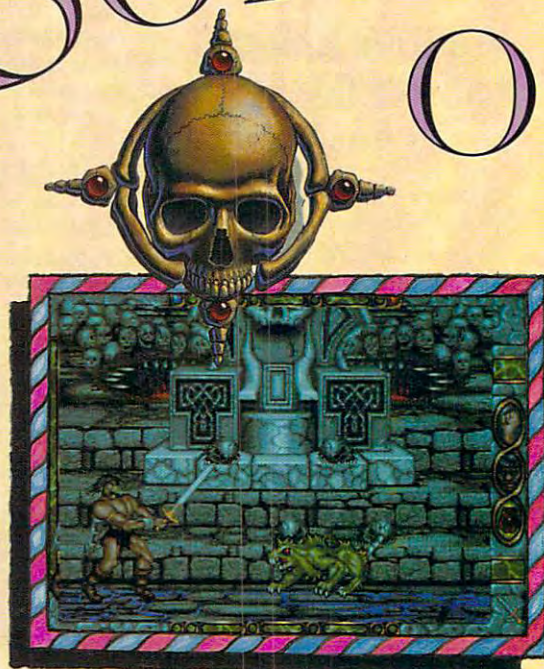


ou have heard the tales of Conan's adventures. Only now will you have the opportunity to live the life of this fierce barbarian from the land of Hyborea.

Our odyssey begins with murder most foul. When Conan's village is massacred by the ravaging 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.

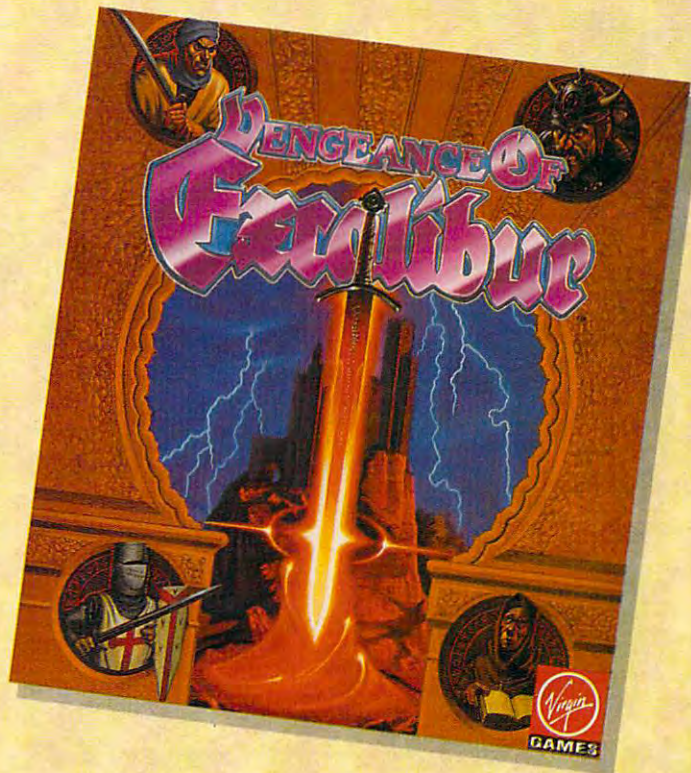
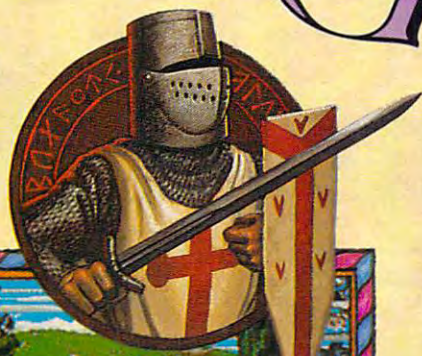
Only with luck, courage and constant struggle will Conan have the chance to force a reckoning with the powerful Thoth Amon.



AVAILABLE FOR THE IBM AND AMIGA THIS SUMMER.
SUGGESTED RETAIL – \$49.99

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Virgin Games, Inc. 18061 Fitch Ave., Irvine, California 92714

THING D



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!

Command knights and whatever followers they are able to recruit to track the Shadowmaster through hazardous, beautiful and mysterious medieval Spain. Explore the hundreds of villages and cities, fortresses and castles, dungeons and palaces and all the secret places where the Shadowmaster may dwell.

Seek what aid you can as you acquire and learn the use of the sorceries of Moorish Spain, for only with the aid of enchantments and the loyalty of strong allies will you stand a chance of ridding the world of the demonic Shadowmaster once and for all.

AVAILABLE FOR THE IBM, AMIGA, ATARI ST AND MAC THIS SUMMER.
SUGGESTED RETAIL - \$49.99

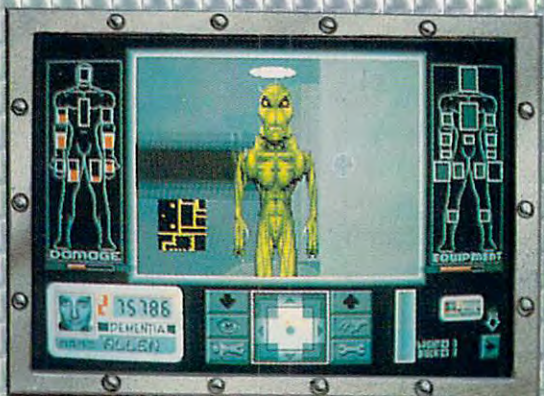
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SOME NE

ALSO TAKING OVER A
SEGA
GENESIS
NEAR YOU
THIS FALL



ARE YOU TOUGH ENOUGH TO TAKE ON THE 21st CENTURY AND SAVE MANKIND FROM HIS UNTIMELY DESTRUCTION BY A GENETICALLY ENGINEERED WAR MACHINE?!

Talk about your work-related stress! As a ZODIAC special agent, your job is to crack the complex security systems of the Universal Cybernetics Corporation and track down the mutant robot they have designed as the ultimate killing machine.

You'll arm yourself with a whole arsenal of weapons - everything from hologram projectors to special vision enhancement visors to thermal infra-red image intensifiers. If all else fails - you'll have to rely on your own psychic powers!

FEATURES INCLUDE:

- 16-level 3-dimensional environment complete with fast, smooth scrolling
- Realistic action control of six characters: 2 male, 2 female and 2 droid
- 360 degree vision
- Environmental sound effects

"Tension and unease, with danger lurking around every corner.... This Number One European Hit will keep you on your toes and coming back for more."

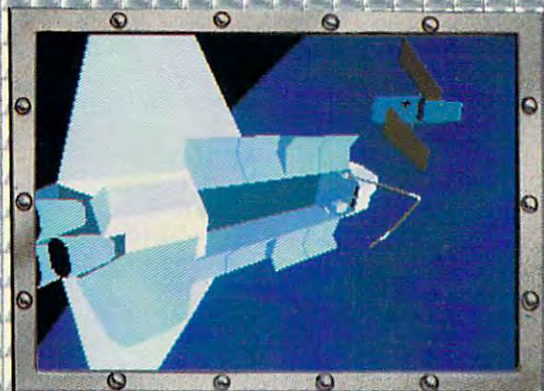
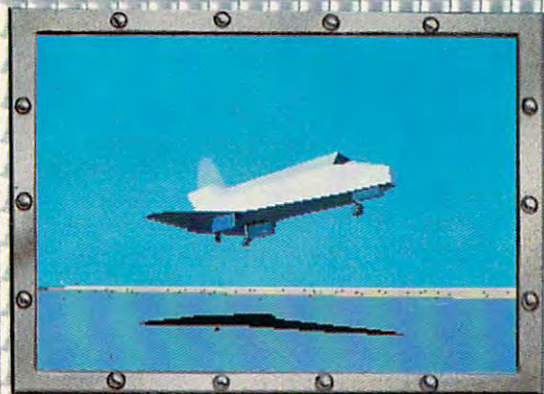
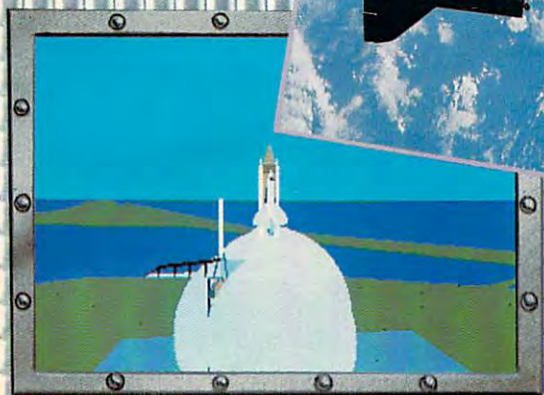


AVAILABLE FOR
THE IBM, AMIGA AND ATARI ST THIS SUMMER.
SUGGESTED RETAIL - \$49.99

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SHUTTLE

W



The space flight simulator to end all simulators, SHUTTLE is the most accurate and comprehensive simulation of NASA's Space Shuttle ever produced for the home computer.

With the aid of Mission Control, you will master such challenges as deploying and repairing satellites, launching spy satellites, maneuvering your craft in zero gravity, attaining the correct re-entry trajectory, and pulling off complicated landings.

Advanced polygon and elliptical graphics, along with actual land and star maps were used to create the breathtaking 3D panoramas of the Orbiter and its environment, which can be viewed from any angle at any time.

Other features include:

- Authentic control panel display
- Detailed comprehensive training and reference manual
- Numerous training, scientific and "Star Wars" (SDI) Missions
- Multiple help levels from "novice" to "veteran"
- Various launch and landing sites
- Orchestral quality music
- Fold-out Shuttle flight deck poster

AVAILABLE FOR
THE IBM, AMIGA AND ATARI ST LATE SUMMER.
SUGGESTED RETAIL - \$59.99

AdLib™ and Roland™ sound boards supported on IBM
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Circle Reader Service Number 179

PUBTECH FILE ORGANIZER

To judge from third-party developers' efforts, Microsoft really missed the mark with the Program Manager and File Manager in *Windows 3.0*. A dozen replacement file managers and shells (program launchers)—and a few products that do both—promise an improved *Windows* environment. One of the best of these, *PubTech File Organizer 3.0*, makes good on that promise.

