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(SEE PAGE 40)**

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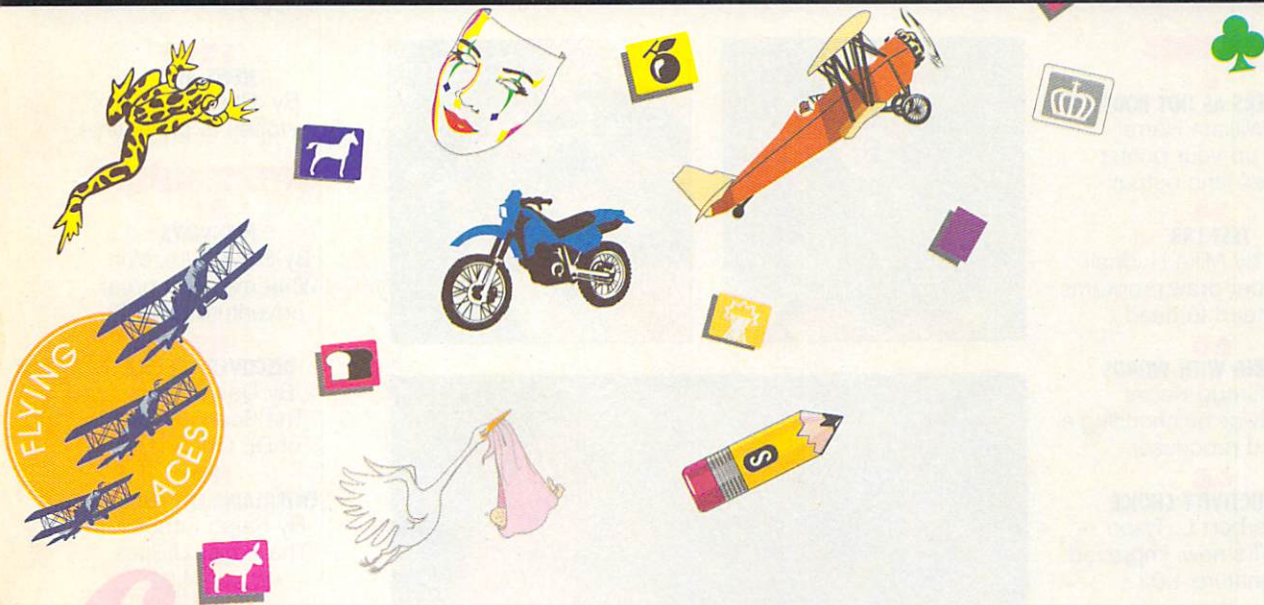
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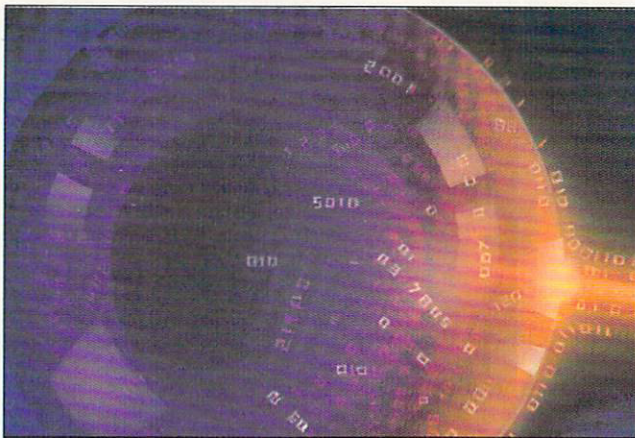
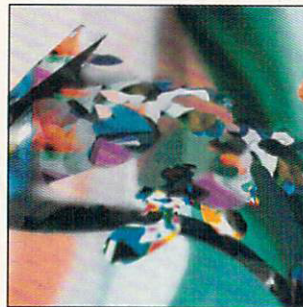
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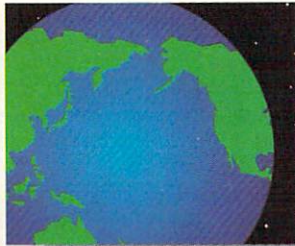
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WordPerfect for Windows, Roland SCC-1, The Rocketeer, Sports Adventure, Sony Multiscan HG VGA Monitor, Micro-Scope 4.28, Star Laser Printer 4, Midwest Micro Ultra 386SX-20, Three Windows Utilities, Armor Premier Accounting Software, Pet Mouse, PC Positive 2100-2, The Bard's Tale Construction Set, and Freedom Menu System.

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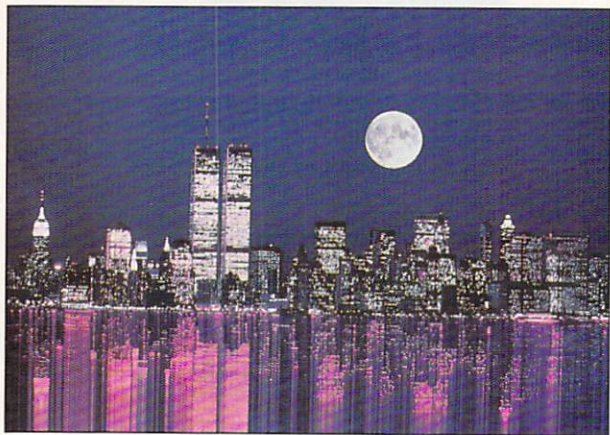
EDITORIAL LICENSE

Clifton Karnes

PC Expo, held this past June in sunny New York City, saw the introduction of several new, innovative products. Some of these are major new releases, but many would be easy to miss. Here's a quick look.

First, many of the innovations at PC Expo focused on notebooks, which get smaller, lighter, and faster each year. The most exciting news for laptopppers is the introduction of PCMCIA cards. PCMCIA is a standard for credit card-sized add-ons that are machine independent, so any PCMCIA card can work in any machine. The first use for PC-

Here's an inside look at PC Expo in New York, the show of shows for corporate buyers.



MCIA cards was memory. With the introduction of an enhanced specification (2.0), however, PCMCIA cards can be used for modems, ethernet adapters, and just about anything else.

At NCR's booth, the company was proudly showing its light and sexy NCR 3170 laptop, an enhanced version of the Safari, which made such a stir several months ago. Besides a state-of-the-art pointing device and battery-saving CPU, the 3170 has a PCMCIA slot, and the reps at the booth were running around with handfuls of every type of card imaginable, demonstrating how each worked with the

3170. They even hinted that the next generation of PCMCIA cards would allow a fully functional Winchester hard drive to be put on a card.

At the other end of the hall, one of NCR's competitors, Sharp Electronics, showed its gorgeous notebook color displays. And, behind closed doors, the company also unveiled a working version of its new Pen Wizard, a slightly larger Wizard with a GUI pen interface.

Aldus, famous for PageMaker, upped the ante in the low-end draw market with its introduction of IntelliDraw, a draw program that uses intelligent objects. What's an intelligent object? It's a vector-based graphic that retains its shape and character when resized or stretched. This means you can manipulate intelligent clip art and never lose the object's identifying attributes.

Although PC Expo is primarily a show for corporate buyers, there were several entertainment companies represented, and one of them was a major surprise: Microsoft. Until recently the only Microsoft entertainment title was Flight Simulator, one of the most popular games ever. At PC Expo, the company introduced Microsoft Golf, a game it has licensed from Access, the creators of Links. (Look for a book on Links and Microsoft Golf this fall from COMPUTE books.)

Programmers at PC Expo were able to see demonstrations of two cutting-edge Windows code generators. A code generator allows a Windows programmer to draw an interface interactively and then have the program generate the code necessary to produce the interface. The programmer then takes this code as a starting point for a program. At PC Expo, Protoview and Caseworks were showing

their stuff. The big news is that both companies offer an upgrade path for different compilers. Caseworks' Case:W 4.0 offers Knowledge Engines, add-ons that allow the same program to generate code for different compilers. There are separate Knowledge Engines for C, C++, MFC, OWL, and so on. With this approach, you can design your interface and generate code for one compiler, say Microsoft C, but if you decide to move to C++, all your interface design can be reused by simply plugging in another Knowledge Engine. Protoview plans to include all these code generators with its basic product.

As most Windows users know, Windows leaves a big footprint when it takes control of your system. Understanding what Windows does to your operating environment is difficult, but Renasonce's Skylight, a new diagnostic tool introduced at the show, is a big help. One of Skylight's most useful features is its system file editor. When you're inside the editor, you can right-click on any line and get an explanation of just what that line does. If you've every looked at your SYSTEM.INI file, you know how useful this can be.

Physiotronics introduced Sherlock, a new tool that breaks the eight-character limit for Windows filenames. With Sherlock installed, all your Windows applications will be able to use filenames of as many as 254 characters. Looking through my WinWord and Excel directories, I see filenames such as E0692PCX.XLS, REP0692.DOC, M0692BT2.DOC, and F0592FD.DOC. Clearly, I need this program.

Stay tuned to future issues of COMPUTE for full reviews of these products. □

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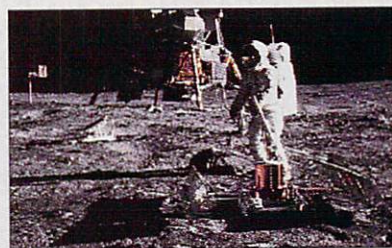
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PRINTERS

Remember the hot rods? Muscle cars like the '65 GTO and '66 Chevelle SS. In our prideful youth, we spent every penny on our cars and every spare minute with them, working on the engines to make them faster and more powerful, waxing them and detailing them to catch the eye of that certain

someone at the drive-in or just to turn heads on the main strip in town. Young and image-conscious, we put all our attention into whatever we thought made us look good. I was as guilty as the next guy. I souped up my car—a fuel-injected carburetor for speed, wide tires for traction, loud pipes to announce my presence, and chrome wheels and pinstripes to look good. I read hot-rod magazines voraciously, lusting after new and improved add-ons. Enthusiastically ordering the extras I could afford, I waited impatiently for the mail carrier to deliver them.

As we age, we still want—and need—our toys, but somehow they have to be more utilitarian to be justified.

**Instead of junking
your jalopy of a printer,
soup it up with one
of these super add-ons**

By William Harrel

Today, all grown-up, I read computer magazines, marveling at the newest technology, all the work it can help me do, and the speed it will give my computer. How much better my documents would look if only I had this add-on, that peripheral. I buy the ones I can afford. And when they don't come on time, I call

the freight carriers to find out why.

Just as I tinkered with my car, I piddle with my computer. I've found that one way to tweak my computer's performance is to tune up my printer. Out of the box, few printers are fast enough, and even fewer have pretty or versatile output. Luckily, however, add-ons that enhance both speed and quality abound. The solutions range from inexpensive software to costly hardware—and include everything in between. What you can do to improve your printer's performance depends on the type of printer, your application (what you need), and, of course, your budget. The goal is to get the output right, and to get it fast.

S HOT RODS

Output quality—the look of the printed page—is improved by printing at a higher resolution (more and better paint) and by adding fonts (detailing). Again, depending on the printer, there are a number of add-ons that do one or the other. A few do both. Some products, such as soft fonts, give you professional-looking typefaces. Others, such as PostScript-emulation cartridges, make a LaserJet printer PostScript compatible. At the high end of the add-on market are resolution-enhancement boards, which boost resolution by several hundred dots per inch (dpi). Some, such as LaserMaster's WINJet 800, increase both speed and resolution.

You can speed up printing with memory boards that increase your printer's RAM (a new carburetor), allowing it to receive and process data more quickly. Another alternative is a spooler—a place on your hard disk or in your computer's memory where print data is collected and transmitted at a rate the printer can handle. Neither memory nor



spoolers do much to actually make the printer faster; instead, they move printing to the background, returning control of the computer to you faster so that you can continue working. Enhancement boards, which take processing away from the printer, speed up printing.

The surest way to enhance printing is with a fast computer and a new printer (the latest RX7 or Mustang). But for most of us, this is impractical, perhaps even impossible. Besides, you can't get much on trade-ins. Instead of retiring your printer to the scrap pile, try one of these add-ons to boost its performance.

Dot-Matrix Printers

This class of printers needs the most help. Dot-matrix printers usually have only a few built-in (resident) fonts and are slow to begin with. Unfortunately, there isn't much help available. With many laser printers now priced well

REVVING UP WINDOWS

Almost everyone raves about Microsoft Windows. But no one lauds the program's printing performance. That's because Windows printer drivers are notoriously slow. And version 3.0 limps away from the starting line when it comes to font handling. There are, however, ways to supercharge your printing in Windows.

Upgrade to Windows 3.1.

Before buying a third-party printer add-on, run down to the software store and pick up Windows 3.1. It's like trading in your two-year-old Ford on a brand-new Lincoln. Version 3.1 runs faster; handles memory better; stalls less; and, yes, prints more quickly—much more quickly. And it comes with its own type manager, TrueType.

TrueType runs in the background with no fuss, is compatible with other type managers (you can run them concurrently), prints on almost any printer—and it's free! Fifty TrueType fonts and four weights of Helvetica, Courier, Times, and Symbol equivalents come with the upgrade, and you can buy others from Microsoft. For many applications, the original 50 are the only fonts you'll ever need.

Turn on Print Manager. Windows' Print Manager is a built-in spooler that processes print jobs in the background, quickly freeing up your computer so you can get back to work. To use it, click on the Control Panel icon in the Main program group; then click on the Printers icon. In the lower left corner of the Printers dialog box, select Use Print Manager. Close the dialog box and Control Panel. Windows will now spool your print jobs.

Install a RAM drive. If you have plenty of memory in your computer (at least 4MB), you might want to install a RAM drive with RAM-DRIVE.SYS, which is included with both DOS and Windows. A RAM drive is a portion of memory that emulates a physical drive; it's much

faster than a hard disk. Once you've installed the RAM drive, you can direct spooler and other temporary files to it with a SET TEMP= statement in your AUTOEXEC.BAT file. There are complete instructions for setting up and using RAM drives in the DOS and Windows manuals.

Install a third-party printer driver. If you still aren't satisfied with the printing speed even after upgrading to 3.1 and turning on the spooler, try adding an enhanced printer driver, such as Zenographics' SuperPrint. One of these products will replace Windows' printer drivers and spooler files. It can often speed up printing. Be sure, however, that a driver for your particular printer is included.

Install a type manager. If your application requires many different fonts and imagesetter compatibility, you may still need ATM or some other type manager. Even if TrueType catches on (which it probably will), it could be some time before there are many typefaces available for it.

Install an enhancement board. The ultimate solution, other than buying a new computer or printer, is installing a resolution-enhancement board. LaserMaster's WINJet 800, designed especially for Windows, speeds up printing, has 50 fonts, and is PostScript compatible. The bad news is that you'll need a 386 with 8MB RAM to use it.

HERE ARE SIX WAYS TO
SUPERCHARGE YOUR
PRINTING IN WINDOWS.

below \$1,000, like it or not, dot-matrix is a fading technology. Fortunately, however, dot-matrix users do have some options (not the case with my '56 Buick Special—to find parts for it, I was finally relegated to the junkyard).

Dot-matrix printers rely heavily on the computer for processing print data. Many are capable of receiving only a few lines of information at a time. So there's little you can do to speed up your dot-matrix printer unless you install a software spooler, like Windows' Print Manager or Zenographics' SuperPrint, or buy a print buffer, which is nothing more than a RAM spooler. You can, however, improve print quality with one of the following software solutions.

Type managers. If you use Windows, WordPerfect, PageMaker, Ventura Publisher, or any other major software application, you're probably familiar with type managers. The most popular is Adobe Type Manager (ATM). Also in this category are LaserTool's Fonts-on-the-Fly, Bitstream's FaceLift, MicroLogic's MoreFonts, Microsoft's TrueType, and many others. Type managers manage type. In other words, when you ask for a certain font in a document, such as 12-point Helvetica, the type manager creates it from a font outline on your hard disk and sends it to the printer. Although dot-matrix printers aren't capable of accepting downloadable fonts as laser printers are, with a type manager installed, they can draw graphic representations of the fonts, thereby giving your printer access to virtually hundreds of professional typefaces.

Nowadays, most type managers run under Windows. ATM, Fonts-on-the-Fly, and a few others can be used with WordPerfect 5.1 and other popular DOS applications.

PostScript emulators. PostScript is the output of choice for desktop publishers and graphics designers—the people who really need quality printing. With PostScript you get fonts that are scalable from two to several hundred points (there are 72 points to an inch). And PostScript improves graphics capabilities. For dot-matrix printers, emulators

DOT-MATRIX PRINTERS RELY HEAVILY ON THE COMPUTER.

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such as LaserGo's GoScript are the only way to get PostScript. The output is a little shy of laser quality, and emulation software requires a lot of computer horsepower—as much as a 386 with 4MB of RAM and a math coprocessor. Even then, don't expect exceptional performance. Another advantage of PostScript is that it's high-resolution imagesetter compatible (see the sidebar "Renting a Limo"). If you need typesetter output occasionally, an emulator is one way to proof documents before taking them to a service bureau.

Ink-Jet Printers

The Hewlett-Packard (HP) DeskJet and other ink-jet printers can use most type managers. Memory can be upgraded (but not by much) with memory cartridges. But so far, emulators are the only way to get PostScript. Ink-jet printers can also use bitmapped soft fonts and font cartridges.

Like dot-matrix printers, bitmapped soft fonts are being supplanted by newer technology—in this case, scalable soft fonts and type managers. However, some top-selling DOS applications (Lotus 1-2-3, Harvard Graphics, and WordPerfect) currently still use them. A drawback is that bitmapped fonts come in fixed sizes and require a lot of disk space. To use soft fonts with an ink-jet printer, you must upgrade printer memory.