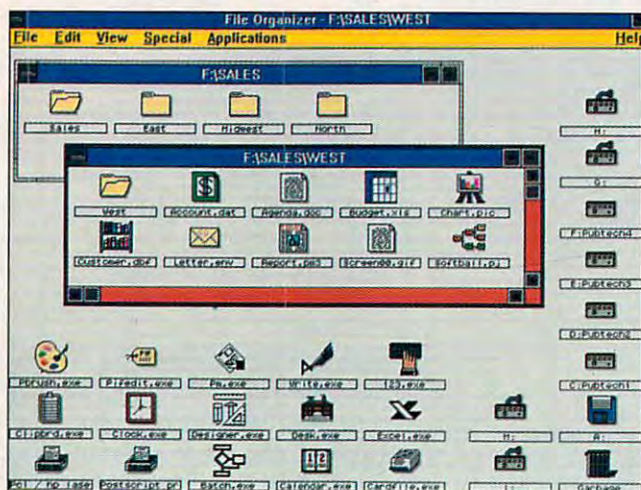
File Organizer strives to simplify controlling the computer within *Windows*. As with many simplifications, it gets harder before it gets easier. If you have several hard disks and many files, for instance, the first screen you see after installing *File Organizer* is downright scary. The 320-meg hard drive on my Arche Legacy 386-33 is partitioned into ten drives with an assortment of installed printer drivers. The initial screen displays a double stack of drive icons along the right side and a row of printer driver icons across the bottom. A row of icons representing minimized applications runs above the printer icons. Of the 22 icons on the screen, none will run an actual program. Not even the *Windows* desktop accessories are available. To launch an application, click on the icon for the program's hard drive. That opens a window with a folder icon for each directory in the drive and icons for all the files in the root directory. If your desired executable file is in a subdirectory, click on its folder and find the appropriate file icon. Double-click, and you're running.

That's not easier than the *Windows* Program Manager.

File Organizer provides three easier ways to launch a program: putting the program's icon on the desktop, assigning a special hot key to the program, or adding it to the pull-down applications menu. All work well.

If you put icons on the desktop, though, you'll fill your already-crowded desk-

manipulation. To move an entire subdirectory from one drive or directory to another, grab its folder and drag it to where you want it. Dragging a file to the trash can icon deletes the file. To print a file, drag its icon onto the printer icon. To start an application and load a file, drag the file icon onto the application



PubTech File Organizer grants you superior control of *Windows* files through improved icon control.

top quickly. Instead, move to the Desktop Utilities function (which has its own separate manual) to create any number of custom desktops. For instance, you could have a desktop with *Excel* and its associated subprogram icons along with icons for your most frequently used spreadsheet files. Pull up your *Excel* desktop, and you're ready to work. Or if you have a regular task that involves several separate applications, create a desktop with those applications already running. Although creating the desktop files can take some time, you have an endlessly customizable front end for *Windows*.

File Organizer has features, however, that you can enjoy right out of the box, most notably icon-based file

icon. Almost any file management task is done solely by clicking on and moving icons.

For file management by icon, *File Organizer* is top-notch. As a Program Manager replacement, it takes a shift of gears and extra time to set up an appropriate batch of customized desktops. If you persist, though, and thoughtfully customize, you'll have a *Windows* shell that suits you perfectly.

RICHARD O. MANN

IBM PC AT and compatibles (286, 386, or 486), 640K RAM, DOS 3.0 or *Windows 3.0*, hard disk; mouse recommended—\$199.95

PUBLISHING TECHNOLOGIES
7719 Wood Hollow Dr., Ste. 260
Austin, TX 78731
(800) PUB-TECH (sales)
(512) 346-2835

Circle Reader Service Number 314

BUSHBUCK CHARMS, VIKING SHIPS, & DODO EGGS/ GEOJIGSAW

A scavenger hunt by any other name could never be this much fun. *BushBuck Charms, Viking Ships, & Dodo Eggs* (yes, that's the name) is superior educational software. Not only will you gain an understanding of the world's cultures and increase your knowledge of geography, but you'll have fun along the way.

The object of the game is to fly to the different countries of the world and gather various common objects in each country you visit. Each location offers a special attraction or contains some historical significance; their descriptions can help you later, so read them all carefully. Points accumulate as you discover objects. Colorful, detailed maps and creative, animated sequences add interest, while the musical scores tend to stick with you for hours after you play.

Play alone, against another player, or against one of the included villains: Pierre, Natasha, and Otto von Slinkenrat, a real stinker who slithered his way to the top of the PICKLE (Preserving Individual Cultures and Knowledge in Lands Everywhere) Foundation.

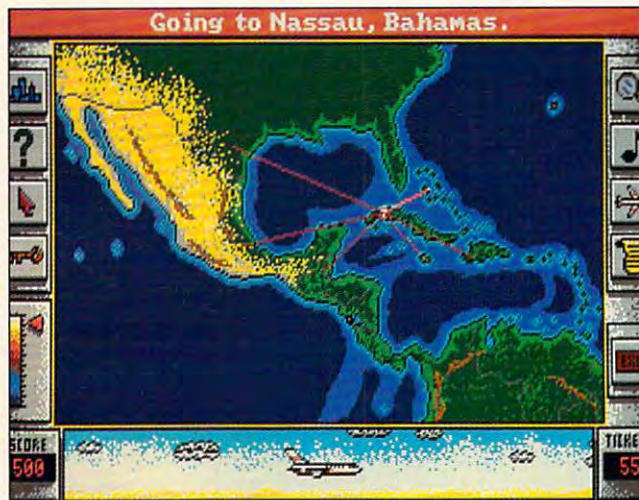
My complaints are minor. Gathering all 15 objects requires some time; a save-game feature would be appreciated. And although recommended for all ages, I wouldn't expect *BushBuck Charms* to hold the interest of very young children unless they're able to read and decipher maps. Children

with those skills will love the game, if they can persuade Mom and Dad to quit playing for a while.

Another PC Globe educational game, *GeoJigsaw*, is far more suitable for young children. The color-cycling feature (available for VGA systems only) creates an illusion that the 12 puzzles are ani-

While *GeoJigsaw* not as strong a teaching tool as *BushBuck Charms*, both games offer children an opportunity to learn and enjoy themselves at the same time. And at a cost of \$39.95 for *GeoJigsaw* and \$49.95 for *BushBuck Charms*, learning comes at bargain prices.

JOYCE SIDES



Scavenger hunts go global and show their educational side in *BushBuck Charms*, *Viking Ships*, & *Dodo Eggs*.

mated. Puzzle choices range from depictions of dinosaurs to the solar system. Additional puzzle disks would offer variety, but none were offered on the order blank included in the game box.

Puzzles may be cut into as few as 6 or as many as 294 puzzle pieces—just remember that you have to put the pieces back together. Puzzle pieces are easy to move with a mouse or joystick. A keyboard option is available, but maneuvering pieces using this option is difficult. The game supports only the PC speaker, but it does reward a completed puzzle with musical notes. A puzzle is automatically saved in its current state if you quit the game.

BushBuck Charms, Viking Ships, & Dodo Eggs

IBM PC and compatibles, 512K RAM, CGA, EGA, or VGA; mouse and Ad Lib sound card optional—\$49.95

GeoJigsaw

IBM PC and compatibles, 512K RAM, CGA, EGA, MCGA, VGA, or Tandy 16-color; mouse optional—\$39.95

PC GLOBE
4700 S. McClintock
Tempe, AZ 85282
(602) 730-9000

Circle Reader Service Number 315

PC DISKLOCK

Data security is increasingly becoming a top-priority issue for small business owners and corporate MIS managers alike. Now Fifth Generation Systems, maker of the *Mace Utilities*, offers a solu-

tion to this growing problem with *PC Disklock*.

Disklock provides comprehensive protection of sensitive data through the use of primary and secondary passwords, selective locking and encryption of files, and an audit trail of unsuccessful log-on attempts.

Disklock's password system draws the first line of defense. When installing the program, the user selects a primary password and, optionally, a secondary password. When using the primary password, the user has full access to all files and directories on the system, while someone logged on under the secondary password cannot access locked or encrypted files. This sort of simple security is useful in situations where several users, some of whom do not require access to sensitive files, share one computer.

In addition to the general security provided by the password system, *Disklock* provides two methods of safeguarding selected files. By locking a file, you make it inaccessible to users logged on under the secondary password. Encrypting a file, in addition to making it inaccessible to secondary users, also encodes the data in a way that makes it unintelligible. You can decrypt files only with the primary password you chose earlier.

As a final safety feature, *Disklock* keeps a log of all unsuccessful log-on attempts. *Disklock* stores the time and date of each failed entry attempt in a file called *Disklock.log*, which you may review periodically.

Does the average user need a data guardian such as *Disklock*? Probably not. Its main use will be to provide security in business environments where several us-

ers share computers containing sensitive information. Because of its thoughtful design, *PC Disklock* places a minimal burden on legitimate users while keeping the bad guys, and the merely curious, at bay.

RICHARD RAPP

IBM PC, and compatibles, 512K RAM, hard drive; mouse optional—\$189

FIFTH GENERATION SYSTEMS
10049 N. Reiger Rd.
Baton Rouge, LA 70809-4559
(504) 291-7221

Circle Reader Service Number 316

HARD NOVA

Nova's not your typical twenty-first century housewife content to sit home tending the antigravity machine. Armed with a generous supply of Sonic Mace and a Stun Club, this spacegoing barracuda seeks a more fulfilling life of contract kidnapping, assassination, and smuggling assignments. Nova's a mercenary, and she stays alive by never dropping her guard or her weapons.