Bitmapped font cartridges.

Bitmapped font cartridges offer a limited number of typefaces in fixed sizes. Many printer manufacturers offer optional cartridges for their ink-jets (HP has a whole line). Also available are some third-party products, such as CPI's DeskSet, which has 68 fonts, and Pacific Data Products' DeskJet, which has 25. Ink-jet font cartridges vary widely. Be sure that the one you buy works with your printer.

Laser Printers

Although laser printers come in all shapes and sizes, they can be separated into two basic types: HP compatibles, which use HP's Printer Command Language (PCL), and PostScript. There are other printer lan-

RENTING A LIMO

The quality of printer output is determined primarily by resolution, or dots per inch (dpi). Dot-matrix printers, for example, print between 75 and 150 dpi, which is the reason graphics, straight lines, and large type come out jagged. There aren't enough dots to fill in the gaps. Most laser printers print at 300 dpi, which is passable for many applications, such as printing text and simple graphics. Recently, 400-, 600-, 800-, 1000-, and even 1200-dpi laser printers have appeared. Although their output is markedly better than that printed at 300 dpi, they still don't match the clean, crisp quality of high-resolution imagesetters, such as the 1270- and 2540-dpi Linotronic 330.

If your documents contain complex graphics, halftone screens, or scanned photographs, they really should be printed on an imagesetter. Laser printers—no matter how high the resolution—just can't measure up. The only place to get imagesetter output is at a desktop publishing service bureau. If you live in a city, there's probably one around the corner. If not, there are several throughout the country that accept files by modem or on disk by mail or courier.

If you use a type manager with PostScript fonts (such as ATM), you can easily print your documents on an imagesetter. Because of the diversity of IBM-compatible applications, however, most service bureaus prefer that you provide them with a PostScript file. Some require it. Many programs let you print to a file; in Windows, since printing is handled by the environment, almost all applications do this.

The following is the procedure for printing to a PostScript file from WordPerfect for Windows. It's similar in all other Windows programs.

1. Call the service bureau and ask what model its imagesetter is. Be sure to get the full name and number, since some companies make

more than one model.

2. Define a new printer in Windows using the service bureau's imagesetter as the device and File as the connection.

3. In WordPerfect for Windows, select the new printer. Use the Windows printer driver, rather than the WordPerfect one. (If your document was originally composed for a non-PostScript printer, look it over to make sure line and page breaks haven't changed. You might have to make a few minor adjustments.)

4. Print the document. Windows will ask you to name the file. You can name it anything you want, but print files generally have a PRN or EPS extension.

5. Send the file by modem or mail to the service bureau. You'll be asked at what screen frequency (lines per inch) the file should be printed. If you plan to have the document reproduced, ask your print shop for the proper screen settings. Be sure to tell the service bureau what kind of paper the final document is to be printed on; this is important to the print quality.

It doesn't take much—a photograph or two, several fonts, and graphics—for a print file to get too big to fit on a disk. If your print file is too large, use a file-compression utility, such as PKZIP, to compress it. Make it a self-executing file, or make sure the service bureau has a copy of the decompression utility. I usually include the utility on the disk.

Another option for multipage documents is to print one page at a time to several smaller EPS files. This works only when the pages aren't complex.

If you aren't using Windows, check your program's documentation for instructions on printing to a PostScript file. If you use a LaserJet-compatible printer, this isn't the same as creating a PCL print file. Imagesetters require PostScript, and nothing else will do.

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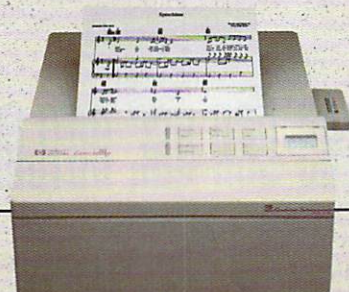
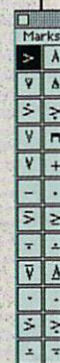
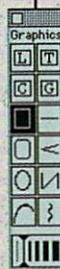


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WHERE TO BUY

Adobe Type Manager

\$99.00
Adobe Systems
(800) 833-6687

FaceLift

\$99.00
Bitstream
(800) 522-3668

DeskSet

\$149.00

JetPage

\$349.00

JetType IIP

\$249.00

Computer Peripherals
(800) 854-7600

GoScript

\$149.00 (13 fonts)
\$299.00 (35 fonts)
LaserGo
(619) 450-4600

WINJet 800

\$795.00
LaserMaster
(800) 365-4646

Fonts-on-the-Fly

\$149.00
LaserTools
(800) 767-8004

MoreFonts

\$149.95
MicroLogic
(800) 888-9078

PacificPage and memory board

\$499.00 and up
25 in One!
\$399.00
Pacific Data Products
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SuperPrint

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Zenographics
(714) 851-6352

guages, but these two are the most widely used.

Laser printers differ from other printers in that they process entire pages at once rather than a few lines at a time. To do so, they have processors built in. As data is received from the computer, it's held in RAM and rasterized (processed). When an end-of-page code is encountered, the printed page rolls out.

Memory upgrades can increase printing speed greatly. And often additional RAM is required to run many output-enhancement add-ons, such as soft fonts and font- and PostScript-emulation cartridges. Laser printers can use all of the products mentioned so far (type managers, bitmapped soft fonts, and font cartridges), and they can use emulation software as well.

The following discussion of add-ons pertains mostly to PCL printers. In fact, most printer add-ons are designed to bring non-PostScript devices closer to PostScript standards. If you own a PostScript printer, you have almost everything you need for state-of-the-art font and graphics printing.

Scalable soft fonts. Another term for scalable fonts is *outline fonts*. Type managers, such as ATM,

FaceLift, and so on, use outline fonts to do their magic. The beauty of outlines is that one size fits all. One relatively small font file on your hard disk for Times Bold, for example, will give you emboldened Times in sizes ranging from 2 points up to and (depending on the font and application) beyond 200 or 300 points.

Without a type manager, however, not all laser printers (such as the HP LaserJet Series II, IID, IIP, IIP Plus, and compatibles) can use outlines. There are all kinds of scalable fonts available. Be sure you buy the ones supported by your printer.

Scalable font cartridges. In most cases, your printer must support outline fonts to use scalable font cartridges. Exceptions are cartridges that give printers scaling capabilities, such as CPI's JetType IIP, which brings scalable TrueType fonts to the LaserJet IIP and IIP Plus. Scalable cartridges are similar to bitmapped cartridges in that all you do is plug them into the printer. However, depending on the number of fonts in the cartridge, you have a lot more size and weight choices.

PostScript-emulation cartridges. If you have a LaserJet or compatible printer and need

PostScript, this is the way to go. You get complete PostScript capabilities—scalable fonts, enhanced graphics printing, and typesetter compatibility—for a fraction of the cost of a PostScript printer. Several vendors, including Adobe, HP, CPI, and Pacific Data, sell emulation cartridges. Among them, you should find one for your HP compatible, whether it's a Series IIx or IIIx. However, not all vendors make cartridges for every printer.

Most PostScript cartridges require at least 2.5MB of printer RAM, which, if you don't have it, is an extra expense. CPI's JetPage will print limited fonts and graphics with 1.5MB, and Pacific Data bundles a memory board, 2MB of printer RAM, and its PostScript cartridge, PacificPage, for \$499.

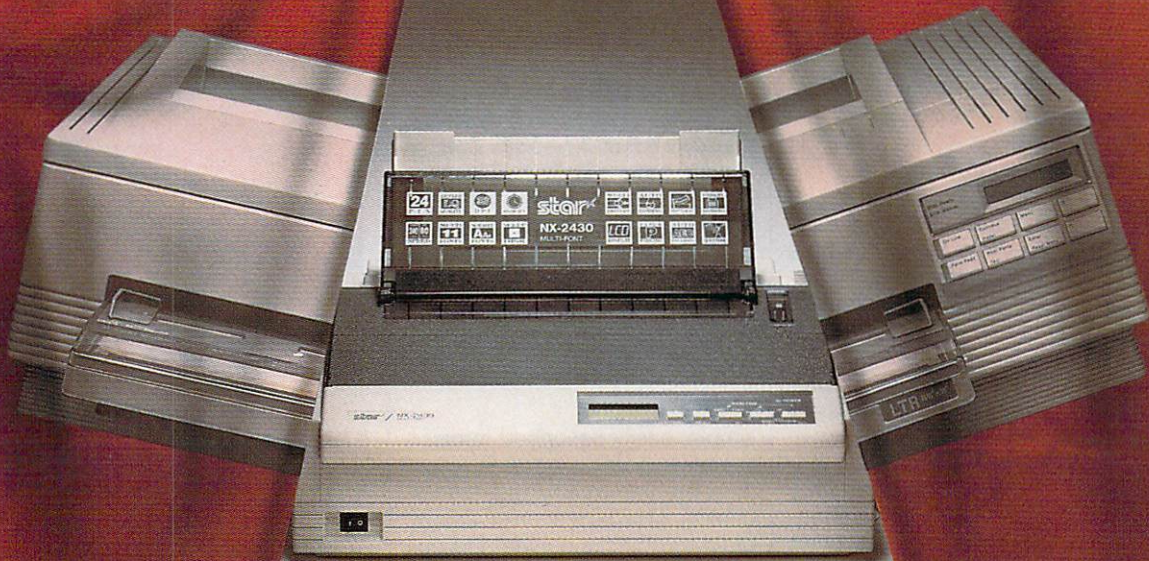
Resolution- or image-enhancement boards. Enhancement boards occupy a slot in your computer, and most of them take processing away from the printer. There are several boards around, but the most common is LaserMaster's WINJet 800. Prices, features, and the number of fonts included vary with each board. LaserMaster claims that depending on the complexity of the page, WINJet 800 prints 3–100 times faster than an unenhanced printer. It comes with 50 PostScript and 50 TrueType fonts for less than \$1,000. Like PostScript cartridges, enhancement boards are usually printer specific. Be sure you buy the right one for your printer.

Before You Buy

Whether your printer needs minor tuning with a type manager or the supercharged positraction of an enhancement board, be sure to analyze your future application before buying. If, for example, you'll be moving to Windows or upgrading to Windows 3.1 soon, you may not need an add-on (see the sidebar "Revving Up Windows"). Some popular desktop publishing (Ventura and PageMaker), graphics (Designer and Freehand), and presentation packages (Persuasion) come bundled with ATM and other type managers, making purchasing one of them pointless. In other words, look before you leap—you may get chrome wheels free. □

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star

IT TAKES A LITTLE EXTRA TO BE A STAR.

Circle Reader Service Number 113

TEST LAB

Edited by Mike Hudnall

As children, we learned first to finger-paint and then to draw simple figures. But as adults, we're embarrassed when we make those same stick-figure drawings, so we leave the painting and drawing to others.

Fortunately, computer paint and draw programs make it easier than ever to acquire the skills needed to create professional-looking art. While you still need an understanding of the proper tools and techniques to create great works of art, computer programs can make it much easier to learn and experiment.

Draw programs store their images as lines and curves (unlike paint programs, which store images as thousands of dots). Even though you see a draw image on the screen as dots, the image is really a series of commands. A horizontal line is simply a command for the program to plot a line from point A to point B.

Because paint programs are dot based, they're resolution dependent. A 72-dpi (dots per inch) paint image will print at 72 dpi, even when printed on a 300-dpi printer. Because draw programs are command based, they're resolution independent. When printed on a high-resolution printer, a line will automatically include any extra dots that fall between the two plotted points. For this reason, a 72-dpi draw image will print at 2400 dpi on a 2400-dpi printer.

Paint programs are your best choice if you work with scanners and photorealistic images. Draw programs are best if the form of the image is more complex than its color or if you plan to print at high resolutions. For the best of both worlds, you might look for one of the draw packages that include autotrace programs. It will let you convert bitmapped paint images into line-based draw images. As you might expect, autotrace programs work best with paint images, such as icons and clip art, that include

IBM PC and compatibles (80286 or faster, 80386 or faster recommended), 2MB RAM (4MB recommended), EGA or Hercules (high-resolution graphics recommended), hard drive (80MB drive recommended), mouse or other pointing device, Windows 3.0 or 3.1—\$595 (free upgrade automatically sent to registered owners of version 3.0 for Windows in the U.S. and Canada)

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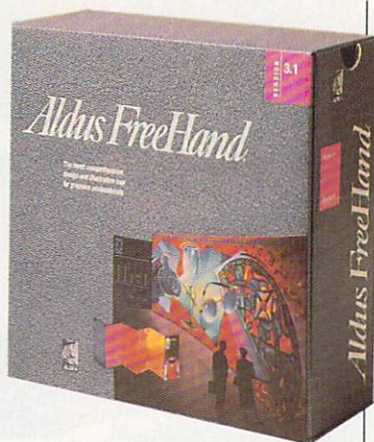
simple, easily described forms.

Unlike paint programs, most draw programs allow easy manipulation of shapes (you simply grab an object's outline and pull it), grouping and ungrouping of objects (for global special effects), and elaborate type effects (including the ability to align text to a path). Most draw programs also include a generous selection of clip art and typefaces.

This month's Test Lab features five industrial-strength draw programs (Aldus FreeHand 3.1, Arts & Letters Graphics Editor 3.1, CorelDRAW! 2.01, Harvard Draw for Windows 1.0, and Designer 3.1) and two bargain-basement draw programs (Arts & Letters Apprentice 1.0 and Windows Draw! 3.0). If you have a 386SX or faster machine and work with technical drawings, illustrations, or object-based graphics, any of the five high-end programs should suit you. If you're new to the area and just want to experiment, you'll find that the two lower-priced programs have most of the features of their higher-priced cousins.

Whether you're a professional illustrator or a weekend wannabe, this current crop of draw programs offers a wealth of powerful features. But don't be intimidated by the features. Remember to put your ego on hold, and you'll soon become a starry-eyed kid again.

DAVID ENGLISH



ALDUS FREEHAND 3.1

Wrap up nearly everything you can imagine in a draw program, bundle it in an interface that looks like PageMaker, and you have Aldus FreeHand 3.1 for the PC.

FreeHand, venerable Macintosh illustration software, finally makes its PC debut, and the program is as comfortable to use as any software of its kind that I've seen. But I'm a regular user of other Aldus products—PageMaker and Persuasion—so perhaps the family feeling contributes something to my affinity for FreeHand.

FreeHand provides the usual assortment of drawing tools plus a complement of line styles and patterns to dress things up. The freehand drawing tool includes an added twist—pressure sensitivity. Although designed for artists plugged into a pressure-sensitive digitizer, this feature has keyboard controls that allow it to work reasonably well on any PC. The idea is that the harder you press while drawing, the wider the resulting line. On a stock PC, you use the cursor keys to increase or decrease the weight of the line.

FreeHand also offers plenty of flexibility in the editing of shapes. With the pen tool, you draw by placing points, both curve points and corner points, which allows

you to create any shape with a single tool. The curve, corner, and connector tools help you refine shapes. To join a straight path with a curved path, you can use the connector point tool.

The program allows you to combine separate elements into groups that can be moved and resized as a whole. Related to this, a very convenient feature permits you to select elements within a group and make changes or additions without ungrouping the set. There are also dozens of pre-designed file and line styles, and there's ample opportunity to create styles of your own. One other handy tool is the knife. If you need an arc, you can use the knife to excise the appropriate segment from a circle or ellipse.

FreeHand comes packed with a copy of Adobe Type Manager 2.0, which allows the program to show off its text-handling prowess. Although Aldus says many text features will work with other text-management utilities, Adobe Type Manager is the only utility guaranteed to support all of FreeHand's type attributes.

The program is a whiz at placing text on a path, be it circle, arc, or freehand squiggle. Typographic controls include letter and word spacing as well as kerning. Characters are easily converted to paths manipulated as you please. You can enter text directly on the drawing or in a text dialog box, depending on your selection in the Preferences menu. A collection of preprogrammed text effects—fill and stroke, inline, shadow, and zoom text—can produce startling results with little effort.

FreeHand offers myriad options for delivering artwork to other applications. It exports in a variety of formats including AI, EPS, EPS with TIF, TIF, and WMF. But a word of caution is in order: FreeHand uses the level 5 TIF format, which may not be understood by some of your applications. As you might expect, though, other

Aldus products read the TIF and the EPS with TIF formats just fine.

You'll also have plenty of control when sending your finished art to the printer or the high-resolution imagesetter. The program includes a setting to change an illustration's flatness value, which can shorten printing time. FreeHand also provides control over screen angles and densities. Although more than adequate at producing line art and drawings for use in other programs, FreeHand is fully capable of intricate full-color work. One of the manuals in the document set is a guide to FreeHand and commercial printing. This short volume alerts FreeHand artists to issues such as color selection, trapping, separations, moirés, screens, and bleeds.

The program's clip art selection is a bit of a letdown. Though the images number nearly 500, many of them are maps and flags of the world. Some of the symbols will prove useful, but I think the images of computers and printers will not. If you're a skillful enough artist to use all that this program offers, however, you won't need clip art. You'll create your own.

And that may define the target audience for this program—skillful artists. FreeHand is a complex and versatile design tool, and unless you know how to handle such a tool, it may be more than you need. FreeHand will do just fine doctoring up clip art images, but if that's all you need to do, using FreeHand may be akin to running an Indy car back and forth in the driveway. The pro-

gram also places heavy demands on your computer. On a 386SX, you can get the job done, but you wouldn't want to work long at that pace. If your job depends on what you do with the program, plan to use a fast machine with plenty of memory to make your work bearable.