Hard Nova offers a combination of arcade action, role-playing, and strategy—providing a little something for everyone, including a choice of playing a male lead (Stark) instead of a female (Nova). First-rate graphics begin with the opening screens and culminate in a visual explosion as you traverse a stargate (providing you keep your Bremar-Nav sentient alive long enough to lead you through).

The graphics do more than just provide colorful eye-wash, however; they serve to help orient you to your rapidly changing alien surroundings, reveal the whereabouts of your few friends and many enemies, and occasionally supply a way to rest your war-



From the command chair in *Hard Nova*, you'll conduct serious, but diverting, mercenary action.

wearily brain by playing Zerg Roulette.

The gee-whiz technology evidenced throughout *Hard Nova* extends beyond its top-quality graphics to encompass numerous ingenious ways to pillage, plunder, maim, and murder. In the four distant frontier worlds where you ply your trade, the power of your weapons contributes directly to the length of your life.

Hard Nova provides one of the deadliest and most diabolical assortments of personal or ship-based armament this side of, well, Ariel. Weapons alone, however, do not guarantee survival; you still need what on Earth would be called people skills. Most often when you encounter aliens or humans, you try to kill them (or they kill you).

Remaining alive and victorious requires that you collect useful, strategic, and current information. You do that by questioning foul-smelling bartenders, beautiful women, and spiritless aliens. You need not be polite—say (or do) whatever is needed to get your answers.

It's all in a day's work for a mercenary, and you'll fight anything, if the price is

right. You've come a long way, baby. . . .

HOWARD MILLMAN

IBM PC and compatibles, 512K RAM, EGA, MCGA, or VGA; supports mouse, hard drive recommended, supports Roland MT-32, Ad Lib, and PS/1 sound boards—\$49.95

ELECTRONIC ARTS
1820 Gateway Dr.
San Mateo, CA 94404
(800) 245-4525

Circle Reader Service Number 317

FASTBACK PLUS

Let's face it; most of us don't back up our hard drives as often as we should. We see it as a tedious, time-consuming, and generally unpleasant experience. But thanks to the award-winning *Fastback Plus*, this doesn't have to be true.

Fastback Plus includes a host of features, such as support for floppy, tape, and removable drives, as well as multiple hard drives. Advanced data compression, error detection, incremental and differential backups, and automatic disk formatting make backup chores less onerous and more rewarding. A macro facility allows you to automate your backups. The only major fea-

tures missing from *Fastback Plus* are disk image backups and LAN support. The omission of disk image backups, used most often when saving data to a streaming tape drive, seems odd considering the wealth of options you're offered in other areas of the program.

Be that as it may, *Fastback Plus* offers the average user more than enough choices. The data compression option allows you to choose between minimizing either the number of disks used or the amount of time used to perform the compression. The macro facility is extensive enough for all but the most demanding backups, and you can even choose between the original command line interface or the new point-and-click one. This allows users of the original *Fastback* to upgrade to the new package without having to rewrite their existing macros and batch files.

You are buying a well-conceived package when you pick up *Fastback Plus*. The *Fastback Plus* manual offers advice on developing a regular backup regimen and explains the program's features in understandable terms. You can choose from a multitude of options and, most importantly, *Fastback Plus* is fast. So unless you need specialized features such as disk image backups or LAN support, *Fastback Plus* is the program to make hard drive failure a temporary condition at worst.

RICHARD RAPP

IBM XT and compatibles, 330K RAM, hard disk—\$189

FIFTH GENERATION SYSTEMS
10049 N. Reiger Rd.
Baton Rouge, LA 70809
(504) 291-7221

Circle Reader Service Number 318

LINKS CHAMPIONSHIP COURSES

Access Software's hot 1990 release, *LINKS: The Challenge of Golf*, came with an incredibly detailed, digitized version of Torrey Pines South Golf Course in southern California. The designers promised additional courses—these are the first out of the chute.

Just a few miles from Access's former offices, you'll find the setting for the Bountiful, Utah, course—high in the foothills of the spectacular Wasatch Front Mountains. Access captured the course in the fall, with gorgeous colors festooning the mountainside in the background. (Firestone is also dressed in its autumn best.)

Since Bountiful is in the hills, the course has lots of up- and downhill fairways moving across steep hillsides. A ball hit out of the fairway may end up anywhere. Watch out for the windows of the nearby condos! I live on the Wasatch Front. I can testify that playing this course on the computer captures the look and feel of a brisk 18 holes in the mountains on a sunny fall day.

The Firestone Country Club of Akron, Ohio, is a world-class course, the site of many PGA tournaments. It's also a duffer's nightmare. The densely tree-lined fairways continually obscure your view of the pin. If you don't have precise control of your hooks and slices, you'll spend hours in the woods, hitting trees on almost every stroke.

In short, it's a challenge. You'll fine-tune your skills here—or vie for a spot in the Hall of Shame. There's no mid-

Can You Do A Better Job Than Gorby?



Access brings an autumnal Bountiful home to LINKS fans.

dle ground. These beautiful courses have been lovingly re-created in astounding detail, right down to the types, shapes, and colors of the trees, buildings near the course, and scenery in the distance. *LINKS* is a great game. With these realistic courses (and many more to come), it should remain popular indefinitely.

RICHARD O. MANN

IBM PC and compatibles, requires *LINKS: The Challenge of Golf*—\$24.95 for Bountiful Golf Course—\$24.95 for Firestone Country Club

ACCESS SOFTWARE
4910 W. Amelia Earhart Dr.
Salt Lake City, UT 84116
(800) 800-4880
(801) 359-2900

Circle Reader Service Number 319

VOLKSWRITER 4

Do the words *advanced*, *powerful*, and *professional* intimidate you? To the rescue comes the Volkswriter line of word processors, offering power and advanced capabilities with an inviting menu interface and simple commands. And while *Volkswriter 4* targets managers and professionals, anyone who's familiar with word processing will quickly pick up the commands.

Six tutorial files introduce such basics of word processing as storage, retrieval, and creation of files. These tutorials end with more complex capabilities, like changing type styles and layouts, using embedded commands, and creating macros. Extensive online help is also available at the touch of a key. By the time you work through the tutorials, you'll realize that even advanced word processing really isn't difficult, and you just might begin to enjoy it.



© Jeffrey Aronson

CRISIS IN THE KREMLIN

Coming live in October from
Spectrum HoloByte

2061 Challenger Drive, Alameda, CA 94501 (510) 522-1164

Circle Reader Service Number 167



NordicTrack introduces...

Simple instructions for changing your spare tire:



- 1 Burn more calories.** Studies show that the combined use of both your upper and lower body during exercise burns more calories in less time. Unlike exercise bikes, treadmills, and stairclimbers that only work your lower body, NordicRow TBX is a total-body exerciser.
- 2 Put NordicRow TBX to work for you.** Split-resistance settings for the upper and lower body allow you to fine-tune your own workout and burn maximum calories. A revolutionary *Back Stress Management System* works to support your lower back for safe, effective exercise.
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Or write: NordicTrack, 141 Jonathan Blvd. N., Dept. 328J1, Chaska, MN 55318

Circle Reader Service Number 119

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www.commodore.ca

Maybe you want to carry work to and from the office. Don't worry if you receive files from coworkers in a different file format. *Volkswriter 4* automatically reads *WordStar* (3.3-5.5), *WordPerfect* (5.0 and 5.1), *Microsoft Word* (3.0-5.0), *Lotus 1-2-3* (releases 1 and 2), and *Displaywrite* files. And for an additional \$69, you can purchase *Volks Word for Word*, a file-conversion utility that converts more than 30 file formats.

Unlike some other word processors, *Volkswriter 4* doesn't require you to change the type style of a document to print it with a different printer driver. *Volkswriter 4* tries to match the layout type styles with those of the new printer driver, or you can alter the type styles manually. Install or create type styles for specific purposes, such as inserting headers at the top of pages.

Noteworthy features in *Volkswriter 4* include page preview, a keyboard display chart, a calculate crossfoot option for columns of numbers, the ability to insert page numbers as Arabic or Roman numerals, the ability to insert nonprinting comments, the change case command, and the notepad.

Save paper by using the page preview option. (This option is only available for systems with a graphics card.) Embed special printing characteristics such as bold, italic, underline, subscript, and superscript easily, or send Escape codes to your printer with the CMD command. Or display the little known Ctrl key assignments in a box at the top of the screen with the keyboard assignment command; that way, you won't have to laboriously search for elusive key assignment tables in your DOS manual.

Calculate in column or row format, and use the crossfoot method to figure rows and columns simultaneously—instead of loading your spreadsheet for such simple calculations. You also can sort text columns in ascending or descending or-

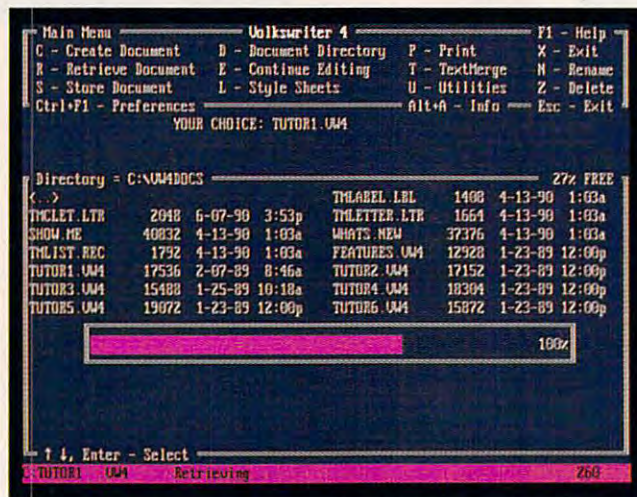
characters to draw boxes around text. With *Volkswriter 4*, you simply highlight a block of text and use the Alt-B command to draw a double or single line box around the highlighted block of text.

Creating macros with *Volkswriter 4* poses no more

a reasonable sum. These include an extended 610,000-word thesaurus; specialized dictionaries with computer, legal, and medical words; and multilingual dictionaries, thesauruses, and dictionaries.

This version of the program doesn't include mouse or bitmap graphics support or an indexing feature, but it wasn't intended to be another desktop publishing package, either. *Volkswriter 4* can be a useful tool for managers and other professionals and even students who need to meet term-paper deadlines (the footnote feature is outstanding). And with a 30-day money-back guarantee, you can't lose. This word processor truly puts the power of words into the hands of the people.

JOYCE SIDES



Here the user-friendly *Volkswriter 4* displays some of its myriad available options on the main menu.

der by name, ZIP code, and so on. This option comes in handy for sorting names and addresses for use with the mail-merge option.

With the special page-numbering options, you can use Roman numerals for the table of contents and index, and Arabic numerals for the rest of the document. And since capitalization typos occur often, the caps change command offers a quick way to correct the errors without retyping an entire word or line. *Volkswriter 4*'s notepad option lets you keep notes for yourself. If you think of something while working on a document, key it in and send it to the notepad. It will be cut from the current document and appended to a file that you specify.

Most word processors lack an easy way to use line

threat than tying your shoelaces. Even users who've never created a macro will enjoy experimenting with this feature.

The word count command saves you time. You needn't move to the top of a document to get an accurate word count. To count the words in a specific section of a document, merely highlight the text in question before choosing the word count command.

More special features include mail merge, undelete (up to 900 characters), storage of blocks of text to a separate file, and printing in landscape or portrait modes. The most impressive capabilities of this package include the 310,000-word thesaurus and *Grammatik IV*.

You can purchase several accessories separately for

IBM PC and compatibles; 640K RAM; CGA, EGA, VGA, or Hercules (for print preview); hard disk—\$249

VOLKSWRITER
One Lower Ragsdale Dr.,
Bldg. 2, Ste. 100
Monterey, CA 93940
(408) 648-3000

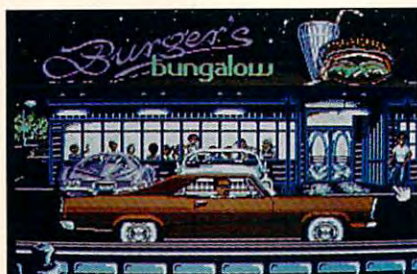
Circle Reader Service Number 320

STREET ROD 2

Do you want to be King of the Road without spending the big bucks for a top-quality racer? Do you lack the smarts to build a monster machine from scratch or the guts to push the pedal to the floor? If so, then *Street Rod 2* might be just your ticket.

You'll begin by selecting your first set of wheels and spare parts from the want ads. Even though there are 25 autos and 60 parts to choose from, with only \$1,200 to spend, a Ford Fairlane and a few new tires are about all you'll be able to afford.

Next it's into the garage, where you can perform cos-



After a brief pit stop, cruise the streets searching for racing action.

metic surgery by spray-painting your monster, chopping its roof, and removing the bumpers. To improve your chances against the competition, pop the hood and tune your engine or bolt on a new part. With *Street Rod 2*, you can even roll under the body and do some serious work, adding differentials, mufflers, and exhaust manifolds. Eventually, substitute a top-performance manual transmission for that easy-to-shift, but decidedly inferior, automatic.

When you arrive at the local drive-in, sit tight until a beatable car cruises by. Then challenge the driver (male or female) to a drag race on a mile-long straight track or to a road race on either of two 2½-mile courses.

If you're not off the line fast enough on the drag strip, you'll eat mouthfuls of your opponent's dust. If you jump off too quickly, you'll blow your engine and yourself right out of the competition.

On the road, controlling your speed on turns and sensing when to brake and downshift are essential for victory and for continued good health. Be warned: Cops are everywhere, ready to ticket you if you can't outrun them.

A ruined engine, a dropped transmission, and other damages can be repaired—if you have the cash. At other times, you might want to write your heap off as a loss and junk it for a few bucks.

Three months is all the time you'll have to go from rank amateur status to being an opponent worthy of the King of Street Racing. Winning lots of races and regularly upgrading your vehicles with your earnings are the keys to victory. Don't expect to complete the program in one sitting; the save-game option comes in handy.

Though enjoyable and exciting, the racing sequences add little new to the

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10SP91C

genre in terms of action or challenges. Whether using a mouse, joystick, or keyboard, you'll experience more than your share of killer crashes before you begin to master the controls. The garage segment is more original, and, thanks to a responsive point-and-click interface, easier to handle. In all locations the graphics, animation, and sound are excellent.

If you fantasize about the ultimate machine but you drive a ho-hum buggy, consider taking to the road with *Street Rod 2*. It won't make you think your Chevette is a Corvette, but it'll let you experience the sensation of driving a superfast monster car—without the danger and at a fraction of the cost.

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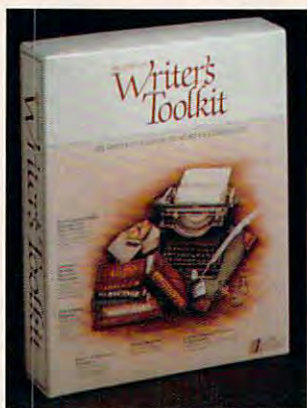
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THE COMPLETE WRITER'S TOOLKIT

While it won't replace a serious writer's reference library and while one of its functions isn't quite up to scratch, *The Complete Writer's Toolkit* is a welcome addition to the resources available to the writer. *The Toolkit* contains six modules, as many or as few of which you can install as you like. Five of these—The American Heritage Electronic Dictionary, Roget's II Electronic Thesaurus, Written

Word III, The Abbreviation Expander, and The Concise Columbia Dictionary of Quotations—can be made memory resident and hot-keyed in windows over your text within your word processor.

Three of these modules may get limited use: Written Word III is a reliable handbook on the basics of gram-



Every serious writer needs a serious toolkit.

mar, spelling, and punctuation, though its sections dealing with research papers and résumés are too general to be very useful. On the infrequent occasions you need it, The Abbreviation Expander provides the full terms for abbreviations you type into the Lookup Screen and allows you to add to its list, and The Dictionary of Quotations may actually slow down your writing—chiefly because of the temptation to linger and browse through the 6000 quotations which can be accessed by topic, author, or index, and imported directly into your text file.

In a writer's toolkit, though, the real test cases are the dictionary and the thesaurus—and these are, surprisingly, better than I had hoped for. While not as comprehensive as its hardcover parent, The American

Heritage Electronic Dictionary contains 115,000 entries and provides succinct but detailed definitions; you can also look up words *within* the definition simply by placing the cursor on the word and hitting Enter. The Spelling and Wildcard modes let you search for words even if you're unsure of their spelling, and there's even an Anagram mode for people who want to cheat at word puzzles.

While I wish Roget's II Electronic Thesaurus had been based on a more traditional model, its versatility makes it attractive. Type in your word, and the thesaurus window splits into two columns—one with the word's definitions, the other with its synonyms. Moving the cursor from definition to definition changes the displayed list of synonyms; tab over to the synonym column, and you can check the definitions for each of its words.

The sixth module, The Houghton Mifflin Grammar and Style Checker, is not memory resident but can be accessed from DOS if you want to check an imported text file for grammar, spelling, punctuation, and style. It also contains a Stats option that counts the words in your file and rates its readability. Anything that would reduce the drudgery of proofreading is welcome, but unfortunately, using The Checker is a little like having your work proofed by a C-level freshman comp student. Though it usually catches the most blatant errors, some subtleties escape it. For example, it may confuse participles with verbs or fail to recognize a gerund as a subject. And sometimes its advice is just wrong; in the sentence "The Grammar and Style Checker

is weak," it reads *Grammar* and *Style Checker* as separate nouns and recommends you change *is* to *are*. The Checker allows you to enable or disable its grammar rules and thereby customize it to some extent; however, to use this option, you have to know enough about proper usage not to need it in the first place. Use it with caution.

Despite this weakness, the other modules of *The Toolkit* are serviceable on-line references. *The Toolkit* may conflict with some memory-resident programs, so you'll need to experiment a bit to see what it works well with. If you do have problems, check with the people on the support line listed below; I found them to be helpful and patient even with idiot-level questions.

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lates the value of your current policy and analyzes your life insurance needs and benefits. The college module suggests three financial options to safeguard a sufficient nest egg for your children's college education.

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STUDYWARE FOR THE SAT

Competition can be a good thing, but it sometimes means heartbreak for high school students who've set their sights on attending a prestigious college or university. These students need an edge to improve SAT (Scholastic Aptitude Test) scores to get into those institutions, and help comes from *StudyWare for the SAT*.

StudyWare comes not only with an informative and easy-to-understand user's manual that offers strategies and tips for taking the SAT, but also with *Cliffs SAT Preparation Guide*, a sister publication of *Cliffs Notes*. *Cliffs*

Guide offers two practice exams with removable SAT-like answer sheets. Also included in *Cliffs Guide* are a study guide checklist, a discussion of two approaches to taking the SAT, and strategies for completing each SAT section, including antonyms, analogies, sentence completion, reading comprehension, mathematics, and quantitative comparisons. All of these topics are covered in *StudyWare*'s useful practice exams.

Special features in the program include mouse support, pull-down menus, and an onscreen glossary with over 450 listings. There's also an onscreen clock to help you keep up with the amount of time you've used for each question.