The original FreeHand for the PC was released in late 1991. Version 3.1 appeared just before the release of Windows 3.1. The new release ensured compatibility with the new Windows as well as adding such features as the pressure-sensitive drawing tool, automatic calculation of blend steps, custom magnification and reduction, commands to create color libraries, and improved exporting and printing capabilities.

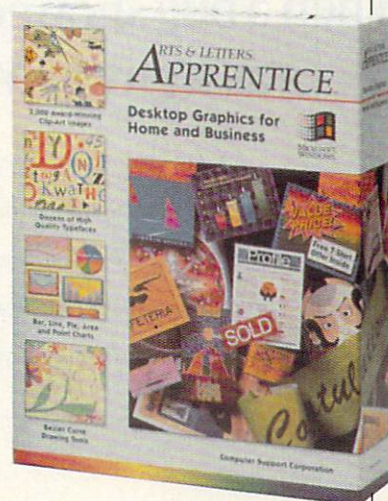
TONY ROBERTS

Circle Reader Service Number 304

ARTS & LETTERS APPRENTICE 1.0

If the high price of draw software has kept you from getting the program you need, take a look at Arts & Letters Apprentice 1.0. This modestly priced package from Computer Support provides all but the fanciest tools.

To the casual artist like me, clip art is a vital feature of a draw pro-



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TEST LAB

gram, and Apprentice offers a rich collection—more than 3000 clip art images in many categories. There are images for symbols, food and beverages, holidays and seasons, nature, people, cartoons, and maps, to name just a few. And the map library itself contains many symbols. You can bring up maps of the Eastern Hemisphere, Western Hemisphere, North America, and Europe. In further detail, you can have the individual European countries as well as the United States by region, time zone, and individual state. If you wish to portray contiguous states, call the individual symbols, and the Apprentice Align feature will paste them together like a jigsaw puzzle. Pulling up clip art images is impressively fast.

Charts are vital features of presentation documents, and Apprentice handles them very nicely. Click on Chart in the Draw menu, and the screen shows a spreadsheet grid. Enter your data by rows and columns, type in the labels and legends, and the task is done. You can have as many as 12 rows and five columns. Choose from five types of charts—area, bar, line, pie, and point.

If you crave color, Apprentice has a wealth. In addition to its seven base colors, you can choose from 14 palettes, with eight or more shades to a palette. The palettes are cleverly designed. For instance, one is for people, with shades for skin, hair, and eye color. Another is for wood, with shades of mahogany, pine, walnut, and so forth. If this abundance fails to meet your taste, you can mix your own colors.

You'll probably want some text with your artwork and charts. Apprentice includes 26 typefaces, scalable from 4 to 3200 points. Choose the style (normal, bold, italic), the spacing of words and letters, the kerning, the aspect ratio, and the fill. A helpful preview feature shows you a sample of the typeface as you browse. If you prefer other fonts, you can choose

any which have been downloaded to your printer. Create striking effects by binding text to a shape, either a free-form one or one chosen from the shape library. The text then follows the curve, however convoluted.

Maybe you prefer to create your own art forms. Apprentice provides you with powerful tools for this purpose. When you draw a curved line, the program smooths the figure by calculating the number of Bézier segments (mathematical representations) in the curve and marking each segment with a control point. You can edit the curve by manipulating the control points and can even add new control points and zoom in for fine adjustments. My sketched figures usually bear only faint resemblance to what I have in mind. With the Apprentice editing tools, my efforts are improved remarkably.

You can manipulate objects—text, clip art, or free-form—in all sorts of ways. Move them around on the page, stretch or shrink them, skew them, flip them horizontally or vertically, rotate them, align them, or do just about anything you please. Moreover, these operations are convenient and fast.

When your work is finished and you're happy with the picture on your screen, what do you do with it? Apprentice lets you output to your printer, with control of orientation, size, and margins. You can print to a file for later use with another printer, such as a color printer, if you don't happen to have one of your own. With the Export option, you create a graphics file which can be used with other programs such as word processors. Apprentice supports seven export formats, including the popular TIF and WordPerfect's WPG. I exported a number of images to WordPerfect and was pleased with the results as well as with how quickly I managed to create the export file.

A high-quality program, Appren-

tice deserves better documentation. I felt that I had to work hard to find information in the user's guide, and the Clip Art Handbook, though accurate on the whole, seems to be out of touch with the program in a few cases. What appears in the handbook is not necessarily what you'll find in the library.

Apprentice is not capable of the fancy operations, such as warp and perspective, typeface editing, and bitmap image enhancement. But it can do just about everything the average user wishes. I am impressed with the speed and power of the program, and I prefer it to CorelDRAW!. At a street price of about \$100, it's a real bargain.

CHARLES IDOL

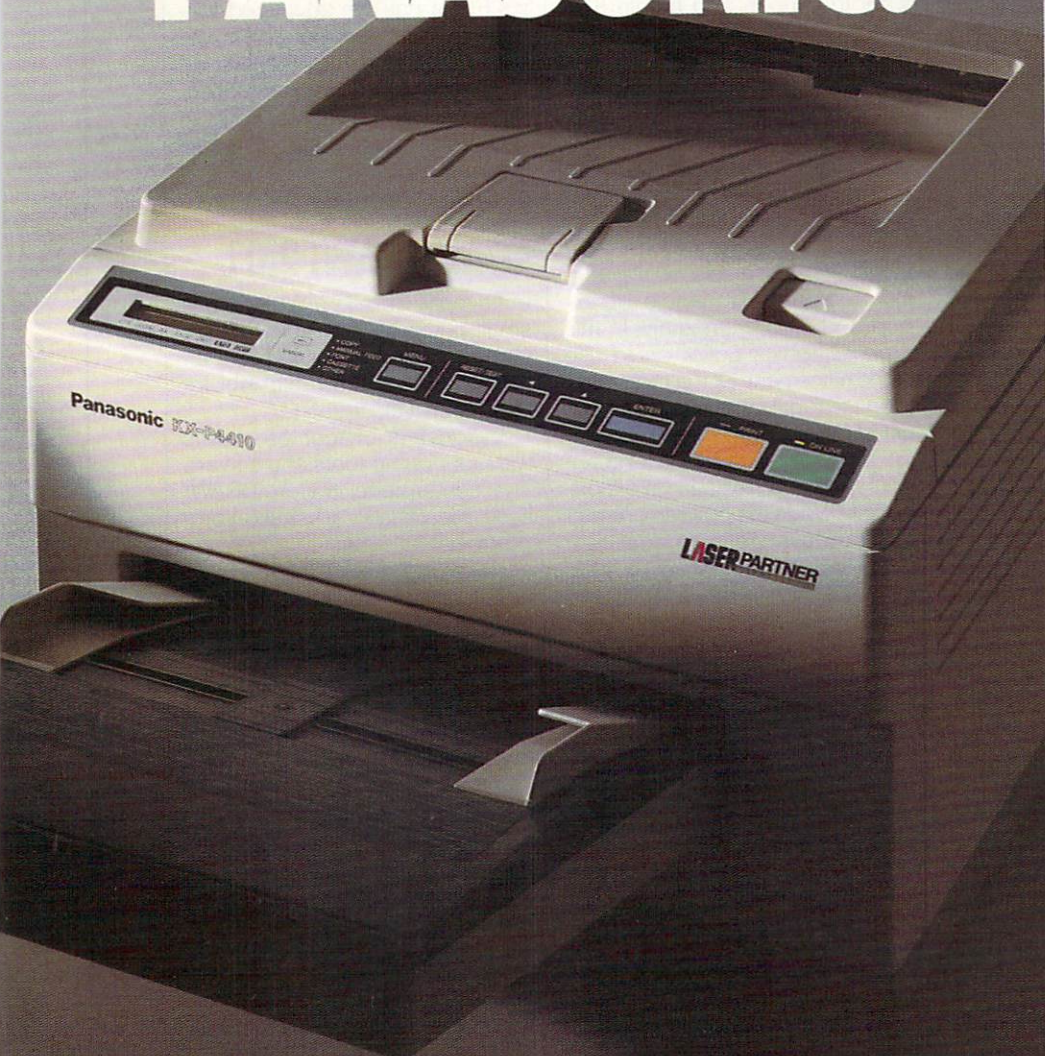
Circle Reader Service Number 305

ARTS & LETTERS GRAPHICS EDITOR 3.1

Maximum graphic impact with minimum effort—that's the goal of any draw program. A difficult goal, to be sure, it requires the program to walk a fine line between being easy enough for the novice and being powerful enough for the working artist who knows the ropes. Arts & Letters Graphics Editor 3.1 is one program that achieves that goal.

Graphics Editor abounds in extras that make design easier for nonartists and professionals alike. First among these is the huge 5000-image clip art collection, which provides pictures of everything under the sun: borders, arrows, geometric shapes, people, faces, animals, airplanes and other modes of transportation, computers, signs and symbols, cartoons, maps of every state and country, and much more. Most of the pictures are high-quality line art; the cartoons and Japanese flags are dispensable, but they constitute only a small fraction of the

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TEST LAB

total. With such a wealth of images, you might never have to draw anything yourself; at least, you probably won't have to invest in another clip art collection.

Graphics Editor also includes 80 scalable typefaces, with versions of Helvetica, Times Roman, and other popular fonts. If your type requirements aren't too demanding, you probably won't have to buy any more fonts, either.

Another invaluable ease-of-use feature is Graphics Editor's 18 defined color palettes, with each color named and tagged for a specific kind of image. There's a set of colors for eyes, hair, and skin; another for building materials; a third for food; and so on. Defined palettes will save you plenty of time because they eliminate the hassle of finding just the right colors and ensure that colors are always used in a consistent way, no matter who creates the art.

But Graphics Editor is not a "dumbed-down" draw program by any means. The tools provided to edit lines and curves are as complete as any I've seen in any other draw program.

Text and draw objects can be warped in hundreds of ways and moved one-hundredth of an inch in any direction by entering fractions into a dialog box. Text can be bent along any free-form or regular curve, and the program can also edit the outlines of Adobe Type 1 PostScript fonts, so you can modify existing fonts to suit your needs. Using an autotrace feature, you can convert scans into editable line drawings. You can work with 16- and 24-bit images even if you don't have a true-color graphics adapter (all the colors won't appear on-screen, but all color information will be retained in the file).

Finally, Graphics Editor performs spot and process color separations for offset printing, with full control of screen angle and frequency and undercolor removal. Professional artists won't be disappointed with what this full-fea-

IBM PC and compatibles (80286 or faster), 2MB RAM, hard drive with 14MB free, Windows 3.0—\$695; upgrade from 1.x—\$99; upgrade from 3.11—\$50 (Call Computer Support to verify price and version upgrade numbers before upgrading software.)

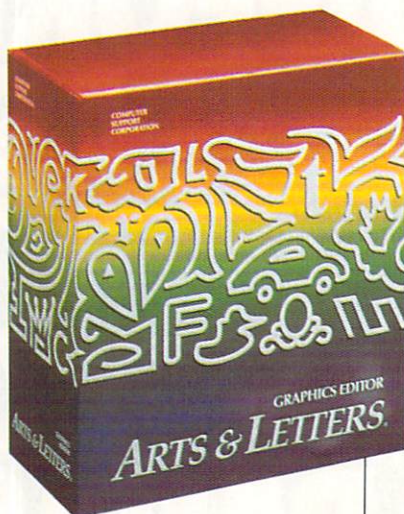
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tured program can do.

The excellent manuals document every feature. Clear tutorials get right to the point for users who want to jump in and create their first charts and posters. You will have to look in the user's guide to get started with editing, but that won't take long, and you can ignore the more advanced features until you need them. Technical support is free to registered users.

Working with multiple graphics file formats is a daily chore for most computer artists, so a graphics program must handle file import and export smoothly. In this area, Graphics Editor could use some refinement. Of the most common graphics file formats (TIF, GIF, TARGA, PCX, and EPS), only TIF files can be imported, and only TIF and EPS files can be exported from within the program. All other file conversions to and from Graphics Editor's native GED file format must be performed through a separate translator utility called Decipher. Powerful and simple to use, Decipher is quite a capable image-processing program as well as a translator. However, having to leave the main program and go to Decipher can slow your work. I'd prefer being able to import and export all the common file formats from within Graphics Editor itself, using the Import and Export menu options.

Usually, I use a Mac to do illustrations and then import them into PC documents, but after using Graphics Editor, I began to think



twice about that practice. Graphics Editor has the advanced features that professional artists demand and the extras that simplify design for nonartists. As a general-purpose draw program, it's as good as any on the market today.

STEVEN ANZOVIN

Circle Reader Service Number 306

CORELDRAW! 2.01

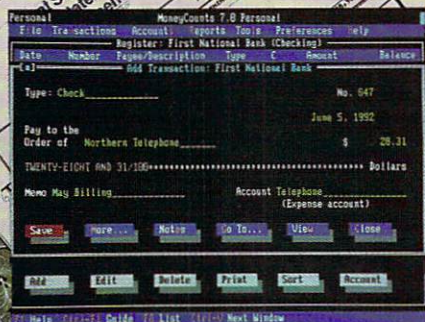
Put simply, CorelDRAW! 2.01 is a small package into which clever Canadians have crammed almost every conceivable tool for design and illustration.

It consists of four programs with supporting fonts and clip art. The centerpiece is CorelDRAW! itself, a leading PC illustration program, but let's quickly survey the satellite programs. One is Mosaic, a visual file selector that organizes artwork based on miniature editions of the art itself. CorelTRACE!, an autotracing program, converts bitmaps into modifiable draw objects. WFN BOSS is a powerful utility that can convert most major commercial fonts into CorelDRAW!'s WFN font format. You can also transform WFN fonts into Adobe Type 1 fonts for use in other software. Or you can create original fonts within CorelDRAW!; these, too, can be modified in WFN BOSS.

CorelDRAW!'s tools for drawing curves are the fastest I've

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used. Editing control points on curves is tedious in most programs. Double-clicking on a node in CorelDRAW! pops up a button palette from which any node attribute can be selected with one mouse click, simultaneously adjusting the node and removing the palette.

This streamlined approach is reflected throughout. The toolbox contains only nine tools, making program functions easy to comprehend and learn. Through fly-out (horizontal) tool strips and menu and dialog box choices, the Spartan toolbox offers rapid access to the program's depths. Extrusion, envelope, and perspective editing are just three examples of this deeper power. With them, you can strap an object onto a stretchable surface; twist, pull, and distort it; and then project the result into three dimensions. It's that easy.

CorelDRAW! deals with type ingeniously. All its fonts are curves, transformable with any modification tool. Use kerning, tracking, and leading with this kind of text simply by dragging handles on chunks of text or individual letters. It's fast and precise, so users can concentrate on how type looks, rather than worrying about dialog boxes or menu choices. For completed illustrations, CorelDRAW! offers a reversal of the widespread conversion of text into curves. If matching Adobe fonts are available in the

IBM PC and compatibles (80386 or faster), 640K RAM, graphics standard that supports Windows, hard drive, pointing device, Windows 3.0 or 3.1—\$695 for disk-based version, \$795 for CD-ROM-based version (Contact Corel for information about upgrading)

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printer, a click on the All Fonts Resident option quickly builds type directly from printer fonts.

CorelDRAW! also supports what it calls paragraph text—small text that might follow a carefully designed large headline. Options include column formatting and export and import of copy. Significantly, CorelDRAW! can merge external text into design work, just as you might use your word processor to fill in the blanks of a form letter with names and other information from another file. If you design a certificate for the local soccer team, for example, you can use names from your word processor or database to fill in the blanks on the certificates.

Other programs in this genre support a system of layers. Instead of merely allowing changes in objects' stacking order, as CorelDRAW! does, they enable the user to create separate levels into which drawing components can be grouped. The stacking order of these layers can be changed, as can object order within each layer. Such layers may simplify the composition of complex drawings, but the trade-off is that confusion often moves from the screen into the designer's brain. Not one art staffer where I work uses layers on a regular basis. I prefer CorelDRAW!'s technique of highlighting objects under active editing.

CorelDRAW! isn't capable of di-

rect editing in full-color preview, but I've never seen any software speedy enough to allow realtime color editing of an illustration. You can be glad of the minimal discipline CorelDRAW! imposes by restricting work to a wireframe view. Because you edit the outline display and update the colored preview only when desired, you're hours closer to finished artwork.

CorelDRAW! is at work in hundreds of thousands of real-world situations, and it's supported by an expert technical staff. I've used CorelDRAW! for more than 2½ years, and its high-quality output appears almost daily on the imagesetters where I work.

Keep in mind, however, that it's primarily an illustration and design program. Users who have overwhelming concerns about accurate dimensioning for work with a highly technical content may want to consider other packages. In my experience with CorelDRAW!, the only problem has been a tendency for the program to create complex objects that don't print readily at high resolution (1270 dpi and above). This snag is not unique to CorelDRAW!, and the current version includes many controls for dealing with it.

CorelDRAW!'s user interface and operating methodology are deliberately sleek and streamlined. The approaches taken by other programs often prove ponderous and confusing, especially where these programs offer features that look better in advertising copy than in daily use. Further, Corel Systems' commitment to its product remains outstanding. The new CD-ROM version I tested for review contains enough additional material (52 new fonts and over 10,000 pieces of high-quality clip art) to support the most demanding user for years. CorelDRAW! should be the first quill in any PC illustrator's inkwell. It will certainly be the most used.

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DESIGNER 3.1

"Get Designer." That's what everybody told me three years ago as I worked on a book. I needed something that was CAD-ish, but not exactly CAD, as CAD has traditionally lacked a few features that paint programs all have.

Well, at the time, Designer 1.0 ran on Windows 2.11, a painful platform if ever there was one. But Designer made the best possible use of it, and it has continued to do that as Windows has evolved. CorelDRAW!, its major competitor, has always focused on flashy text effects, but personally, I've not had much use for that, which is perhaps one reason why I get along with Designer.

Until the latest release, Designer has never been very good at handling text—it's been slow and inflexible—but it's always been great at drawing *things*. Designer's power lies in letting you put a line just exactly where you want to. Designer 3.1 builds on that power, but it also addresses the text problems with the addition of Adobe Type Manager and Text Align. Adding ATM was an excellent move on Micrografx's part, as text handling is much faster than before, and the Adobe text-alignment program almost brings Designer's text-handling capabilities up to Corel's.

I've always liked Designer's large 54-page canvas, space enough to try out alternate versions of a diagram. Its zoom allows you to see the level of definition that you need to get a job done.

Technical drawing often involves moving objects around

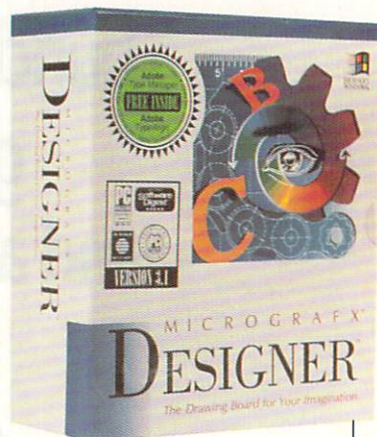
IBM PC and compatibles (80286 or faster); 1MB RAM (2MB recommended); EGA, VGA, 8514/A, or other graphics supporting Windows 3.0; hard drive (20MB or larger); pointing device or digitizing pad; Windows 3.0 or higher—\$695; upgrade from 2.0—\$99

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and aligning them with each other; here, Designer shines. You can designate any object a "snap" point, making it quite easy in a diagram to draw new lines that connect exactly to existing ones. And if you need to place one object atop another, Designer allows you to fine-tune an object's position with the right mouse button—someone finally found a use for that thing! Along the same lines, Designer offers power in its abundance of object-selection tools.

One way to build a diagram of an object is to draw its parts and then assemble them as one unit. Block-selecting some items and not others has always been a problem with other draw programs. With Designer, you just give all of the desired components similar names, like PIECE01, PIECE02, and so on. Then, you just block-select PIECE*, and the deed is done. And once you've got your diagram built, just about any piece of software around should be able to use it, as Micrografx includes filters for PCX, TIF, CGM, and many more file formats. If you plan to use the export feature, however, stay away from built-in printer fonts like "lineprinter" on the Hewlett-Packard printers; they don't render well in bitmap forms.

As powerful as it is, Designer's not an unalloyed joy. It has always been plagued with bugs and instability, and Micrografx technical support is sometimes great and sometimes not so great.



I recently tried to export a drawing to a Windows Metafile format and got an Unrecoverable Application Error (UAE), so I called Micrografx. The tech-support person told me to reinstall Windows and Designer, so I did—a fairly lengthy process. The UAE persisted, so I called back and was told to remove Adobe Type Manager. I did that and still got UAEs. The third phone call connected me with a different tech-support person, one who knew the answer before I finished the question. "Yup," he said, "that's the old Windows Metafile problem. That's been around for quite some time. Here's a work-around. . . ." I lost an entire day.

Keep in mind that you should save a drawing before trying anything new in Designer, because Designer's usual response to a low-memory condition is the UAE. And Designer is firmly rooted in two dimensions, so mechanical drawing with perspective is rough to do. That's a shame, as adding the simple ability to draw boxes with one or two common vanishing points would be fairly easy to do and would enhance Designer's drawing abilities.

Those problems aside, it's still the tool that I find best fits my hand. Give it (or its little brother, Windows Draw!) a try. The learning curve is a bit steeper than with less powerful programs, but the end result is well worth it.

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HARVARD DRAW FOR WINDOWS 1.0

Software Publishing Corporation (SPC) is certainly no stranger to computer graphics—its Harvard Graphics presentation program has been an industry leader for quite some time. Harvard Draw for Windows 1.0 is a welcome addition to the SPC family. It has many of the features of its competition (Arts & Letters, Designer, and CorelDRAW!) and adds a few of its own.

During installation of the program, you have nearly complete control over which filters, fonts, and clip art are installed. Throughout the process, you get a running tally of required and available disk space. Harvard Draw shares filters and fonts—freeing up valuable hard disk real estate—with other SPC programs, such as the Windows version of Harvard Graphics.

The easy tutorial in Harvard Draw walks you through most of the program's features. As with the documentation for so many other draw programs, however, Harvard Draw's documentation falls short in its coverage of advanced topics, such as process color separations, knockouts, traps, and halftone screens. If you're unfamiliar with these prepress topics, you'll have to look elsewhere.

With Harvard Draw it is possible for you to view and edit multiple views of the same drawing, so seeing the overall effect of changes you've made in magnified view is much easier. You can add and edit text directly onscreen, without opening a separate dialog box. Harvard Draw's 16 levels of undo give you the freedom to experiment, without worrying about altering previous work. And, as you reverse actions, the Undo option on the Edit menu tells you which step you're about to undo next.

Many graphic artists and tech-

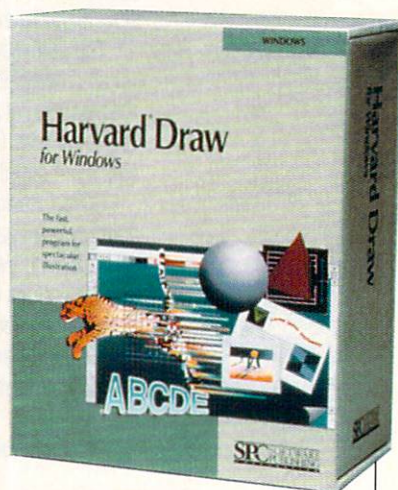
IBM PC and compatibles (80286 or faster, 80386SX recommended), 2MB RAM (4MB recommended), EGA (VGA or SVGA recommended), hard drive with 10MB free (30MB recommended), Windows 3.0 or 3.1—\$595; upgrade from Harvard Graphics (DOS or Windows)—\$149

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nical illustrators will appreciate the layering feature in Harvard Draw. Your drawings can contain as many as 99 layers, which can be named for easy selection, hidden to get them out of the way, and locked so that they cannot be moved or edited. You can copy attributes from one layer to another.

Most common text-manipulation features—such as fit to path, skew, and rotate—are supported by Harvard Draw, as are patterns, graduated fills, and radial fills. The radial fills dialog box allows you to assign shapes such as contours, circles, boxes, and multiple-point stars to fills. You'll find extensive control over the appearance of graduated and radial fills as well as support for up to 999 gradient steps. For further control of special effects, the program lets you designate which step to start and end fills on. Gradient step controls can also help avoid unsightly banding.

Harvard Draw comes with 12 preset color palettes of 150 colors each. You can modify existing palettes or create your own. Print drawings to any Windows-supported output device for color separations. Or Harvard Draw will automatically size them for printing on a slide recorder. However, Windows' printer drivers aren't always adequate when precision separations are called for. Unlike other programs in this class (FreeHand and Designer,



for example), Harvard Draw doesn't provide enhanced Post-Script printing.

Although Windows' 16.7 million 24-bit colors are supported, Harvard Draw doesn't allow you to calibrate your monitor. Colors can vary greatly from system to system. To ensure that what you see on your monitor is as close as possible to what rolls out of the printer (or off the printing press), your display and software should be calibrated. Pantone Matching System (PMS), the printing industry standard for spot color, isn't supported, either. Any high-end draw program with a \$600 price tag should support monitor calibration and PMS.

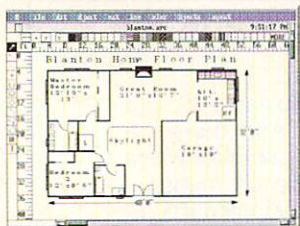
Perhaps unique to Harvard Draw is its script (or macro) language. With it you can automate time-consuming tasks, such as creating 3-D effects or assigning repetitive patterns and fills to objects. Macros are especially helpful for re-creating effects that you use often, without having to remember steps or wade through multiple dialog boxes.

One of my major concerns about this program is the limited supply of fonts and lack of support for type managers such as Adobe Type Manager or TrueType. Instead, Harvard Draw uses Bitstream's Speedo typefaces, which are somewhat limiting if all the fonts you own are from some other vendor, such as Adobe or Microsoft. Harvard Draw's font col-

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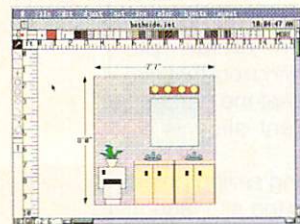
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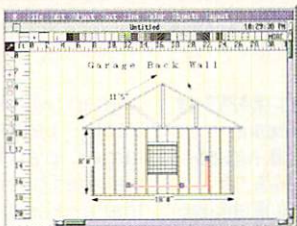
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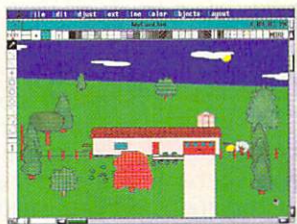
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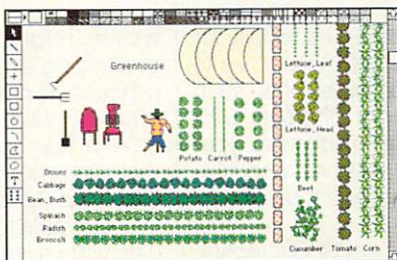
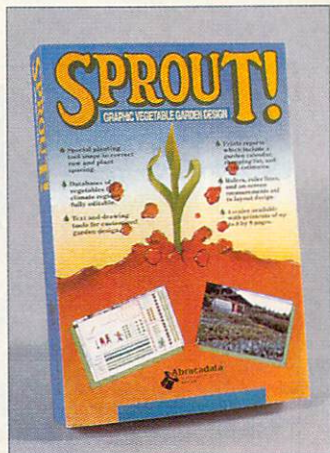


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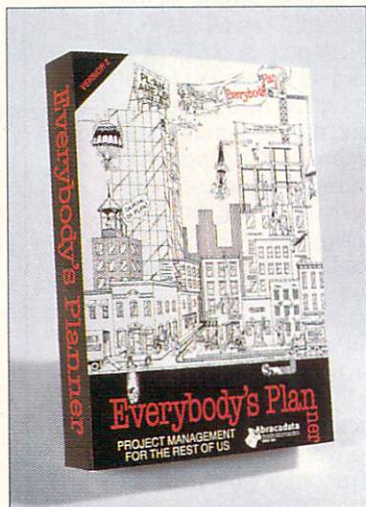
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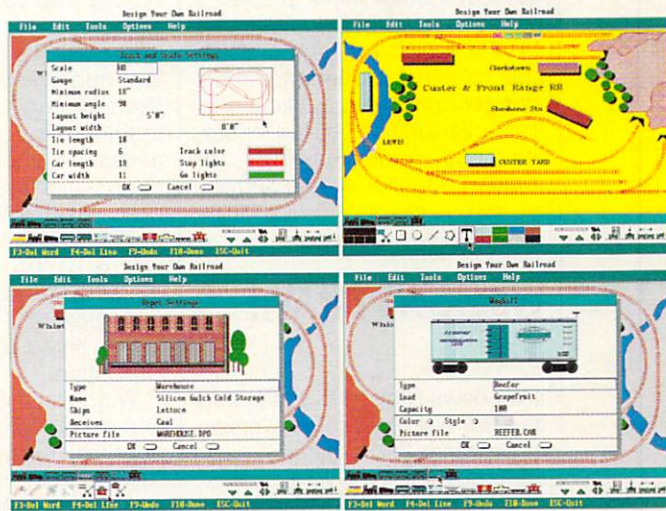
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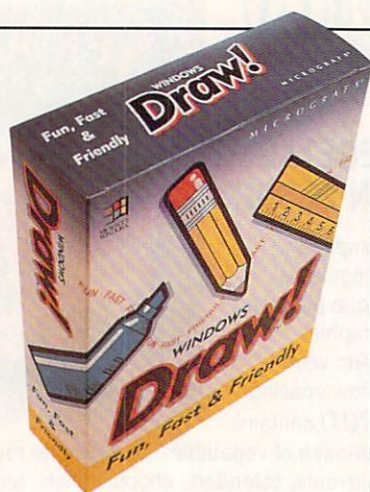


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lection is passable, especially for a first version. But I would like to see more decorative fonts, such as Park Avenue or Dingbats. SPC says that it plans to add more typefaces in future versions, and support for type managers could also be in the works.

It's hard to beat SPC's technical support, which is free and readily available. When I called, my questions received prompt attention, and the technician knew Harvard Draw inside out. Font woes and other minor problems aside, Harvard Draw for Windows 1.0 is a competent program suitable to all but perhaps the most stringent prepress applications. It's particularly well suited for creating full-color drawings for slides or monitor screen shows.

WILLIAM D. HARREL

Circle Reader Service Number 309

WINDOWS DRAW! 3.0

If Windows Draw! 3.0 is intended as a low-end, easy-to-use version of Designer 3.1, a natural question would be, Why would someone not prefer to buy Designer? There are two legitimate reasons: The interface isn't as effective as it could be, and the price is a little high. There aren't many other things to complain about. Windows Draw!, however, offers a low price and has an interface anyone could love.

There's a trade-off in features,

IBM PC and compatibles (80286 or faster, 80386 or faster recommended); 1MB RAM (2MB recommended); EGA, VGA, 8514/A, or other graphics supporting Windows; hard drive; pointing device; Windows 3.0—\$149.95; upgrade from Draw Plus—\$79.95

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which might be significant, depending on how you use the product; but it's not surprising that Windows Draw! doesn't have a features list identical to that of a product that costs more than four times as much. You won't be able to trace bitmaps for use with a vector program or print color separations. Windows Draw! doesn't support layers or allow you to draw on a drawing surface larger than a single page.

But it does offer just about everything else you could ask for in a vector program. It can blend one object into another by successive approximations. It can bind text to a curve, causing the text to follow any contour. You have access to all of the fonts available in Windows, and the text handling is WYSIWYG—the text appears right on the screen while you're typing. Most draw programs make you enter text in a dialog box and place it on the screen only when you click on the OK button.

Windows Draw! can import and export files in virtually every popular format: Micrografx's DRW, ZSoft's PCX, TIF, ANSI text, Windows Metafile, Adobe Illustrator, EPS, CGM, WordPerfect's WPG, and others.

You can name symbols so you can keep track of individual items by name rather than trying to remember what each individual component looks like. The interface has an onscreen palette. You can fill objects with a gradient, a

bitmap (which you can edit), or a vector pattern. And there's a large clip art file, complete with a well-designed clip art manager that makes it easy to find the art you need at the moment. (Incidentally, the Windows Draw! clip art manager will soon be ported to Designer and Charisma.) The clip art is vector art, so you can alter it to suit your immediate needs.

You also can create pie graphs with a drawing tool that displays onscreen what the percentage of the current slice is as you're drawing it.

One of the strong selling points of this package is the interface. It places all of the tools onscreen in a logical way. If you want to draw, click on a pencil icon, which calls up a menu full of drawing tools at the top of the screen, including the canned shapes—rectangle, ellipse, and so on—as well as the pie chart tool, arcs, Bézier curves, and so on. In other words, the main icon bar is the key to a more detailed icon bar.

The palette is onscreen all the time (similar to Core!DRAW!'s). The color selector is quick and easy to learn, allowing you to select fill and outline colors (as well as foreground and background colors for patterns and gradients) with two mouse clicks and no thinking, which means that it's miles beyond Designer.

Also, like Designer and unlike Core!DRAW!, Windows Draw! has one screen that displays the drawing—not a drawing screen and a preview screen. This makes drawing much simpler in the Micrografx products.

If tracing weren't so important to me, I'd recommend Windows Draw! without hesitation. Even without tracing, though, the program is fun to use and will suit the needs of most people who need a vector program to produce text effects and drawings for use with a word processor or a desktop publishing program.