To start, choose Test, Drill, or Exam. If you're interrupted, use the Pause option to stop the exam clock until you're ready to continue. Drills help to improve your speed, and with the Math Drills you can choose to practice squares and square

roots, units of measure, word problems, algebraic operations, ratio/proportion, quantitative comparisons, geometry, and more. In Tutor mode, an explanation appears for the answer you choose, whether the answer's right or wrong.

Your scores are automatically tallied, and you can view the results in three ways: Topic Priority Breakdown, Items Missed, or Results Graph. The Topic Priority Breakdown displays 20 categories with the composite results of your correct answers. This report lists the page numbers in *Cliffs Guide* where you can study that topic.

I encountered a few curious typographical errors and a mismatched explanation for one of the math problems. When I called StudyWare, a spokesperson thanked me for calling and promised to send a disk with fixes to me and any registered user who calls the full-time technical support department.

I was impressed that *Stu-*

dyWare holds its own when compared with other SAT programs. It offers more than 800 onscreen questions and more than 4000 explanations. It also displays more true math symbols than the two other leading SAT programs by Barron's and Davidson and Associates.

If you're looking for a way to help your children score higher on the SAT, put *StudyWare* on your shopping list. Whether they're taking the SAT for the first time or the tenth time, they can't go wrong by studying more. *StudyWare for the SAT* is the perfect tutor, and with a price tag of \$49.95, it's an investment in the future with potentially great returns.

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Q-DOS 3

Even if you feel right at home with the DOS directory and file structure, you may find hard disk housekeeping tedious using only DOS. You may also have trouble every now and then remembering where you put a particular file, or, if you have more than one disk partition, where you put a particular directory.

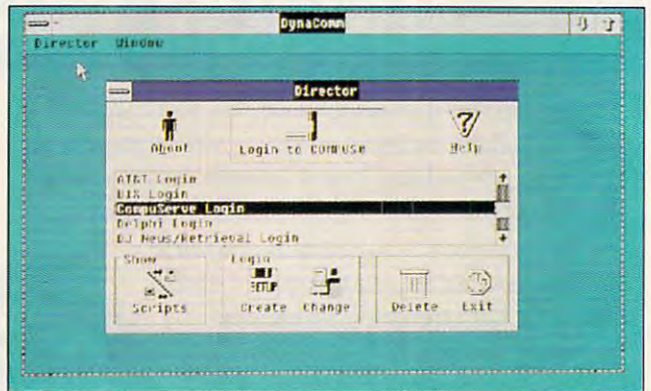
One solution calls for a graphical user interface (GUI). Some of us don't like GUIs. They tend to be slow and to require such involved procedures that by the time you finish with all the GUI protocol, you might as well be back with DOS. A prime example of a better solution, *Q-DOS 3* won't slow you down at all. The program installation puts *Q-DOS 3* in your path

statement, so you can call it from any directory. *Q-DOS 3* occupies only about 9.5K RAM and provides very convenient mouse support, though a mouse is not essential. The first option on its command line is Directory, and if you click on that option or type *D*, the directory structure of your current drive appears as a tree with your current directory highlighted. Want to change directories? Use the mouse or arrow keys to choose your destination, click again, and you'll see a listing of files in that directory, with size and date.

Want to look at another drive? Click on the Change Drive box, and you'll see a list of your drives. Click on a drive, and you'll see a tree of the directories and subdirectories of that drive. Click on your choice, and you move to that directory of the drive.

The *Q-DOS 3* command line remains available always. Can't find a file? Click the Find box on the command line. You'll be asked for the filename as well as whether you wish to search all drives or only the current drive.

Deletion of a directory which has subdirectories seems interminable using DOS. You must go from one subdirectory to another, deleting files, then return to the parent directory and delete the subdirectories one by one. Finally, DOS will let you delete the directory—unless there are hidden files somewhere, which the DOS Delete command will not touch. Not so with *Q-DOS*. One click brings up the tree, another highlights the undesired directory or subdirectory, a third gives the Erase command, and a fourth confirms that you really wish to do this, after which the directory and all its subdirectories and files, hid-



Use DynaComm's script editor to automate your log-in procedures.

den or not, go away.

The program boasts many other fine features. To name just a few, you can alter file attributes (hidden, system, read only, and so on), rename files and directories, and erase or unerase files. Its response is snappy, and its documentation is good. Personally, I have habitually despised file handlers, grumbling, "I know how to handle my files and directories, thank you. I don't need any help from any dumb program." *Q-DOS 3* has changed my mind.

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DYNACOMM ASYNCHRONOUS

For those who prefer mice and icons, telecommunicating in the PC environment can prove a tortuous affair. Many *Windows 3.0* users were probably delighted to find a basic telecom and terminal emulation program, *Terminal*, right in *Windows*. FutureSoft, the company that

wrote the admittedly limited *Terminal* for Microsoft, offers a fully loaded version called *DynaComm*.

No matter what network or computer you need to connect with, you'll find *DynaComm*'s built-in flexibility comforting. *DynaComm* supports the most common binary transfer protocols, including XMODEM (checksum and CRC), YMODEM (batch mode), YTerm, Kermit, and CompuServe B+, but not ZMODEM, the fastest and most advanced protocol. The long list of terminal emulations includes DEC VT52, VT100, VT220 (but not VT102), ADDS VP/60, HP 700/94, IBM 3101, Televideo 925/950, and CompuServe's VIDTEX. Keyboard remapping proves an essential feature when communicating with a terminal that uses a keyboard layout different from that of the standard PC. The manual contains tables that list all the keyboard ASCII values for the terminals *DynaComm* emulates, if you really need to know.

Since you may carry out text transfers in the background, you can run other applications during uploads. In fact, *DynaComm* fully supports Microsoft's Dynamic Data Exchange (DDE). So, for example, the text file you've

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just received can be automatically inserted into a *Microsoft Word* document, or, with the right script, a *Word* document can be uploaded automatically from *DynaComm*. Data can run both to and from *DynaComm* and other programs in multiple channels. Expect a severe reduction in program speed if there's much data exchange going on, though.

Another useful feature for avid telecommunicators is *DynaComm's* ability to open up to eight terminal windows simultaneously. Fully editable, terminal windows come with options for custom text styles, colors, tabbing, and formatting. You can also perform full search-and-replace operations, which become very useful when you receive lots of junk characters in a file.

The *Director* program (really a special script) is *DynaComm's* home base. *Director* functions as an integrated phone dialer and phone book, and provides easy access to settings, files, and log-in parameters. You can choose most actions by clicking on buttons and making menu choices, so communicating becomes about as simple and friendly as possible. Through *Director* you can also create function key macros and scripts that automate communications chores. Many other environments are possible with *DynaComm*, but most users will stay primarily in *Director*.

If you need to write elaborate scripts, *DynaComm* includes a powerful, event-driven script language that also contains the tools to create custom user interfaces, complete with user-definable menus and dialogs. A 400-page manual shows you how to use the script language, but unless you have

some programming experience you won't find it easy going.

Simple log-in scripts aren't too difficult (one is thoroughly explained in the manual), but a typical segment of one of the more elaborate sample scripts confounded me. Log-in procedure scripts for several of the more popular services, such as CompuServe and GEnie, come with *DynaComm*, so you may not need to wrestle with scripts until you're quite comfortable with the program.

Probably the easiest way to begin involves the Record-

LAN interfaces built in; most other communications programs make you buy special LAN versions. This in itself would recommend *DynaComm* to businesses using a LAN. The other attractive capability for *Windows*-based businesses is that users familiar with *Terminal* can use *DynaComm* right away and learn the more complex functions of the program as necessary. Or an industrious network administrator can write and install custom scripts so that the average user doesn't have to worry about advanced functions at all.

As powerful a telecom pro-



PC-IQ makes the austere DOS environment a more temperate one.

er script, which creates scripts of your actions as you make a connection. You can edit scripts created with Recorder as you gain proficiency. The manuals, especially the Script Reference, seem reasonably well written and complete, but they might be hard to follow if you only recently took up computer communications. I'd recommend the online tutorials instead. The online help's a possible supplement to the tutorials, but too often brief to the point of uselessness.

DynaComm has LAN support for NetBIOS and other

program as you could ask for and definitely the most powerful one currently available for *Windows*, *DynaComm* still isn't for everyone, and not everyone should ask for it. If you communicate with only a few easily accessible systems, such as CompuServe or your boss's PC, then *Terminal* may be all you need; why pay for more? But for the professional telecommunicator with a need for advanced LAN compatibility and a desire to customize the *Windows* environment, *DynaComm's* the only choice.

STEVEN ANZOVIN

IBM PC and compatibles, *Windows* 2.11 or higher; *Windows* 3.0 recommended—\$295

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PC-IQ

I am enamored of icons, pull-down menus, and point-and-click control. However, I work in a DOS world, with its command line interface and cryptic error messages. As every PC computing enthusiast knows, typing appropriate commands at the infamous DOS prompt requires utmost precision. Typographical errors return puzzling responses such as *Invalid number of parameters* or *File creation error*. Enter *PC-IQ*, a natural-language DOS interface that uses artificial intelligence to translate DOS computerese into everyday language. Not only does *PC-IQ* understand plain English, but it asks for clarification when it can't interpret a command or when it requires more information to execute an instruction. Online help is always available. All documentation is clearly written. Even computer novices will not be intimidated.

In order to run *PC-IQ* and its associated utilities, you must install it on a hard disk. Installation is a breeze even though the *PC-IQ* directory takes up almost two megabytes of disk space. Be aware that *PC-IQ's* Install option modifies the path statement in your AUTOEXEC.BAT file and also makes changes to the default settings of your CONFIG.SYS file. You'll be able to retrieve the original files, however, because *PC-IQ* renames them

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with the extension OLD rather than overwrite them.