ROBERT BIXBY

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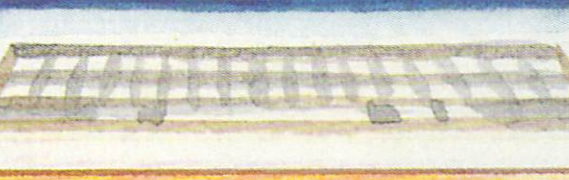
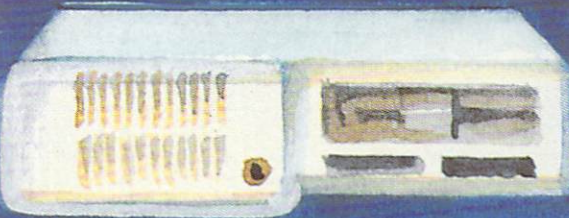
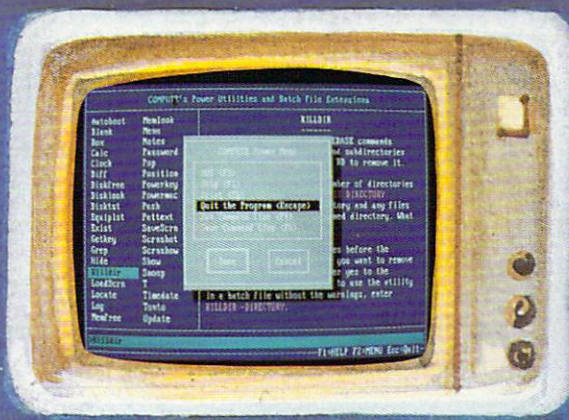
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TEST LAB

DRAW SOFTWARE FEATURES							
	Aldus FreeHand 3.1 for Windows	Arts & Letters Apprentice 1.0	Arts & Letters Graphics Editor 3.1	Core!DRAW! 2.01	Designer 3.1	Harvard Draw for Windows 1.0	Windows Draw! 3.0
GENERAL							
Number of fonts included	13 ¹	25	80	153/253 ²	30	47 + 13 type 1	50
Number of clip art pieces included	484	3000	5000	4000+/10,000+	100+	1000	2600
Edit multiple files	■ (up to 16)	□	□	□	■	□	□
Customizable toolbox	□	□	□	□ ³	■	□	□
Max number of pages per document	1	6	1	1	54	1	1
Number of layers	unlimited	1	1	1	64	99	1
Set measure units	■	□	■	■	■	■	■
Macro capability	□	□	□	□	□	□	□
Script capability	□	□	□	□	□	■	□
Bitmap tracing	■	□	■	■	■	■	□
Output color separations	■	■	■	■	■	■	□
DRAWING TOOLS							
Polygon	□	□	■	□	■	■	■
Polyline	■	□	■	□ ⁴	■	□	■
Arc	□	■	■	□ ⁴	■	■	■
Rectangle	■	■	■	■	■	■	■
Rounded rectangle	■	■	■	□ ⁴	■	■	■
Circle/ellipse	■	■	■	■	■	■	■
Parabola	□	□	■	□	■	□	□
Freehand curves	■	■	■	■	■	■	■
View control points, tangents	■	■	■	■	■	□	■
Automatic smoothing	■	■	■	■	■	□	■
TEXT TOOLS							
Type sizes supported	0.1-3000	4-3200	4-3200	0.7-1440	unlimited	2-1000	1-144
Text editing onscreen	■ ⁵	■	■	□	■	■	■
Convert text to curves	■	□	■	■	■	■	■
Indent text	■	■	■	■	■	■	□
Justify text	■	■	■	■	■	■	□
Word wrap	■	□	■	■	■	□	■
Control kerning	■	■	■	■	□	■	■

	Aldus FreeHand 3.1 for Windows	Arts & Letters Apprentice 1.0	Arts & Letters Graphics Editor 3.1	CoreDRAW! 2.01	Designer 3.1	Harvard Draw for Windows 1.0	Windows Draw! 3.0
MANIPULATION TOOLS							
Rotate	■	■	■	■	■	■	■
Stretch	■	■	■	■	■	■	■
Envelope	■	□	■	■	■	□	□
Warp	□	□	■	■	□	□	□
Skew	■	□	■	■	□	■	■
Extrude	□	□	□	■	□	□	■
Perspective	□	□	■	■	□	□	□
IMPORT EXPORT							
CGM	I	E	E	I E	I E	I E	I E
GEM	□	□	□	I E	E	□	I E
HPGL	I	E	E	I E	E	□	E
HPGL/2	I	E	E	na	na	□	□
PIC	I	I	I	I E	I	E	I E
Pict	□	□	□	I E	I E	□	I E
SCODL	□	E	E	E	na	□	□
WMF	I E	I E	I E	E	I E	I E	I E
EPS	I E	E	I E	E	I E	E	E
EPS (With TIFF header)	I E	E	I E	E	E	E	E
AI	I E	E	I E	I E	E	I E	I E
GIF	□	□	I E	□	na	□	□
PCX	I	□	I E	I E	I E	I E	I E
TIF	I E	E	I E	I E	I E	I E	I E
COLOR							
RGB	■	■	■	■	■	■	□
HLS	■	□	■	■	■	■	■
CMYK	■	■	■	■	■	■	□
Pantone	■	□	□	■	optional	□	□
■ — yes □ — no							
E=export I=import na=not applicable or information about this feature not available.							
¹ Fonts are included with Adobe Type Manager 2.0, which is included with the product.							
² Left figure is for disk-based version; right figure is for CD-ROM version.							
³ Supports 2 toolbox sizes. Tools are customizable.							
⁴ Not a drawing tool by name but you can use other tools to create.							
⁵ Or in text box.							

NEWS & NOTES

Jill Champion

Another Time, Another Place

The history adventure game Time Treks puts you in a battle of wits over the future of history, where you must use your imagination, knowledge, and sleuthing skills to survive time bombs and booby traps, hunt for treasures, and explore secret passages.

The program's built-in historical archives make it unique among educational games, providing players of every age with instant access to a bounty of historical information. Journey in a time machine that accesses 180 time

Drive, Suite 200, Reston, Virginia 22091; 800-543-3744), lets you create a diet and exercise program based on your age, sex, height, weight, activity level, and dieting goals. At \$295 for the DietMate computer, a return on your investment should be all the motivation you need to get in shape.

For dieting Windows users, DINE Right for Windows from DINE Systems (586 North French Road, Suite 2, Amherst, New York 14228; 716-688-2492) is a diet-analysis program that helps you lose weight gradually and keep the weight off by adjusting your food choices and portion sizes so they meet U.S. dietary guidelines. The program's patent-pending DINE Score keeps track of your progress. Using the diet-, recipe-, and activity-analysis reports, which can be printed in chart, graph, and message form, you can improve your eating habits as well as your general health. The program retails for \$149—not a small fee, but worth it if you're serious about nutrition.

Nutridata Software's (223 Myers Corners Road, P.O. Box 769, Wappingers Falls, New York 12590; 800-922-2988) Home Health Series consists of Diet Balancer and Cooking Companion. Diet Balancer views the nutritional contents of over 1700 foods, including fast foods. Cooking Companion analyzes recipes for nutritional content. Diet Balancer and Cooking Companion retail for \$59.95 each. Both are available as a package for \$99.00.

No More Mouse Fights

If you're tired of struggling with a long mouse tail, check out Mouse Control, a simple device that does wonders for getting that wire out of the way. Mouse Control holds

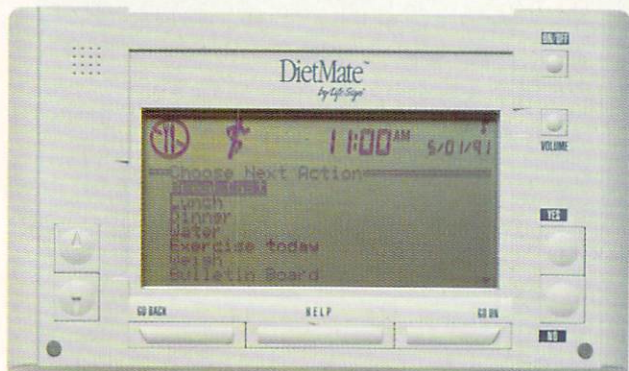
your mouse cord, eliminating tangled-up workspace. Inventor David Streeter of Advanced Image says he got tired of fighting with the wire on his mouse and decided to do something about it. For now, the device is available from the company for \$14.95.

To order, contact Advanced Image, 2 Route 13 South, Brookline, New Hampshire 03033; (603) 673-0212.

Computers on Consignment

If you're worried about doling out the dollars for a brand-new computer or if you're trying to unload one you can no longer use, Practical Computer Consignments, a new consignment superstore located in Washington, D.C., may be your answer. PCC offers a constantly changing selection of new and used, surplus, overstocked, closeout, demonstration, and liquidated computer systems and products, including a wide variety of peripherals, software, and accessories, all bargain priced with discounts typically ranging from 50 to 90 percent. The idea is that cost-conscious consumers can take advantage of new and older-generation equipment values at a fraction of their original selling prices—a sensible way to help buyers and sellers save and make money.

Practical Computer buys, sells, trades, repairs, and upgrades virtually any equipment related to IBM PCs and compatibles and Apples (including Macintoshes). It serves computer distributors, dealers, corporations, and federal and local government agencies, as well as individual PC users. A free service, Practical Computer Exchange Fax Service, matches want-to-buy and have-to-sell listings for customers by fax. Any consignment item purchased from PCC receives a 30-day



Take your health in hand with a diet and exercise program overseen by the DietMate hand-held computer.

lines from 3400 B.C. to the present. There are thousands of historical facts to uncover and explore; 12 increasingly difficult levels of play; plenty of sound effects, animation, and graphics; and hundreds of in-depth perspectives on science, wars, communications, religion, and exploration.

Time Treks is available for a suggested retail price of \$59.95. For more information, contact Earthquest, 125 University Avenue, Palo Alto, California 94301; (415) 321-5838.

Diet Right

Dieters who need that extra boost of motivation have a number of electronic "diet centers" to choose from these days. DietMate, a hand-held computer from Health Innova-

With NRI hands-on training, you can experience the rewards of a career in computer programming

Now you can get the practical training and experience you need to succeed in computer programming, today's top-growth computer career field.

NRI at-home training gives you real-world programming skills in four of today's hottest computer languages: BASIC, Pascal, C, and COBOL. You get hands-on training that now includes a powerful 386sx/20 MHz mini-tower computer, modem, and programming software ... all yours to train with and keep! Best of all, NRI gives you the programming know-how you need to succeed on the job, in a new career, or in a business of your own.

Job opportunities for the skilled computer programmer will increase by 71.7 percent over the next 10 years according to Bureau of Labor Statistics forecasts. And now, with NRI training, you can be one of the increasing number of computer programmers using their skills to build a top-paying career — even a business of their own — in this professionally and financially rewarding high-tech field.

▼ The only programming course that includes a powerful 386sx-based computer system and programming software you keep

Right from the start, NRI training gets you actively involved in the challenge of real-world programming. You learn how to create the kinds of full-featured, powerful programs today's employers and clients demand.

And, unlike any other school, NRI lets you experience first-hand the power of an IBM PC/AT-compatible, 386sx-based computer system, complete with modem, a full megabyte of RAM, disk drive, and monitor — all yours to train with and keep!

NEW!
386sx
mini-tower
computer!

Plus you explore the extraordinary capabilities of not one or two but four in-demand computer languages.

You learn to design, code, run, debug, and document programs in BASIC, Pascal, C, and COBOL. In the process you become uniquely prepared for the wide variety of programming opportunities available today.

▼ No previous experience necessary

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You'll find no heavy textbooks to plow through. No night classes to attend. Instead, NRI's at-home, step-by-step training covers all the bases, guiding you

from the important fundamentals to real-world methods and techniques. Backed up throughout your course by your experienced NRI instructor, you quickly gain the skills you need to handle a wide variety of programming tasks with confidence. You even use your modem to "talk" to your instructor, meet other NRI students, and download programs through NRI's exclusive programmers network, PRONET.

▼ Send today for your FREE catalog

Now you can experience the professional and financial rewards of a career in computer programming. See how NRI at-home training gives you the know-how, the computer, and the software you need to get started in this top-paying field. Send today for your FREE catalog!

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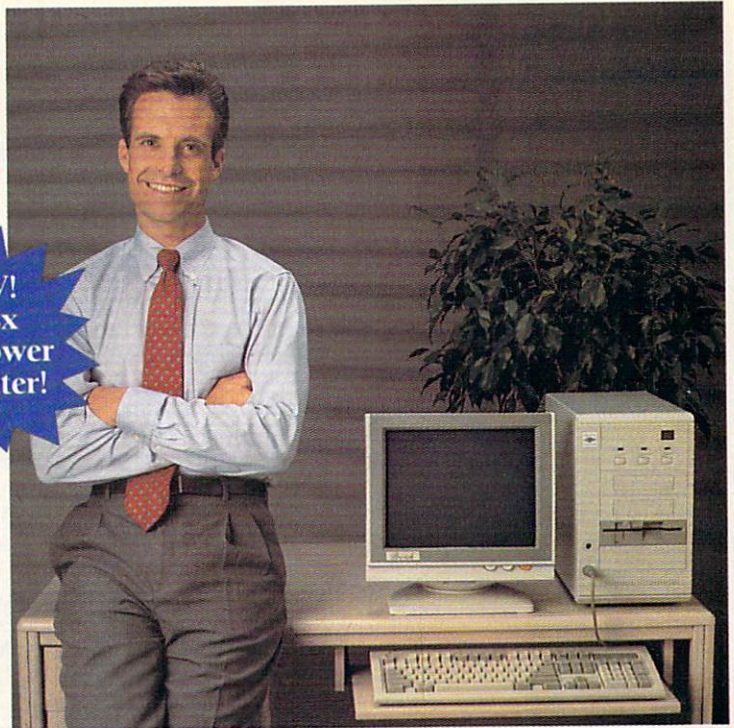
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warranty, and the superstore will ship almost anywhere in the world.

To get additional information, contact Practical Computer Consignments, 5407 Port Royal Road, Springfield, Virginia 22151; (703) 321-3003 (voice), (703) 321-3053 (fax).

Mouse-Free Windows

Windows users looking for something "faster, more efficient, and more convenient than constantly reaching for the mouse" should be pleased to discover Softac's Keyboard User Interface, or K-U-I. This integrated set of keyboard-oriented functions gives users better control of Windows with hot keys and a command line interface integrated into a pop-up control panel. The program includes a keyboard-based mouse simulation that lets mouseless laptop users run Windows.

K-U-I lets you create hot keys that launch and switch between any number of Windows and DOS applications. It also lets you choose from a cursor set that's easier to see with your display (the small white Windows cursor can be hard to see on Super VGA and LCD displays). K-U-I's Lens lets you view WYSIWYG text or anything else on your screen close up.

Suggested retail price is \$79.95. For more information, contact Softac, 23 Sunset Road, Winchester, Massachusetts 01890; (617) 721-1010.

After Dark, the Sequel

Berkeley Systems recently released version 2.0 of its popular, hypnotic After Dark screen saver for Windows, now with more than 40 full-color, animated displays. New additions to the classic Flying Toasters and Tropical Fish include Hall of Mirrors; a Swan Lake display with swimming swans and cygnets; and

bouncing, clacking Marbles.

The program also comes with Sound Palette digital sound that gives you realistic sound effects without additional hardware. You can hear a bubbling fish tank, howling coyotes, and screen-munching worms, for instance, but if you're after even *more* realistic sound, the program supports Sound Blaster and Microsoft's Multimedia sound.

WallZapper, an instant wallpaper creator, automatically turns any After Dark display into wallpaper with a single keystroke. The Amazing MultiModule, one of the most popular features of After Dark's Mac version, has been added to version 2.0 for Windows. You can run several displays side by side or overlapping, either transparent or opaque, to create some unusual effects.

Suggested retail price for After Dark 2.0 is \$49.95, with special pricing for upgrades. For more information, contact Berkeley Systems, 2095 Rose Street, Berkeley, California 94709; (510) 540-5535.

Let the Computer Do It

MySoftware's newest program, MyQuickWriter, touted as "the word processor with a twist," is as simple as it gets. The program includes dozens of prewritten business letters—not just templates—that you customize to your needs. You simply load the document, edit it, and print it out.

MyQuickWriter includes sample letters; business letter style guides like Full Block, Semiblock, and Memorandum; and a QuickFax form, in which you enter your send-to information and a message, and the form prints out with your return address automatically entered.

The program has full word processor features such as a built-in spelling checker, search and replace, adjusta-

ble margins and tabs, and automatic page numbering.

Suggested retail price is \$24.95. For more information, contact MySoftware Company, 1259 El Camino Real, Suite 167, Menlo Park, California 94025; (415) 325-9372.

This Program's for Hire

With unemployment still soaring and corporate layoffs becoming the American way, an interview-clinching résumé usually means paying a premium to your local résumé-writing service—unless you have the right software for the job.

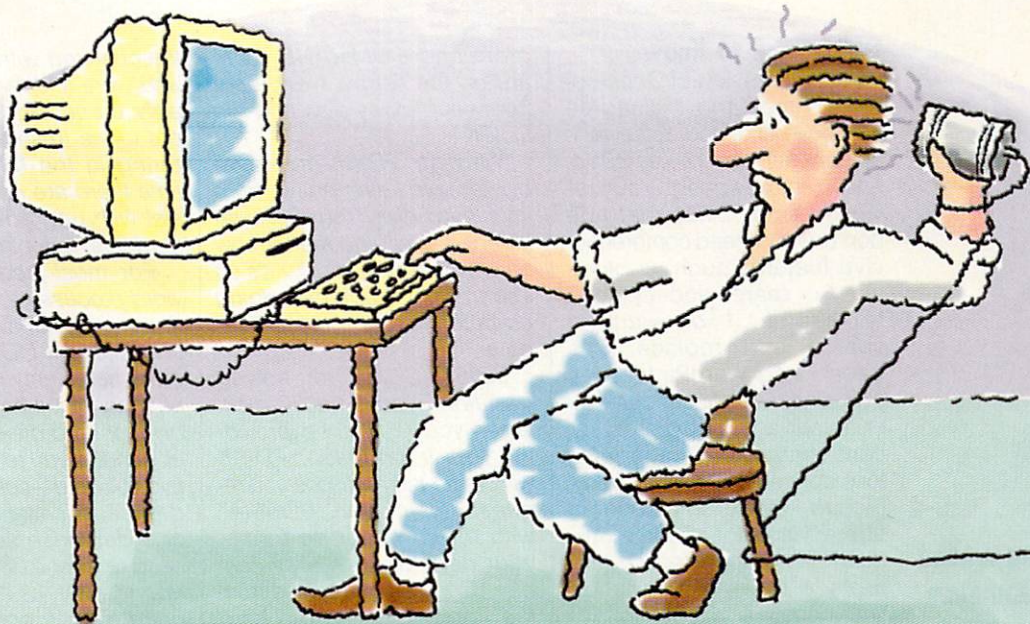
Individual Software's recently enhanced version of its popular ResumeMaker for IBM PCs and compatibles is designed to help you present your credentials in the best possible way while organizing your complete job search, and it offers tips for interviewing—much the same way a search agency or résumé service does.