PC-IQ acts as an interface between DOS and the computer user, translating a variety of natural-language instructions into conventional DOS commands. When it operates in natural-language mode, it shows users how it translates "English" instructions into DOS, thus providing an opportunity for interested parties to learn DOS as they work. For example, in natural-language mode, individuals who want to view all directories on a particular disk simply type TREE C (where C is the name of the desired disk). *PC-IQ* also accepts SHOW, GET, and LIST as TREE synonyms.

Once you're in a directory, you can obtain a listing of all files simply by typing SHOW ALL FILES. To open a new directory, type SWITCH x (where x is the actual directory name). *PC-IQ* also accepts GOTO, GO, CHANGE, ACCESS, and even CD, the actual DOS command. Novices who prefer a menu-driven interface over natural-language typing can switch to the program's point-and-click mode. This directs *PC-IQ* to display program options from pop-up menus. Menu choices include directory- and file-level operations and several utilities. Each option, in turn, calls up a submenu of additional choices.

PC-IQ offers a convenient alternative to typing and provides a great way to avoid the DOS command line. Regrettably, *PC-IQ* doesn't support all DOS commands, and it doesn't always recognize backslashes. You can't issue batch commands or use strict DOS syntax. The program does let you create or remove a directory, recover a deleted file, and view or

change the contents of an ASCII file, however. Supported file operations include copy, find, move, rename, create, and print, while disk-level commands consist of check disk, format disk, and diskcopy. The Autoload function makes it possible to run a designated application from a pop-up menu. The Set command enables you to configure your system with the correct time and date. A simple text editor lets you create and save ASCII files up to 64K in length.

PC-IQ has some nifty features. It comes with a built-in screen saver. Its database manager allows you to add new programs to the Autoload list or customize *PC-IQ*'s vocabulary so it recognizes alternate command synonyms. Entertainment files offer you a chance to play a game like Trivial Pursuit or read a series of famous quotations and interesting facts.

Primarily for computer novices, *PC-IQ* will benefit individuals who want to learn something about DOS without having to grapple with unwieldy commands. However, if the DOS prompt does not seem intimidating, you may find the program limiting. It supports relatively few DOS commands, it may run out of memory when other memory-resident programs run simultaneously, and its interface might slow you down. In the final analysis, it might be better to improve your PC IQ with a primer on DOS instead of using *PC-IQ*.

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EYE OF THE BEHOLDER

On the fifth day of Marpenoth in the year of the Shad-ows Piergeiron, the chief lord of Waterdeep summoned me to a most solemn meeting. There was trouble in Waterdeep, and the source lay deep within the city itself. It would be my du-

character generation, and general gameplay. More importantly, however, the game represents a dramatic advance in sound and graphic quality for the Advanced Dungeons & Dragons line. For instance, as you search through the many labyrinths beneath Waterdeep, you hear the distinct sound of dripping water and the muffled footsteps of undead crea-



Eye of the Beholder takes you and your party deep into deadly, labyrinthine sewers.

ty to uncover this evil and destroy it before it destroyed Waterdeep. With a Letter of Marque in hand, I quickly assembled a small band of hearty adventurers and set out to face the unknown source of evil. Unfortunately, the most logical place to begin my search was also the least hospitable—the sewers beneath the city.

Eye of the Beholder joins Strategic Simulations' Advanced Dungeons & Dragons line of fantasy role-playing games, and it's the first title in the groundbreaking new Legend Series. *Eye of the Beholder*, like all games in the new series, utilizes Advanced Dungeons & Dragons Second Edition game rules for combat resolution,

During combat, you hear the metallic clang of heavy weapons on armor and the ghostly cries and hisses of your dying foes as your party battles with bizarre monsters. The sewers are inhabited by a variety of creatures ranging from Giant Spiders and Zombies to Kobolds and Mantis Warriors. All monsters are carefully drawn and animated.

You can begin the game either by creating your own characters from scratch or, if you want to dive right in, by using a prebuilt party. *Eye of the Beholder* can be played entirely with keyboard input, or you can point and click your way through the adventure with a mouse or other pointing device.

As you explore the sewers below Waterdeep, the area directly in front of your party is visible through a large 3-D view window. To the right are character portraits of the four player characters and up to two nonplayer characters (NPCs) who may join your group during the adventure. Hand-held items such as weapons and spell books are shown alongside each portrait, and both combat and spell casting are accomplished by clicking on the appropriate icons. Below each portrait, characters' hit points are displayed either as a bar graph or, if you prefer, a numeric value. By clicking on a specific character's portrait, you access an equipment screen that graphically displays all of the character's belongings. Here, you can easily outfit a character by dragging weapons and armor from backpack to body. To feed your fearless warrior, you simply drag food from his or her backpack over to a small table setting and drop it on the plate.

A separate character screen supplies all the vital statistics on each character such as class, alignment, race, sex, ability scores, experience, and character levels. Convenient Next and Previous buttons on both the equipment and character screens let you access similar information on other members of your party without your having to first return to the main screen.

Eye of the Beholder is not without a couple of annoying faults. First, each time you load the game, you must specify the graphic mode and sound board you wish to use and indicate whether or not you want to use your mouse. Second, unlike many games that allow you to save multiple games by as-

signing each a unique name, *Eye of the Beholder* makes every game that you save automatically replace the previous one. Even with these glitches, *Eye of the Beholder* remains one of the most engaging fantasy role-playing games I've seen in a long time and one that no Advanced Dungeons & Dragons fan should be without.

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MAPVIEWER

Have you ever looked at a map and wanted to see the information displayed differently? Perhaps a job presentation or sales close could have benefited from a jazzier visual aid than an uninspired photocopy from an old sales manual?

MapViewer, from Golden Software, could be your answer. It allows you to use standard maps or create your own and customize them any way you want. This Windows 3.0 program helps you create great presentations and is a terrific aid to schoolwork.

Any discussion of technical software should start with a review of its most important and often most neglected component—the documentation. *MapViewer* comes with an intimidating 312 pages plus appendices to sift through. The manual contains an introduction, start-up procedures, a tutorial, an advanced features

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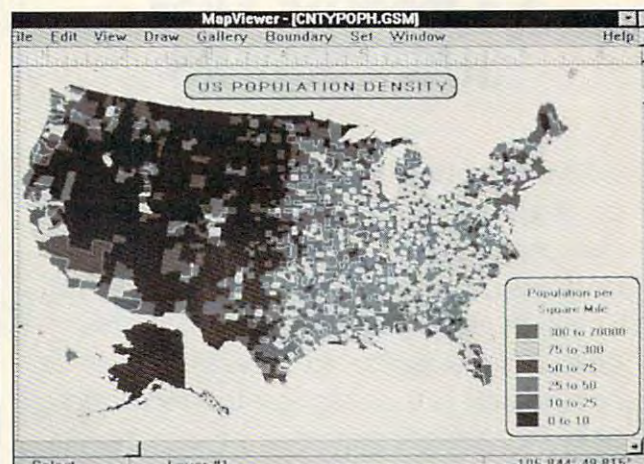
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section, and a handy reference section.

Although the sheer volume of documentation may at first seem a bit overwhelming, it took me only about two hours to work

readable; even the index appeared complete and dependable.

Most people will first experience *MapViewer* by running through the tutorial. When you first boot the pro-



MapViewer puts useful geographical data at your disposal.

through the tutorial and two hours to read the rest of the manual. Then I was ready to use *MapViewer*. I found the manual to be well written, concise, and generally

gram, a standard Windows screen with icons for map customization greets you. The tutorial then instructs you to import a data file of the fifty American states and

a data file detailing the populations of each state. Then, using a simple spreadsheet, the tutorial reshapes the information into a variety of maps that display population ranges. For instance, a hatch map color-codes the country according to population density. A symbol map places appropriately sized human figures in each state. The bigger the person, the bigger the population. Choosing a prism map gives you three-dimensional states with the height of the state corresponding to the size of the population. A dot-density map fills each state with dots in proportion to the population. For incorporating more than one variable, a pie map inserts a pie

chart into each state and allows for population breakdowns into categories such as male and female.

Next, you may print your data. Finally, the tutorial runs through the help screens and index. A tutorial in any manual is an indispensable tool in learning how a program works. You learn best by doing, and Golden Software deserves applause for including such a complete and usable tutorial in the manual.

After running the tutorial, you're ready to explore *MapViewer* on your own. The features included allow you to make your map three-dimensional, display two data variables for each geographical area, put several

maps on one page, cover up parts of the map, or use the clipboard. In order to test the usefulness of the program, I constructed a map representing the spread of my personal business. This was an adequate test of the agility of the program, since my client base spans a large geographical area but is concentrated in very small groupings. I expanded the four counties surrounding me into an enlarged area and showed the remainder of the United States in a secondary map. For good measure and aesthetics, I then made the map three-dimensional and added color. Altogether, it took about four hours—one hour to enter the information into the spreadsheet and three hours to use the manual to figure out what I wanted to do.

The quality of printing was fine on my HP laser printer at work, but the legibility on my inexpensive dot-matrix printer at home was quite poor; distinguishing the different shades in each map area proved difficult. A representation in the manual of how the different colors will show up in black-and-white printing would've been handy and certainly saved time. Another problem is the definition of the geographical representations. Blowing up the area in and around Kuwait (which we've all become familiar with) revealed a very simplistic rendering of the borders. Honestly, though, these quibbles with an otherwise unique and useful program don't begin to undermine its strength.