The program gives you three résumé choices—chronological, functional, and performance—with up to eight different formats, so the résumé presents your experience and strengths in the most effective and attractive manner suited to your line of work.

Suggested retail price is \$49.95. For more information, contact Individual Software, 5870 Stoneridge Drive, Suite 1, Pleasanton, California 94588; (510) 734-6767.

Companies with items of interest suitable for "News & Notes" should send information along with a color slide or color transparency to News & Notes, Attn: Jill Champion, COMPUTE Magazine, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. Although space is limited, all items will be considered for publication. □

YOU MIGHT FIND AN ONLINE SERVICE FOR LESS, BUT THERE ARE PROBABLY SOME STRINGS ATTACHED.



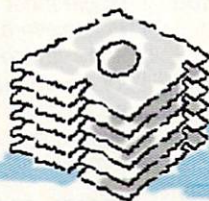
Special Trial Offer: 5 hours for \$5!

Some online services charge a monthly fee for "unlimited access."

This might sound like a good deal.

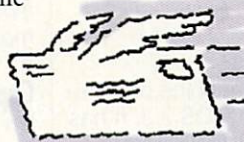
But take a closer look: the monthly fee doesn't include

any of the services you want! All of the valuable features, like downloadable programs, chat, and multi-player games cost extra—sometimes a lot extra. With DELPHI's 20/20 Advantage Plan, you get 20 hours for only \$20—that's 20 hours of real productivity and

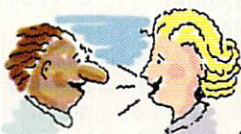


Downloadable Programs

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Chat with members from around the world. Send unlimited electronic mail messages. You can even challenge your skills in lively multi-player games. And all within easy reach: just connect with a local phone call from over 600 cities and towns.

Trial Offer: 5 hours for \$5!

Try DELPHI at \$1 per hour. Join today and get 5 hours of evening and weekend access for only \$5. If you're not satisfied, simply cancel your account before the end of the calendar month with no further obligation. Keep your account active and you'll automatically be enrolled in the 20/20 plan for the next month. So don't be strung along by another online service—get it all for less with DELPHI!



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Press RETURN once or twice
At Password, enter COMPUTE55

Rates apply for evening and weekend access from within the mainland US. There is a one-time enrollment fee of \$19 when you join the 20/20 Advantage Plan.

Kidding around with computers, removing the partition, graduating to a 386, avoiding the bugs in BASIC, learning the difference between a 386 and a 486, accessing executables, and starting a shareware company

Old Enough to Know

I read your review of *Once upon a Time*, and I disagree with several of your reviewer's statements. I'm 12 years old, and I enjoy writing. Your reviewer said, "Kids that age don't want or need comprehensive features such as block move or search-and-replace." I disagree. I *do* want to search and replace. I've been using WordPerfect 5.1 ever since we got our computer a year ago. In my most recent story, a 160-page mystery concerning a polo pony, I found it easier to type in an abbreviation for a commonly used name, then search and replace it later. It reduced time-consuming repetition.

Why do you stereotype? Maybe some people my age want simple programs, but not all.

ALICIA GRAINGER
POWAY, CA

Upgrade Blues

I have a 286 machine originally loaded with DOS 3.3. It has a 40MB hard disk. This disk was partitioned for 32MB, which was the limit of DOS at the time. I've upgraded to DOS 5.0, which isn't limited to 32MB, but I still can only use 32MB of my disk space. How can I get access to the other 8MB?

HAROLD HOROWITZ
BROOKLYN, NY

This is a somewhat complex problem, but it's easily overcome. Begin by completely backing up everything on your hard disk, using DOS's BACKUP program or the PC Tools PCBACKUP program. Now format a floppy disk with the /s option to transfer your system files to the floppy. Copy your AUTOEXEC.BAT, CONFIG.SYS, FORMAT.COM, and FDISK.EXE files to the floppy. Make sure a copy of your backup pro-

gram and COMMAND.COM are on the floppy. Next, boot from your floppy disk and run FDISK.

Warning: FDISK irretrievably removes everything from your hard disk. You can't get it back—ever—no matter how hard you try. That's why it's so important to back everything up before starting this procedure.

FDISK will ask you how to partition your hard disk. When you've finished providing this information, FDISK will create the partitions you request. Next, run FORMAT with the /s option to format your hard disk as a system disk. Copy all of the files from the floppy back to the hard disk and use your backup program (or RESTORE) to restore the previously existing subdirectories and files to your hard disk. When you're finished, you should have 8MB more than when you started.

Captive Audience

I'm an engineering student at a technological institute where each student is required to own a computer. Two years ago, as a freshman, I purchased an AT&T 6286/EL (12.5 MHz, 1MB RAM) from the school, and already I feel as if I have an obsolete computer. There's a lot of software I can't use. I was told to wait until I graduate before making any changes. Is there anything I can do for now?

DEAN LAVDAS
DOUGLASTON, NY

The 80286 processor is becoming a dinosaur, sadly. We assume that the software you're having trouble with is Windows or some other software that makes use of extended memory and protected mode. To make full use of these products, you really need to upgrade to an 80386.

We checked with your school and were told that it will probably be selling 386 computers to the freshman class entering in the fall but at this time there are no plans to assist with upgrades of current students' machines.

For most people running word processors, communications programs, or spreadsheets under DOS, your computer has plenty of horsepower, at least if it has a reasonably fast hard disk. On the other hand, if you're running certain software—concurrent Windows applications, AutoCAD, or a database server—you'll need at least a 386. Some programs, such as AutoCAD, require a math coprocessor. If you can't use certain programs because they require a 386 or coprocessor, you're out of luck until you replace the motherboard or buy a whole new machine. But the single most cost-effective way to achieve a dramatic performance improvement would be for you to purchase an extended memory board and four to eight megs of RAM. Your system will fly.

BASIC's BLOOD Bug

I recently modified an old GW-BASIC program to use BLOADs from a RAM drive to load menus and workscreens to the video storage area (&HB800). Everything worked beautifully until my program encountered a series of LPRINTs. After the LPRINTs and upon encountering a BLOAD, I got a *file already open* error message. Since my program had not issued any OPEN commands, and BLOAD and LPRINT contain their own built-in OPEN and CLOSE, I was mystified. To solve the problem, I eventually inserted a plain CLOSE command after each series of LPRINTs, and the error message disappeared. What's go-

JOIN THE COMPUTE SEARCHSTAKES



YOU MAY WIN STAR'S LASERPRINTER 4 STARSRIPT! DIAL 1-900-454-8681!

**Cost for call \$1.50 first minute, \$1.00 each additional minute.
Must be 18 or older. Touch-tone phone required.**

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IT'S GRAND TO WIN

Every month, from now until November, you'll have the chance to win fabulous prizes by playing the Compute SearchStakes. You'll also have the chance to win the SearchStakes Grand Prize by submitting the solution to any two monthly SearchStakes, plus the solution to the Grand Prize SearchStakes, to be featured in our upcoming December issue.

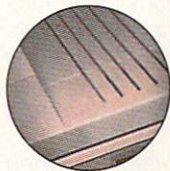
IT'S FUN TO PLAY

Each of the six picture disks displayed below is a portion of a photo or illustration taken from an ad in this issue. To

solve the September SearchStakes, locate the ads from which these disks were taken and note the page number for each. If the ad has no page number, simply count that page or cover as zero. Then add up all six page numbers. That is the solution to this month's SearchStakes.

IT'S EASY TO ENTER

Once you find the solution, you may enter the September SearchStakes automatically on a touch-tone phone by calling 1-900-454-8681 by 10/30/92. The cost for the call is \$1.50 for the first minute, \$1.00 for each additional minute. Average call is estimated to be 2-3 minutes. Callers must be 18 or older. You may also enter by mailing your answer on a 3" x 5" piece of paper, along with your name, address, and phone number, to: "September Compute SearchStakes," 324 West Wendover Avenue, Suite 200, Greensboro, N.C. 27408 by 10/30/92. No purchase necessary. For more information on how you may win this month's prize, valued at more than \$1,995, turn to page 38!



COMPUTE SEARCHSTAKES!

No purchase or phone call required. For automatic entry, call 1-900-454-8681 on a touch-tone phone. The cost for the call is \$1.50 for the first minute and \$1.00 per minute thereafter; average call is estimated to be 2-3 minutes. Charges for calls to the above number will appear on your phone bill. Callers must be 18 or older. To enter June SearchStakes drawing call from 9 A.M. EDT on 4/26/92 through midnight EDT 7/31/92, to enter July SearchStakes drawing call from 9 A.M. EDT on 5/28/92 through midnight EDT 8/31/92, to enter August SearchStakes drawing call from 9 A.M. EDT on 6/26/92 through midnight EDT 9/30/92, to enter September SearchStakes drawing call from 9 A.M. EDT on 8/26/92 through midnight EST 10/30/92, to enter October SearchStakes drawing call from 9 A.M. EDT on 9/26/92 through midnight EST 11/30/92, to enter November SearchStakes drawing call from 9 A.M. EDT on 10/26/92 through midnight EST 12/31/92, to give your name, address, telephone number, the Compute issue date (month), and the solution for the month you select. To enter the Grand Prize drawing, call from 9:00 A.M. EST 12/1/92 through midnight EST 1/29/93 to give your name, address, telephone number, the solution to the Grand Prize SearchStakes plus the solution to any two of the previous monthly SearchStakes. All call-in entrants will receive a \$5.00 savings coupon toward caller's choice of: (1) Kathy Keeton's newest book, *Longevity*, or (2) a two-year subscription to *Compute*. Multiple coupons may not be combined on a single book or subscription purchase. Coupon expires 2/15/93. Call as often as you wish; each call is a separate entry. Call-in entry option is void in GA, LA, MN, OR, NJ and where prohibited.

Alternate Entry Method: Print your name, address, and phone number on a 3" x 5" piece of paper. (1) To enter the monthly drawings, print the Compute issue date (month) and solution for that month on your entry and address your envelope to include the issue date (month), for example: "June Compute SearchStakes." (2) To enter the Grand Prize drawing, print the words "Grand Prize," the Grand Prize solution, plus the solution to any two previous monthly SearchStakes on your entry. Address your envelope: "Compute SearchStakes Grand Prize." Mail all entries, addressed as directed above, to: 324 West Wendover Avenue, Suite 200, Greensboro, N.C. 27408. Enter as often as you wish; each entry must be mailed separately. All write-in entries must be postmarked by 1/31/93 and received by 2/15/93.

For the solution(s), complete rules, and detailed description of prizes including prize values, send a self-addressed stamped envelope to Compute SearchStakes Solutions, Dept. RRS, 1965 Broadway, NY, N.Y. 10023-5965 by 12/31/92; no return postage required for residents of VT and WA. Solutions and prize information will be provided through the issue date in which the request is received.

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FEEDBACK

ing on? This was a repeatable error and did not occur until I added the BLOAD instructions.

JERRY L. PORTERFIELD
OMAHA, NE

Microsoft admits that this is a bug in the BASIC Professional Development System version 7.0. It was corrected in version 7.1. The fixes they give include the one you already discovered. In addition, they suggest that you try the following.

1. Open the printer as a device and send output to the printer using the PRINT #file number statement instead of the LPRINT statement.

2. For an executable program, compile the program with the Near Strings option.

Don't forget that upgrading to 7.1 is a feasible option, too. It wouldn't hurt to tell Microsoft why you're making the upgrade.

On a related note, remember that the BLOAD address would be &HB000 on a monochrome system.

486 Instruction Set

I know the 80386 and 80486 have different instruction sets. Every program I've ever seen comes with the same package, however, whether you have an 8086 or a 486. Do any programs actually take advantage of the 486's superior instruction set? If not, then a 386 running at 33 MHz should be the equivalent of a 486 running at 33 MHz, shouldn't it? Or does the 486 process information more efficiently than the 386?

JASON LEWIS
ASCUTNEY, UT

Your letter is insightful and contains almost all of its own answers. The 8086 (which has the same instruction set as the 8088) was succeeded by the 80286, not counting a few oddballs such as the 80186 and 80188. The 286 has a few additional instructions that work in real mode (its 8086 emulation), and a lot of instructions that work only in protected mode. Therefore, any software that uses protected mode (for example, OS/2 and DOS extenders) uses these extra instructions.

Likewise with the 386, but it has even more new instructions for protected mode. The 486 has the same instruction set as the 386 in the CPU, but it has a math coprocessor built in, making its instruction set equivalent to a 386 plus a 387.

However—and your letter touched on this—many operations on each suc-

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ceeding chip have been improved in efficiency. That's why real-world tests show that a 33-MHz 486 is around 20 percent faster than a 33-MHz 386, not including vast speed improvements in code requiring a numeric coprocessor. And having the coprocessor on the same chip speeds math up substantially, simply because there's less hardware for the instructions to travel through and less communication required between the chips. Concerning software specific to these chips, all compilers worth their salt, such as Borland C++ or Microsoft C, can generate 286- or 386-specific code. Even so, few packages support two or more different versions of the software. Why? Think about it from the vendor's perspective. If your program requires, for example, a dozen 5¼-inch or ten 3½-inch floppies, would you want to double or triple that figure by including duplicates of everything for 286 and 386 versions?

All out of Proportion

What's the difference between EXE and COM files?

SHAWN BOWER
COLUMBIA, MO

To you as a user, there's no difference. To DOS, the difference is great. A COM file must be loaded into memory all at once and only at a fixed location in memory. It must also be short, with all its components lumped together into 64K or less (there are some exceptions).

An EXE file contains a great deal of information about itself, and DOS can perform numerous feats of memory management trickery on it, such as allowing overlays that trade memory usage for disk access time. This lets EXE programs leave parts of themselves on disk while leaving in RAM only the executing portion at any given time.

The richer EXE format requires at least 512 extra bytes per file, and sometimes much more, to keep track of everything. So a COM file would necessarily be smaller than the equivalent EXE file. On the other hand, software has reached the point that it's rare to find a main program smaller than 64K; therefore, COM files are generally reserved for quick little utilities, sometimes typed in with the use of DEBUG.

Thank You for Sharing

I'm seriously looking into the possibility of starting a shareware business, but I haven't any idea where to begin. Whom can I contact to get accurate information? I feel I have the right equipment. Are there any publications on the market that explain the tricks of the trade? The location we're looking at is ideally

suited for a business such as this.

JAMES A. RAMSDEN
DUNEDIN, FL

We're not sure whether you're a software author or you want to become a disk vendor. We'll cover both.

To become a disk vendor, you'll need a supply of up-to-date shareware. You can get this from other shareware vendors, but the best place to look is on GENIE, CompuServe, or local BBSs specializing in each category of shareware you carry. That's because it's important to get the latest version, which you might not get from other vendors. Then join ASP, the Association of Shareware Professionals (545 Grover Road, Muskegon, Michigan 49442; 616-788-2765 fax). The best way to learn about ASP is with GO ASPFORUM on CompuServe. ASP membership isn't free but will result in a deluge of free disks from hopeful shareware authors and access to several publications on shareware businesses. You can get great practice by volunteering to be the club librarian for your local user group.

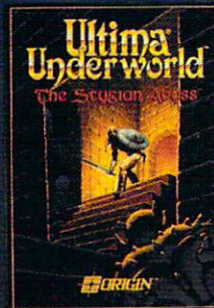
If you write software and want to market it yourself, read Writing and Marketing Shareware by Steve Hudgik, published by McGraw-Hill.

The Turbo User Group (P.O. Box 1510, Poulsbo, Washington 98370; 206-779-9508) has an excellent \$39.95 video featuring Rob Rosenberger of Barn Owl Software. It covers virtually every aspect of becoming your own shareware publisher and costs less than many books on the same subject. Although TUG is nominally a programmer's group, this video is for anyone with shareware to publish, programmer or not.

In both cases, follow these tips:

- Order catalogs from successful shareware vendors (they're the ones who regularly run full-page ads in magazines) to see how they organize and write the descriptions.
- Find a local disk duplicator.
- Be sure your phone lines are answered consistently at specified times.
- Don't bother to rent office space until business gets big. This is the ideal business to run from your home.

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



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POINT & CLICK

Clifton Karnes

TEN TIPS TO SPEED UP WINDOWS

Windows has never been criticized for being too fast. It's a simple fact that to accomplish Windows' GUI magic, the operating environment must jump through hoops while juggling an assortment of diverse elements. This hoop jumping and juggling takes time, mostly in memory access, disk access, and pixel pumping. Most of us have looked for ways to improve Windows' performance. Here are my top ten suggestions to boost Windows' speed.

Upgrade your software. Upgrade to DOS 5.0 and Windows 3.1. The latest version of DOS was designed with Windows in mind, and the two work very well together. If you upgrade your Windows version to 3.1, you'll get faster disk I/O, faster video drivers, faster printing, and generally snappier performance.

Upgrade your hardware. If you don't already have a 386, get one. And upgrade your memory to at least 4MB. With memory weighing in at \$40 a megabyte, it's an inexpensive option.

Upgrade your hard disk to a 1:1 interleave, 100MB or larger drive, with an access time of less than 15 ms. Windows applications are large and they access the disk often, so the larger and faster your drive, the happier Windows will be.

If you're using 3.1, run Fast Disk, Windows 3.1's new 32-bit disk access driver. Setup may install this for you if you have a Western Digital or compatible controller, but you can check by running Control Panel and clicking on the 386 Enhanced icon, followed by Virtual Memory and Change.