When I first received *MapViewer*, I struggled to justify its utility. Though undeniably well made, *MapViewer* made me wonder, "What can I use it for?" I found my an-

swers. While other graphic business programs might sit on my shelf after reviews are written, *MapViewer* will stay on my hard disk. My son and I discovered (in my case rediscovered) the versatility and usefulness of maps. I know of no other tool as handy for supplementing a child's geographical education. In addition, its usefulness in supplementing business proposals recently became apparent—and since then, indispensable. I incorporated *MapViewer* into two presentations, and the results pleased me tremendously; my presentations were simply more impressive. For a program that on first glance appeared all but useless, a trip through the workings of *MapViewer* soon convinced me that its appeal should, geographically speaking, reach far and wide.

ADAM STARKWEATHER

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Once the program has been installed, just push a few buttons, answer some questions, and out pops a customized form. The program allows individuals to create a new document, revise an existing document, or print a hardcopy of a completed document. Onscreen prompts give directions every step of the way, and you can expect online help for any question you might have.

Our family lawyer, a practicing attorney in the state of Massachusetts, says that *Personal Law Firm* has potential. Ordinary folks shouldn't have to run to a legal professional for routine paper processing, especially when it comes to documents like a power of attorney, promissory note, or bill of sale. While the laws of different states may vary, these basic forms often prove legally valid in most jurisdictions.

On the other hand, our lawyer points out that blind faith in some *Personal Law Firm* documents could spell danger. For example, in the matter of a commercial real estate lease, virtually no such thing as consumer protection exists. If you execute a commercial lease without go-

ing to a lawyer, you can inadvertently leave out important provisions that protect your interests.

Your unease may heighten when you consider that *Personal Law Firm* documents were created by a member of the California bar. Laws tend to differ from state to state. For example, if landlords use the standard form for a residential lease (designed for nationwide application) in Massachusetts, they could get into serious trouble by overlooking specific state requirements concerning move in/move out inspections, escrow accounts for damage deposits, maximum limit for damage deposits and last month's rent, and other landlord obligations. These landlords could be forced to return tenant damage and security deposits before the end of the lease. They could even end up paying their tenants up to triple damages and attorney's fees.

A step in the right direction, *Personal Law Firm* could benefit people preparing a document for legal review. Clients might not save any money in attorney's fees, however, because lawyers often charge a set fee for completing particular documents, regardless of whether or not the client prepares an outline.

Probably best suited for a typing service run by a skilled independent paralegal, *Personal Law Firm's* forms require the attention of someone who knows when it's appropriate to fill in the blanks and when it's necessary to approach a lawyer. Our lawyer cautions that a little bit of knowledge, posing as expert advice, can be as dangerous as an outdated law book.

The whole thrust of *Person-*

—Wizardsry—

And the visions
Appeared
as they never had
before

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al Law Firm seems to suggest that individuals do not need a lawyer for certain documents. The packaging states that the software "creates documents that are valid in 49 states and the District of Columbia." Yet a tiny note at the bottom of the box says, "BLOC Publishing offers no warranty, express or implied, as to the legality of these documents in your particular state." This disclaimer appears intended to absolve BLOC Publishing of any liability. With the possible pitfalls in mind, exercise caution when creating your legal documents. Ultimately, the price of mistakes will be paid by you.

In future versions of *Personal Law Firm*, I'd like to see documents tailored to the laws of specific states. I'd also like BLOC Publishing to have its attorneys include the citations which specify the legal basis for the documents included. If nothing else, the program provides some insights into the legal system that laymen might oth-

erwise never investigate. Citations would add to the educational value. For safety's sake, though, don't rule out an attorney or a typing service run by an independent paralegal. In law, as with the medical profession, it's sometimes wise to seek second opinions.

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STUDYMATE— THE GRADE BOOSTER

One commonly held educational theory states that a critical aspect of learning is the development and strengthening of study skills. Capitalizing on this notion is Compu-

REVIEWS

Teach's *Studymate—The Grade Booster 2.2*.

Studymate does not pretend to be a program that teaches study skills. It leaves that multifaceted task to David H. Griswold's *How to Study*, a 148-page paperback enclosed as a bonus. Essentially a test-construction kit, *Studymate* provides a tool to help students organize their learning, review it in many different formats, and absorb it through repetition.

The main program consists of two parts—Editing Functions and Taking a Test—both accessed via a series of keyboard-controlled menus. From the Editor menu, you may create, edit, review, print, delete, or copy a test. In addition, you can

call up a disk directory that contains not only each filename but also a brief description of all exams on the disk, the style of questions they use, and who wrote them.

Taking for granted that you already know how to write a test, the documentation offers only a few tips on how to go about doing so. Fortunately, viewing some of the 75 different 20-question quizzes included on the Vocabulary Power Disk will give you ideas for framing questions, as well as help you improve your word usage.

Teachers using software for their pupils or parents generating quizzes for their children should have no trouble manipulating the Create function or thinking of ideas for

tests. Likewise, bright students who need review in certain subjects will find the program easy to handle.

Slower learners, however, will be hard-pressed to locate the relevant facts and ideas and to formulate them into meaningful questions. Although the program is best employed for teaching knowledge- and comprehension-based material, to construct items for it requires higher levels of learning, such as analysis and synthesis. This might make the Create function of *Studymate* inaccessible to many of the very people it is trying to help.

In the right hands, the Create module may be used to produce a wide variety of tests: true/false, multiple

choice, fill in the blanks, spell scrambles, missing letters, and combinations of the above. Noticeably absent are matching columns, a test format commonly used by teachers of all grades.

Each test type has its own unique options and template. For instance, from the Multiple Choice menu you may determine the total number of responses and enter your own incorrect choices or have the program randomly assign them. After making your selections, you move to the template and fill in your first question, the correct reply, and the incorrect answers (unless randomly chosen) in the spaces provided. In this way you may create

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as many items as disk space allows.

After completing your exam, you may administer it either on screen or via hardcopy. If you choose the former, access the Take a Test module and then load in the file, and you're ready to go. As a test giver, the computer flags mistakes and will usually offer you a second chance. If you're still in the dark, the program supplies the correct answer. When you're done, you're told the number and percentage of correct replies and the time it took to complete your work. Then you may decide to print the results, to be retested on the items answered incorrectly, or to re-take the entire examination.

If you're preparing to take a test, *Studymate* provides solid value at a reasonable price. It won't study for you, but it will help when you decide to crack the books.

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CENTRAL POINT ANTI-VIRUS

You know that feeling you get when, after a complete physical examination, the doctor shakes your hand and tells you you're as fit as a fiddle? Well, that's how I feel since installing *Central Point Anti-Virus* on my hard drive. The program assures me that my system is free of computer viruses. *Central Point Anti-Virus* not only checks your entire system

for any signs of viruses but also can remove viruses from infected files and provide continuous protection from infection. That supplies invaluable peace of mind.

Central Point Anti-Virus recognizes more than 400 viruses—nasty little bugs with names like Dark Avenger, Chaos, Disk Killer, Leprosy, Beast, and Friday the 13th. Even more frightening than the names of viruses is the wide range of symptoms you're likely to encounter if the viruses manage to infect your system. Symptoms range from the annoying (files increase in size, your system slows down, music plays over your PC speaker, or mysterious messages appear) to the disastrous (your hard drive reformats!).

Two memory-resident utilities, *VSafe* and *VWatch*, provide continuous protection. The highly configurable *VSafe* uses 22K of system memory and monitors your system at all times for suspicious activity. If free memory's scarce on your system, substitute the 8K *VWatch* instead. *VWatch* checks for the presence of known viruses each time a program executes or a disk is accessed.

You can install either utility as a COM file or as a driver. As COM files, the utilities can easily be removed from memory at any time with a couple of keystrokes. You can't disable the driver versions of these utilities, but since they load into memory before *COMMAND.COM*, they automatically check this file for viruses.

Bootsafe, a utility run from your *AUTOEXEC.BAT* file, protects your system against viruses that try to infiltrate the boot sector on your hard drive. During installation, the program creates images of your boot sector and parti-

tion table and stores them in a hidden image file in the root directory of your hard drive. Then each time you boot your system, the program looks for existing boot sector viruses by comparing the current boot sector and partition table with those in the image file.

As with *VSafe* and *VWatch*, *Bootsafe* is completely optional during installation. If you don't think you need continuous protection, you can simply load *Central Point Anti-Virus* periodically to scan for viruses. If you choose to use the program in this manner, it will even remind you at regular intervals (user-selectable from one week to three months) to scan your system. Despite the sophistication of *Central Point Anti-Virus*, the program remains very easy to use, with context-sensitive help available at all times and a clear and extremely thorough manual. Besides telling you everything you need to know to use the program, the manual explains how the program works and includes a

43-page Virus Dictionary, which lists close to 200 viruses and describes in some detail their symptoms and infection mechanisms. In addition, you can count on support from the Virus Protection Service Plan, which provides registered users with a virus hotline, quarterly mailings, online support via Central Point's BBS (or CompuServe), and one free upgrade. Now, that's a comprehensive PC health package.

BOB GUERRA

IBM PC and compatibles, 512K RAM—\$129, \$30 for registered owners of other Central Point products

CENTRAL POINT SOFTWARE
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WINDOWS 3 POWER TOOLS

If you're interested in becoming a *Windows* power user, this is the book for you. Instead of concentrating on get-

—Wiz—ardry—

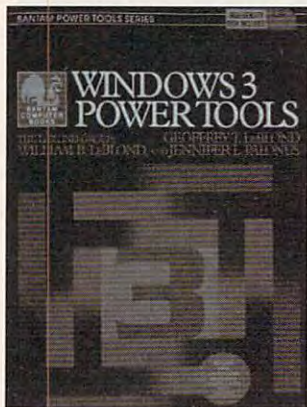
*I have died
of untold fear
and horror,
but my secret is safe—
for now*

CRUSADERS of the DARK SAVANT

As rich a tale as ever told

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ting-started information or the basics of using *Windows* accessories, this book-and-disk combination focuses on *Windows* itself, and it includes solutions to lots of knotty problems that plague intermediate and advanced *Windows* users.