Use EMM386.EXE. Use the latest version of EMM386.EXE, the Windows/DOS memory manager, and configure it correctly.

If you're not running a PS/2 or a monochrome monitor, give EMM386 some extra UMBs by including the memory addresses E000-EFFF and B000-B7FF. And if your DOS apps don't need expanded memory, be sure to use the NOEMS option. With these parameters, your EMM386 line would look like this:

```
EMM386.EXE I=E000-EFFF  
I=B000-B7FF NOEMS.
```

If you're using an expanded or extended memory board, configure the board for all extended memory, and use EMM386 to emulate expanded memory.

Use SMARTDRV.EXE. Version 4.0 of SMARTDrive, which comes with Windows 3.1, is a real cache, and it's fast. The default is for SMARTDrive to cache writes (which will give you the greatest speed increase). If you have 4-8MB of RAM, use the following parameters:

```
SMARTDRV.EXE 1024 1024.
```

Note that you install this version of SMARTDrive in your AUTOEXEC.BAT file, not in CONFIG.SYS, and note that it loads high automatically.

Fine-tune CONFIG.SYS. In addition to your EMM386.EXE line, make sure your CONFIG.SYS contains the following lines:

```
HIMEM.SYS  
DOS=HIGH,UMB  
FILES=40  
BUFFERS=10  
SHELL=COMMAND.COM  
/E:512 /P
```

If you're on a network, use FILES=60. BUFFERS=10 assumes you're using SMARTDrive or another cache.

Use a permanent swap file. The only reason not to use a permanent swap file is if disk space is at a premium. A permanent swap file must go on a physical volume—not a logical one (such as a Stacker or network drive). If you have a choice of physical drives, put your permanent swap file on your fastest drive, and make it 4096K or larger.

Optimize regularly. SMARTDrive's performance will be impaired if your disk is fragmented. Optimize your hard drive once a week.

Fine-tune SYSTEM.INI. To make sure your apps run as smoothly as possible, put the following lines in the 386 enhanced section of your SYSTEM.INI:

```
SysFileChange=NO  
NoEMMDriver=YES.
```

Use a low-resolution, low-color graphics mode. In Windows, the higher the resolution and the greater the number of colors, the slower the display.

A resolution of 640 x 480 is much faster than 800 x 600, which in turn is much faster than 1024 x 768.

With colors, the difference in speed is even more dramatic. A 16-color mode runs rings around 256-color modes. If you must run in high resolution, high color, or both, use a software speed-up, such as WinSpeed (Panacea; \$79.95), or get a graphics accelerator card.

RTFM. Read the Friendly Manual! After you've used Windows 3.1 for a couple of months, start reading the manual. After you've finished, start reading the Microsoft Windows Resource Kit (Microsoft; \$19.95). It's a book (of over 500 pages) and disk combo that features comprehensive technical information on almost every aspect of running Windows. □

Here are my
top ten suggestions
to boost
Windows' speed.

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PROGRAMMING POWER

Tom Campbell

SHOPPING FOR BASICS

This month we'll look at some of the burgeoning Microsoft BASIC world. Microsoft now sports at least half a dozen major dialects of BASIC, half of them mostly incompatible with the others. If you're shopping for a new programming language, this column may help.

First, let's examine some terms. A BASIC that makes stand-alone programs allows you to distribute programs you've written so people without your version of BASIC can still run them. Ones that are extensible let you add to the language via assembly (or, in the case of Windows, DLLs). Modular BASICS let you break a program into separate files.

QuickBASIC—almost as big as Elvis. Despite Visual Basic's strong showing, QuickBASIC 4.5 is arguably Microsoft's flagship BASIC and certainly one of the most popular languages anywhere. It runs under DOS, comes with an interpreter and a compiler, makes stand-alone programs, is extensible, and is modular. A very good general-purpose language, it lacks only the pointers and dynamic memory allocation of C. Each can be made up for with assembly extensions and a copy of Ray Duncan's *Advanced MS-DOS*, and you can sometimes fake it with the very useful CALL INTERRUPT, which lets you get at MS-DOS internals without resorting to assembly.

QuickBASIC is rare among development environments because it comes with an interpreted development environment and a true compiler that creates faster-running EXE programs that don't need the interpreter. Version 4.5 is inexpensive, and though it's several years old, it's great for creating nearly any DOS application. It's

almost as popular as Elvis and deserves to be, although new versions have been as elusive as the King.

QBASIC—free and worth every cent. QBASIC runs under DOS, comes with an interpreter, but lacks a compiler. It eliminates the dreaded line numbers and turtlelike pace of the old GW-BASIC that probably came with DOS when you bought your computer. A stripped-down version of the QuickBASIC interpreter, QBASIC doesn't make stand-alone programs, isn't extensible, and isn't modular. I feel it's hideously scarred by not supporting CALL INTERRUPT, but since many people still don't have DOS 5.0, maybe that doesn't matter. QBASIC is still better than GW-BASIC, with its vastly superior editor and one of the best help systems around.

Visual Basic—incompatible and worth it. Visual Basic is a spanking-new version of BASIC for Windows. That's the good news. The bad news is that it's not compatible with QuickBASIC, so there's a huge amount of rewriting to do if you want to port your QB application to Windows.

The loss of seemingly critical standbys such as INKEY\$ and BLOAD may seem crippling. Actually, it's liberating—but plan to spend a fair amount of time learning VB.

Most disturbing about VB is that it isn't as good for developing serious Windows programs as QB is for DOS; it lacks support for fundamental Windows building blocks such as callbacks. Plus, it lacks a true compiler, instead requiring you to include a separate 270K runtime interpreter with your applications. No big deal, but the EXE that VB makes still retains your subroutine and variable names—a no-no for users who need to protect every aspect of the source code. Still, VB makes

stand-alone programs, is extensible, and is modular; its strengths far outweigh its few weaknesses.

PDS 7.1—not for pros only. The BASIC Professional Development System runs under DOS, comes with an interpreter and a compiler, and is an awesome package with the CodeView debugger, built-in support for a proprietary but flexible and fast code generator, size and speed advantages, and everything QuickBASIC has besides. It makes stand-alone programs, is extensible, and is modular. The most expensive (\$400) of Microsoft's BASICS, it's well worth its price.

GW-BASIC—still good for a gee-whiz or two. GW-BASIC, usually sold with computers that run DOS 3.0, is actually quite substantial. It comes with an interpreter, but it lacks a compiler, its editor stinks, it relies on line numbers, and it doesn't work well with separate files. It doesn't make stand-alone programs and isn't modular, but it is extensible. If you got it free and you're not a pro, it can teach you a lot. But plan to graduate to QBASIC or QuickBASIC ASAP.

Word BASIC—YAB. Word BASIC comes only with Word for Windows and is a YAB (Yet Another BASIC), but it's a godsend to word processor power users. It's extensible and includes an interpreter but not a compiler. It doesn't make stand-alone programs and isn't modular. Still, it's much better than any other word processor's macro language and lets you create sophisticated features like dialog boxes quickly and easily. It's also incompatible with Visual Basic (ouch!).

To be announced. Microsoft has threatened for years to release a Windows batch language founded on BASIC. No doubt it's in the works, but for now you'll just have to get infected with VB. □

QuickBasic comes with an interpreter and a true compiler that creates faster-running EXEs.



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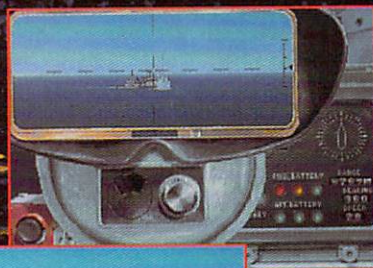
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INTRODOS

Tony Roberts

PLAY IT AGAIN, SAM

One of the highly touted features of DOS 5.0 when it hit the streets a year ago was the macro-handling ability of DOSKEY—DOS 5.0's command line retriever. Now that all the hoopla has died down, DOSKEY's macro function is all but forgotten.

Chances are you've experimented with DOSKEY's macros and quickly moved on to more interesting pursuits. If so, I hope you haven't given up on DOSKEY itself. The program's command line retrieval and editing functions are a substantial power boost for anyone who's not insulated from the command line.

Let's get DOSKEY running and see what it can do. If it's not already installed, enter the command *DOSKEY* at the prompt. If *DOSKEY.COM* is on your system's path, it will execute with no problem. If *DOSKEY* doesn't run, locate the program and execute it by including the entire path in the command line.

DOSKEY's most obvious benefit is that it permits you to repeat and edit previously executed commands without retyping. To do this, you press the up-arrow key or the down-arrow key to cycle through old commands. When you find the one you want to reuse, you simply press Enter to execute it.

The default startup mode for DOSKEY is overstrike. When you edit a previous command, the characters you type replace those already on-screen. If you find it more convenient to edit commands in insert mode, execute *DOSKEY* again, but this time add the insert switch: *DOSKEY/INSERT*. In either case, you can toggle manually between insert mode and overstrike mode

anytime you like by pressing the Insert key. In overstrike mode, the cursor appears as a solid block; in insert mode, the cursor is an underline character.

By default, DOSKEY allocates 512 bytes of memory to hold your command line history. If you use up all that available space, new commands will replace the oldest commands in the buffer.

If 512 bytes isn't the appropriate amount of space for you, change the buffer size as needed, using the *bufsize* switch. The command *DOSKEY /INSERT /BUFSIZE=256*, for example, would place DOSKEY in insert mode and would create a 256-byte buffer for the command line history.

There are several shortcuts available for using the command line history. At the outset of any computing session, when only a few commands have been issued, you'll find that scrolling through the history with the up and down arrows is a fast, efficient way to locate and reuse old commands. As the end of the day nears, however, and the buffer is crammed with dozens of old commands, you'll need a faster way.

Use the F8 key to cut through to the commands you need quickly. If you know the command you're looking for starts with the letter *p*, for instance, enter *p* on the command line, then press F8 to cycle through only the commands that begin with the letter *p*. If you can, be more specific. If you want to repeat a copy command you issued earlier, enter *COPY* on the command line and press F8 to see only the commands that begin with the letters *COPY*.

Although F8 is my favorite DOSKEY shortcut, the F7-F9 combination comes in handy, too. Press F7 to see a list of all

the commands currently held in the buffer. Each command is numbered. Find the number of the command you want to reuse and press F9. DOSKEY will prompt you for a line number. Enter the number for the command you want, and that command will instantly fill the command line and be ready for editing or execution.

Here are a couple of additional DOSKEY tips. To clear the command line, press Esc. If you want to zap the entire command line history and start from scratch, press Alt-F7.

Finally, having DOSKEY installed permits you to enter and execute several commands on a single line. DOSKEY gives you up to 128 characters with which to work, so you can load up your system before you head off to the water cooler.

To use this feature, just enter the commands on a single line, separating them with the Ctrl-T combination. This will appear as a paragraph symbol (¶) on your screen. Here's an example:

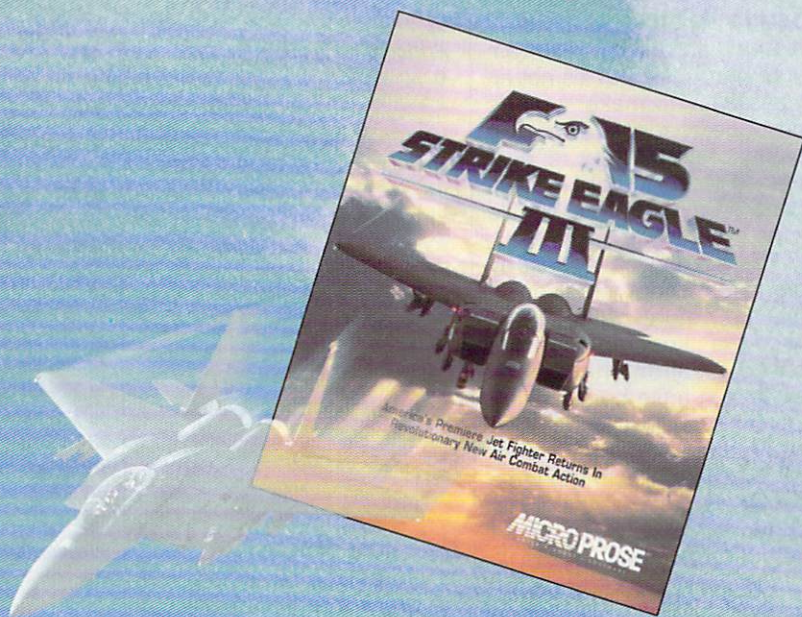
```
copy c:\letters\*.doc a:
copy d:\123\4qtr*.wk1 b:
pkzip archives c:\reports\*.may c:\reports\*.jun
```

Once you get used to DOSKEY, you'll want it running all the time. The best way to ensure that it's always available is to insert the DOSKEY command and any appropriate switches into your AUTOEXEC.BAT file. The program and a 512-byte buffer occupy just over 4000 bytes. I think the benefits are well worth the small investment in memory space.

Now, if I've offended any of you who really believe that DOSKEY macros are indispensable, good. Drop me a note in care of the magazine or, if you have access to GENIE, pop into the COMPUTE RoundTable and take issue with me there. My ID on GENIE is TROBERTS. □

DOSKEY's macros may be lacking, but don't miss its command line power.

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G17

TIPS & TOOLS

Edited by Richard C. Leinecker

Overwrite deleted files, hide your mouse away, and edit your batch files created with COPY CON.

Secure Deletes

It's easy to delete a file from your hard disk, but it's not always easy to make sure it's no longer readable. There are plenty of utilities that recover erased files. And once that's done, in most cases, the file is as good as new.

The solution is to destroy any information contained in the file before deleting it. I wrote a special program called Cleandel that zeroes all data in a file before deleting it. Even if it's unerased with a disk utility, it won't contain any useful information (except the information that some clever person zeroed the data before deleting the file).

You can type in Cleandel using the DOS DEBUG command. Make sure the DOS program called DEBUG is in your path or the current directory. In these examples, the italic text is what the computer prints; the roman text is what you should type. One way to be sure you get these programs exactly right is to have someone read the numbers to you as you type them in. Another way suggested by one of our readers is to read the numbers into a tape recorder and then play them back as you enter the program code.

DEBUG CLEANDEL.COM

File not found

```
-e 100 8c c8 8e c0 be 80 00 ac
-e 108 0a c0 74 5f ac 3c 0d 74
-e 110 5a 3c 20 74 f7 8b d6 4a
-e 118 ac 3c 0d 74 04 3c 20 75
-e 120 f7 c6 44 ff 00 8b ea bf
-e 128 6f 01 2b c0 b9 00 01 f3
-e 130 ab b8 02 3d cd 21 8b d8
-e 138 2b c9 8b d1 b8 02 42 cd
-e 140 21 8b f2 8b f8 2b c9 8b
-e 148 d1 b8 00 42 cd 21 ba 6f
-e 150 01 b9 00 02 b4 40 cd 21
-e 158 81 ef 00 02 83 de 00 73
-e 160 ed b4 3e cd 21 8b d5 b4
-e 168 41 cd 21 b4 4c cd 21
-RCX
CX 0000
:6f
```

```
-W
Writing 006f bytes
-Q
```

If you have the Checksum program from the July 1992 issue, you can easily check your typing. Type *CHECKSUM CLEANDEL.COM*, and if you have typed the file in correctly, 224 will appear.

To use it, just type the command with a filename as a parameter: *CLEANDEL filename*. It ignores system or hidden files.

RICHARD C. LEINECKER
MIAMI, FL

Hide Your Mouse

You're getting ready to run a program that you love, but the mouse support is weak, and you'd rather not have an active mouse when it runs. You could edit your startup files and reboot. Or you could run the following programs, Hidemse and Showmse. Hidemse disables your mouse driver. Any program that runs after Hidemse won't know you have a mouse (with the possible exception of Windows or other programs that have their own mouse drivers). After you're done and want your mouse restored, you just type *SHOWMSE*.

These programs also use the DOS DEBUG command.

DEBUG HIDEMSE.COM

File not found

```
-e 100 8c c8 8e d8 2b c0 8e c0
-e 108 bf cc 00 26 8b 05 a3 50
-e 110 01 26 8b 45 02 a3 52 01
-e 118 26 8b 45 04 26 89 05 26
-e 120 8b 45 06 26 89 45 02 ba
-e 128 46 01 b4 3c 2b c9 cd 21
-e 130 72 10 8b d8 ba 50 01 b9
-e 138 04 00 b4 40 cd 21 b4 3e
-e 140 cd 21 b4 4c cd 21 4d 56
-e 148 00
-RCX
CX 0000
:49
-W
```

```
Writing 0049 bytes
-Q
```

The checksum for this program is 126.

DEBUG SHOWMSE.COM

File not found

```
-e 100 8c c8 8e d8 ba 34 01 b8
-e 108 00 3d cd 21 72 22 8b d8
-e 110 ba 3e 01 b9 04 00 b4 3f
-e 118 cd 21 b4 3e cd 21 2b c0
-e 120 8e c0 a1 3e 01 26 a3 cc
-e 128 00 a1 40 01 26 a3 ce 00
-e 130 b4 4c cd 21 4d 56 00
-RCX
CX 0000
:37
-W
Writing 0037 bytes
-Q
```

The checksum for this program is 97.

RICHARD C. LEINECKER
MIAMI, FL

COPY CON Corrections

One of the easiest ways to write short batch files is with DOS's COPY CON capability. To use it, just type *COPY CON filename*. Type the lines of your batch file, press F6, and then press Enter. The batch file will be saved to disk. This can be a lot easier than loading a word processor or text editor.