Windows 3 Power Tools works the kinks out of *Windows*.

Windows 3 Power Tools delivers information on almost every aspect of running *Windows*. Early chapters deal with mastering *Program Manager*, *File Manager*, fonts, and *Recorder*. More advanced sections follow on *Clipboard* and *DDE*, memory management, and customizing *Windows*. The final chapters concentrate on improving the performance of *Windows* and using *Windows* on a network.

The section on *Windows* memory management is especially noteworthy. It's the clearest discussion of *Windows*' three modes of operation and how *Windows* uses expanded and extended memory I've read. There's also useful information on high-memory managers like QuarterDeck's *QEMM*.

The chapter on improving *Windows*' performance is excellent as well. If you've wondered what arguments you should really use to optimize

SMARTDrive's performance, this chapter will clear up the confusion.

In addition to these tips and techniques, *Windows 3 Power Tools* includes a disk full of some notable *Windows* software. Included are *Oriel*, a batch language for *Windows*; *Command Post*, Wilson Window's replacement for *Program Manager*; *Aporia*, a true object-oriented interface to *Windows*; and *IconDraw*, an icon editor. All are worth a look.

Since *Windows 3.0* hit the scene, scores of *Windows 3.0* books have appeared. *Windows 3 Power Tools* is the best one yet.

CLIFTON KARNES

Authors: The LeBlond Group—Geoffrey T. LeBlond, William B. LeBlond, and Jennifer L. Palonus
664 pages—\$49.95

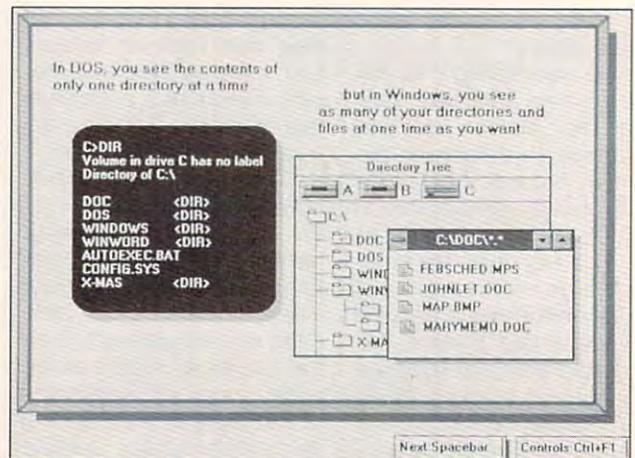
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New York, NY 10103

Circle Reader Service Number 334

MICROSOFT PRODUCTIVITY PACK

If *Professor Windows* is for the computer-shy, *Microsoft Productivity Pack* is intended for the computer-literate. Its purpose is the same, teaching basic *Windows* skills to the new user, but it places greater confidence in that user's study habits and familiarity with computers.

The largest of the three modules included in *Productivity Pack*, *Learning Windows* provides sections on Getting Started, *Windows* Essentials, Working with Applications, Managing Your Files, Organizing Your Work, and A Day with *Windows*. Graphical representations of historical and fictional charac-



Microsoft Productivity Pack explains the fundamental differences between *Windows* and *DOS*.

ters lend each presentation a creative touch. Cleopatra, for instance, multitasks several *Windows* applications while designing the pyramids.

Productivity Pack doesn't quiz you as lessons proceed, so take notes like a good detective. You'll conclude *Learning Windows* by using the environment to help Sherlock Holmes solve a case. This calls on all your recently developed skills, and while you can always tab through this section to get at *Productivity Pack*'s answers, who wants to fail Sherlock Holmes?

The other two *Productivity Pack* modules, *Quick Troubleshooting* and *Working Smarter*, are simply fancy titles for problems and hints. Both topics offer *Windows* Help-style access to simple but effective information. These two areas give the impression of providing more material than they actually cover because many of the extensive help subbranches lead back to a relatively small number of answers.

Productivity Pack is a refreshing, hands-on approach to learning about the

GUI that conquered America. While you may find all the same information in the *Windows* manual, you won't get all the fun pictures.

BARRY BRENESAL

IBM PC and compatibles, *Windows 3.0* or later—\$59.95

MICROSOFT
1 Microsoft Way
Redmond, WA 98052-6399
(800) 426-9400

Circle Reader Service Number 335

OPTIONS

Does the dreaded *DOS* command line interface get you down? Do your typing skills give rise to a *File Not Found* response more frequently than you care to admit? Do you have difficulty remembering obscure nested directory paths? Then replace the infamous *DOS* prompt with *Options*' point-and-click interface.

Options typically installs in the C drive and modifies your *AUTOEXEC.BAT* file to execute automatically at startup. Alternatively, you could access the system by entering *MENU* at the *DOS* prompt. Menu options execute *DOS* commands,

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launch programs, or run batch files.

The program features time-saving macro capabilities, password protection to limit access to designated users or particular directories, plus a screen saver that blanks the screen after a user-specified length of time. You also get Tracking Control to keep records of computer usage, a Stopwatch function for time tracking (great for keeping time records on client phone calls), and pop-up calendar, calculator, and memory map accessories.

Options automatically loads functions into extended memory in order to lessen the amount of conventional memory required to run the application. Pull-down menus in the Edit mode and context-sensitive online help assist with program operation. The package provides users with several convenient features in one handy location. Isn't it time you considered your options to maximize productivity, guarantee system security, and minimize operator error?

CAROL HOLZBERG

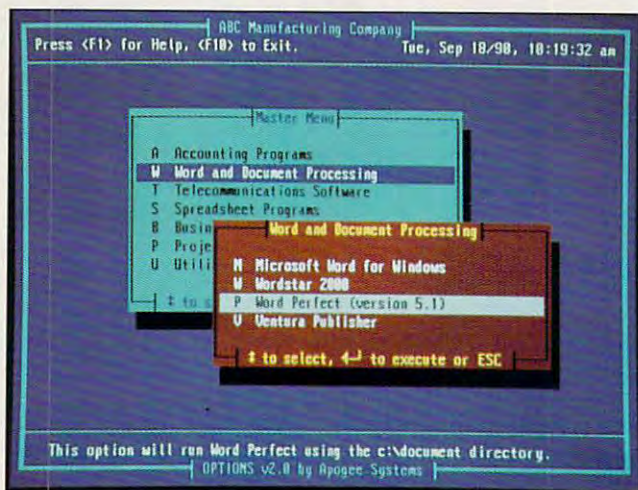
IBM PC and compatibles, 384K RAM, hard disk; mouse recommended—\$89.95

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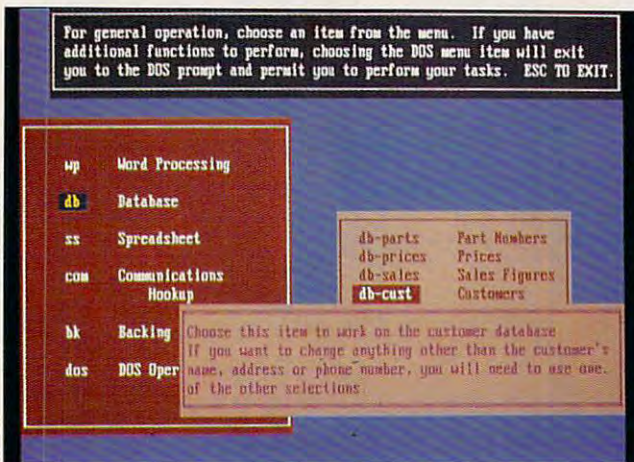
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PROKEY PLUS

Popular with experienced computer users, macros sometimes perplex or intimidate computer novices. Even a novice, however, can appreciate the advantages of macros. Substituting a single keystroke for a series of strokes, macros save time and prevent typing errors.



Exercise your options and do away with the DOS prompt.



ProKey Plus helps you write macros for every occasion.

Like most shortcuts, macros have some drawbacks. Creating macros so that Ctrl-E produces the closing lines of a letter and Ctrl-H writes letter headers only saves time if you can remember which key does what. *ProKey Plus* solves this problem. To help you write macros, *ProKey Plus* lets you annotate them. When you list your macros, you'll see a description of what a hot key does, rather than the usual litany of the component keystrokes. *ProKey Plus*, which occupies about 67K of RAM, interposes itself between your key-

board and any application you may be running. This means that you can use the program to define or execute macros from within your application programs.

Modern word processors are notorious for the complex keystroke sequences necessary to invoke their commands. *ProKey Plus* provides an alternative; I tested it with *WordPerfect*, arguably the word processor that puts you through the most rigorous keyboard gymnastics, and it worked satisfactorily. *ProKey Plus* is quite rapid in its response. I fault it only on

its documentation. The manual is not tutorial in nature and needs more explicit examples. Even so, *ProKey Plus* in your library might go a long way toward easing the tension between you and your word processor!

CHARLES IDOL

IBM PC and compatibles—\$129

ROESOFT
P.O. Box 70337
Bellevue, WA 98007
(206) 562-0225

Circle Reader Service Number 337

PC USA

How many outdated atlases, dictionaries, and encyclopedias do you have gathering dust? Well, for the atlas at least, the days are numbered. *PC USA*, a computer atlas program available from PC Globe, offers both a graphic representation of the United States and a comprehensive database of all sorts of useful and trivial facts. Now you need never miss a question in the geography section of your favorite trivia game.

In order to access all this great information, you use a standard imitation *Windows* interface. Commands lined all along the top of the United States map allow you to determine which database you want to enter and the level of detail involved. You'll also find mighty helpful the small insert that describes how to run *PC USA* through *Windows 3.0*.

The manual itself adequately describes installation and all the various databases, though I ran the program effectively without much preparation. You also get a complete bibliography, which proves vital when determining the accuracy and currentness of the abundant information utilized in the program.