One problem you might encounter is getting to the end of a line and realizing that you've made a mistake toward the beginning of the line. You can backspace to the beginning of the line and retype what you've done, but that's a hassle; now you have a choice.

If you'd like to change the line you're currently editing but don't want to entirely retype it, press the F5 key. That'll place you on the next line. Press the right-arrow key until you're at the point that needs correcting. (Each time you press the right-arrow key,

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TIPS & TOOLS

Substitute DOSKEY scripts for batch files, get more lines on your screen, and write beefier batch files.

another character of the previous line will appear.) After typing the corrections, you can press the right-arrow key until you're at the end of the characters of the corrected line. Then you can proceed with creating the file.

WADE PORTER
WORLAND, WY

Diskless Batch Files

Before DOS 5.0, you could add commands by creating batch files that performed useful tasks and putting them somewhere in your path. The drawback was that they all occupied at least one cluster. Small hard drives usually allocate 2K per cluster; larger ones usually allocate 4K. That's a high price to pay for a small batch file.

DOS 5.0 includes a special utility called DOSKEY. It has the ability to define simple commands that were previously carried out by small batch files. Such a command is limited to a single line, but in many cases that's all you need.

Make sure DOSKEY is being loaded in. Check your AUTOEXEC.BAT file, and if you don't see a line that says DOSKEY, add it. Then define your macro commands like this.

```
doskey da=echo y | del a:*. *
doskey db=echo y | del b:*. *
doskey qform=format a:/q/u
doskey top=cd\
doskey gogames=cd
  \mystuff\games
```

The first two commands are very dangerous because they will clear a disk of all the files in the current directory without asking for confirmation. Only enter them if you are sure you will never use them in error. You can change the DOSKEY list anytime you want just by typing in a new DOSKEY entry.

GREG SOMMERVILLE
CHICAGO, IL

More Lines

If you have a VGA monitor, DOS 4.0 or above, and ANSI.SYS installed, you can increase the number of lines displayed by using the MODE command. Type `MODE CON LINES=X` where X is 25, 43, or 50. This is especially handy when you're viewing files from the DOS prompt. The additional lines might enable you to see an entire large file in a single screen.

BEN SEREBRIN
LAKELAND, FL

Batch File Hints

Here are several tips for writing batch files.

If you'd like to display the date or time but don't want people to have to press Enter to go on, here's what to do. Type `COPY CON ENTER` and press Enter. Press Enter, F6, and Enter. You've just created a file named Enter. This file can be redirected into DOS commands that need Enter before proceeding. The following two lines show the time and date from a batch file and don't wait for a keypress.

```
time < enter
date < enter
```

You can copy or delete groups of files with a simple batch file that uses the FOR command. Here are two examples that copy and delete groups of files. The first is COPYGRPS.BAT.

```
echo off
if "%1"==" " goto usage
if "%2"==" " goto usage
for %%r in ( %2 %3 %4 %5 %6
  %7 %8 %9 ) do copy %%r %1
goto end
:usage
echo To use this batch file, type
copygrps followed by the
echo destination and the groups
you want to copy.
echo For example, to copy all of
```

```
the EXE and COM files to
echo the directory
c:\work\backup, you'd type
echo copygrps c:\work\backup
*.exe *.com.
:end
```

The second example is KILLGRPS.BAT.

```
echo off
if "%1"==" " goto usage
for %%r in ( %1 %2 %3 %4 %5
  %6 %7 %8 %9 ) do del %%r
goto end
:usage
echo To use this batch file, type
killgrps followed by the
echo groups you want to delete.
For example, to delete all
echo of the EXE and COM files,
you'd type killgrps *.exe *.com.
:end
```

Several of you have written batch files to change configurations. Then, you need to reboot before they become active. You can write a special batch file that reboots for you. Here's REBOOT.BAT.

```
goto begin
```

```
rsc
ffff
rip
0000
g
```

```
:begin
debug < reboot.bat
```

RICHARD C. LEINECKER
MIAMI, FL

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



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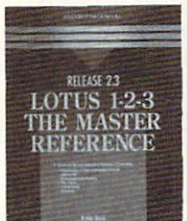
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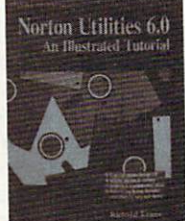
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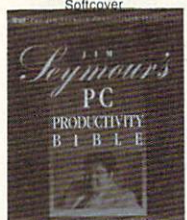
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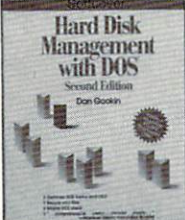
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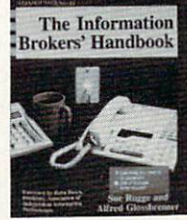
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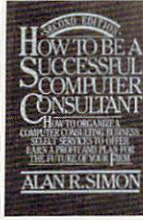
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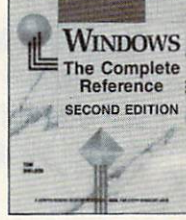
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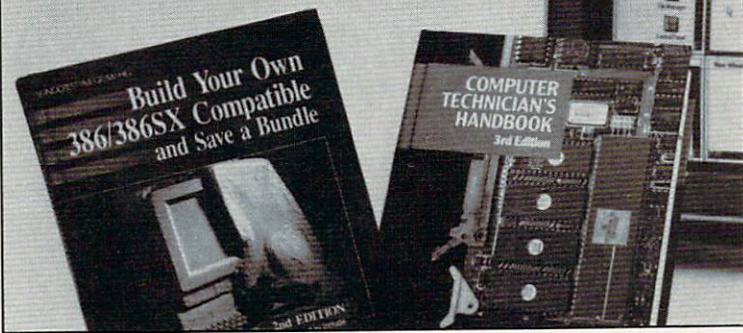


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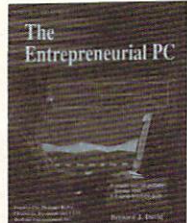
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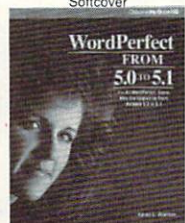


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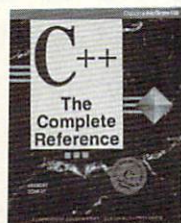
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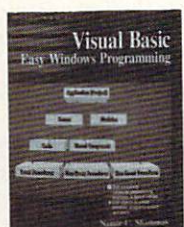
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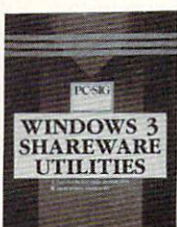
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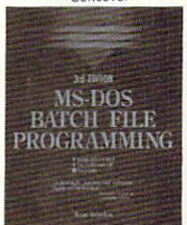
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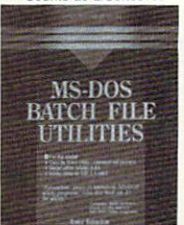
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HARDWARE CLINIC

Mark Minasi

FONT ABC's

This month, we'll start looking at fonts on the PC, particularly under Windows, as the release of Windows 3.1 with TrueType has reopened a source of perennial mystery for a lot of PC users. But before we get started, here's an administrative note.

I'm thankful for the amount of mail that this column generates, and I want to answer all of your questions: Keep 'em coming. But if you need a reply, *please* don't send letters to me or COMPUTE without a self-addressed stamped envelope! I'm absolutely swamped at the moment working on two new books (one on OS/2, one on Windows) and a video script. So if I have to hunt around for an envelope and stamp in order to reply, that letter just ends up in the do-this-sometime pile. On the other hand, if I can zip off a quick reply, drop it in a self-addressed stamped envelope, and post it, I'll get it done quickly. Thanks in advance—now on to the column.

Just a few years ago, nobody worried about fonts. The first professional computer seminar I recall doing was in 1982, on the subject of spreadsheets. The class and I worked from a course book consisting of seven Xeroxed pages of dot-matrix output. Nowadays, any instructor working from material like that would get lynched. Then, like everybody else, I graduated to laser printers, marveling at the crispness of letter quality (remember that term?) Courier type.

In 1985, really nice-looking stuff starting flowing out of laser printers attached to Macintoshes. For the next few years, anytime I produced attractive-looking printouts, people would ask, "Did you do this on a Mac?" (I always answered, "No, I did it on a computer." Sorry, Mac guys—I

couldn't resist.)

What was novel in 1985 became de rigueur by 1988. People started asking when I would "desktop publish" my materials. What they meant was, When will you stop using Courier and go to Times Roman and Helvetica? One vendor suggested broadly to me in 1989 that course materials in Courier were too low-class for her company. So in 1988, I changed my materials over to Microsoft Word, seeking Times and Helvetica. It was a nightmare.

Between 1989 and 1991, I struggled with a desktop pub-

ca? Take a look at figure 1, and you'll see the difference.

The words *Times Roman* are printed in the Times Roman typeface. The word *typeface* refers to how letters are formed. Note that the Helvetica lettering is simpler. The Times Roman lettering has little swishes called serifs at the edges of its letters (see figure 2). Helvetica doesn't, and it's called a sans-serif typeface for that reason.

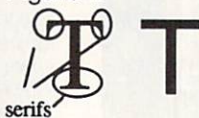
Why are there different typefaces? Type designers are artists, and people who work with printed media know that

Here's how to take some of the mystery out of using fonts on the PC.

Figure 1

Times Roman
Helvetica

Figure 2



lishing system based on a mainframe language called GML/Script. I still like it, but sadly, it's not supported on PCs anymore, so I was forced to switch. Then, fortuitously, Windows 3.0 came along. Now I use Ami Pro 2.0 and like it, except for its fatal flaw. Once you've gotten a document to look really nice, there's no way to reuse that document in another document, short of recreating it. Because of all the systems I've used, I've ended up buying and rebuying fonts for every system. What I want to do here is make sure that you don't have to buy and rebuy.

Let's start off here with some basics. What, exactly, are Times Roman and Helvetic-

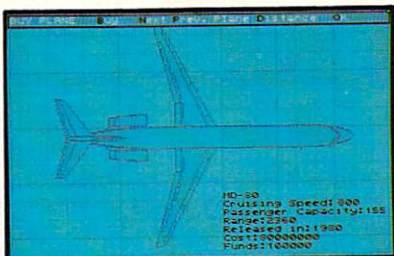
a different typeface gives a different mood to the printed page. Take, for instance, Times Roman. It's very legible and unobtrusive. You don't look at the printed page and say, "My, that's an interesting typeface." You just see the same old typeface that you've been looking at since you first read a newspaper.

Times Roman was developed in 1929 by Stanley Morison and Victor Lardent for the *Times of London* newspaper. It gets its name from the fact that it was developed for the *Times*, and it's a roman face. Here, *roman* just means that it's not italic or boldface, so Times Roman is just the normal text face used by the *Times of London*.

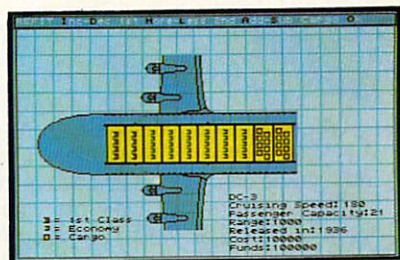
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HARDWARE CLINIC

When unveiling the new typeface, the *Times* dubbed it Times New Roman. The *New* is often dropped because one of the first versions available was offered by Linotype, which dropped *New* from the name. The version of Times Roman shipped with Windows 3.1 includes *New* in its name. Times first saw print in 1932 and was used by the *Times* until November of 1991, when the newspaper replaced Times New Roman with a newly designed type called Times Millennium. As it turns out, Times Roman's popularity was its downfall in the eyes of its creators: The *Times* didn't want to look like everyone else, so the newspaper chose a slightly different image.

Depending on whom you read, either Times or Helvetica is the best-selling and most used typeface in the world. Helvetica was born in 1957 to two founding fathers, Max Miedinger and

Edouard Hoffman, both designers for the Haas Typefoundry in Switzerland. Its original name was New Haas Grotesk, where *Grotesk* refers to an early term for sans-serif typefaces—*grotesque*. They were called that because, believe it or not, the whole idea of a sans-serif typeface seemed ugly at the time (the early nineteenth century). Some printers in England still use the term *grotesque* instead of *sans-serif*. A Helvetica ships with Windows 3.1, but its name is Arial.

When selecting a particular type of text to print your document in, you'll no doubt come up against a confusing item: typeface versus font. Since the advent of laser printers brought typefaces to the PC world, most people have agreed that Times Roman isn't a font; it's a typeface. A font is Times Roman in a particular size, weight (is it bold or not?), and slant (is it italic or not?).

Thus, we generally don't say that Times Roman is a font, but rather that Times Roman in the normal roman face and 12-point size is a font. (Discussion of size, or points, will be coming right up.)

You may recall that I discussed some of this a few months back, when I showed you how to make a LaserJet use a particular font. Why bring it up now? Because this terminology doesn't get used in the same way in the Windows world. There, if you open a dialog box controlling your printout's typeface, you'll see a list box containing all of your typefaces (Times Roman, Helvetica, or whatever), and the list box will be labeled Fonts. For whatever reason, the folks at Microsoft have thrown us a bit of a curve, so when someone uses the word *font*, it can't hurt to double-check to find out what is meant. When I use *font* in this column, I mean a particular

LINKS 386 Pro Rivald only

This all new LINKS 386 Pro version of our award-winning LINKS golf game offers many dramatic improvements that make playing LINKS 386 Pro more enjoyable – and gives you exciting new golfing possibilities!

Super VGA Graphics and 386 Power!

The new *LINKS 386 Pro*, featuring Harbour Town Golf Links, is the first golf game specifically designed for the graphic capabilities and computing power of your personal 386/486 computer system. SUPER VGA 256-color graphics at 640x400 resolution display breathtaking views of LINKS Championship Courses. Your friends won't believe that your computer looks so good!

A lot of listening went into LINKS 386 Pro.

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Over 345 combinations of Viewing Windows.

With the new *LINKS 386 Pro* you're not stuck with just one standard viewing window. With a few clicks of your mouse you can split the screen giving you a real-time reverse view of your shot to the green or add a scaleable top-view that displays the flight of your ball. Scorecard, club distance chart, terrain profile and other panels give you the flexibility to display what you want to view while playing and you can change your viewing setup at anytime!

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combination of typeface, stroke weight, stroke slant, and size. I use *typeface* to refer to a particular type design, such as Helvetica or Times.

You're familiar now with what *typeface* means, but how about the other font-selection terms? *Stroke weight* is another important descriptor of a font. Strictly speaking, most typefaces offer only two weights: normal roman and bold. But others may offer varying degrees of weight; when you see *extra bold*, don't smile. Some font vendors also offer font packages with a light weight in addition to a bold and normal. *Stroke slant* refers to whether or not the typeface is italic. It's important to understand that you must actually have the italic or bold versions of a typeface in order to use italic or bold attributes. The computer can't just lean the letters over to create italic; the italic version of the face must be designed separately

from its roman version. The same goes for bold. In fact, the bold versions of typefaces can look quite different from the normal roman faces.

Last on the list of font descriptors is *point size*. It refers to the height of the font; a point is a unit of measurement equal to 1/72 inch. By default, most word processors print in 10-point text. You may want to change that, depending on your audience. It's a little tough for farsighted people to read 10-point type, and there are more and more of these people around, as the population is aging. You'll find that 12-point type is considerably easier on the eyes, particularly if you're creating text that will be read by someone over, say, 35. I print my course books out in 12-point type and get positive comments about it all the time.

While we're on the subject of readability, let me make one more point

about making text readable. Text lines that are squeezed too close together are a real challenge to read. If possible, open up the space between your text lines. The term for this is *leading* (pronounced so that it rhymes with *bedding*). Printers refer to it in combination with the text point size, as in a set of instructions to set something in 10 on 12 Helvetica, for example. This means to use Helvetica in a 10-point size with a total line height of 12 points—so there are 2 points left over for leading. Leading is vitally related to readability.

Here's a leading tip you'll find useful. Most word-processing and desktop publishing programs don't set leading correctly, so don't trust the line spacing. Ami Pro, for instance, prints 12-point Palatino way too close together, a feature I didn't notice until after I'd printed out my 200-page Windows manual and gotten copies made at the printer. □

by the game itself.

Improved swing indicator to allow for more accurate putting.



Real-time split screen views of your shot. Great for making your approach shot to the green.

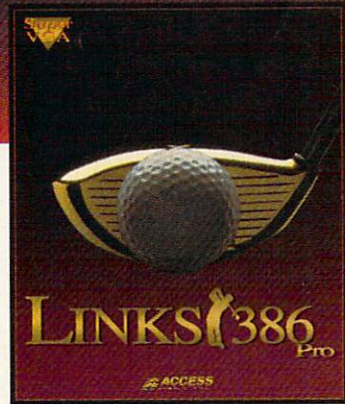
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Yes! I'm a registered owner of LINKS and I want to order my *LINKS 386 Pro* featuring Harbour Town for the introductory price of \$39.95 including shipping in US and Canada. (If you own LINKS and haven't registered, mail or FAX us a copy of the inside front cover of your LINKS manual along with your check or credit card information.) Offer expires December 31, 1992.

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Equipment required:

PC with 386 sx/16MHz CPU or better. • 2 MB of memory (RAM) • Hard disk drive with 13 MB free. (*Links 386 Pro* requires 5 MB and temporary playing files use up to 8 MB) • Mouse • Super VGA video card and monitor capable of 640x400 or 640x480 resolution in 256 colors.

Yes! Send me the new *LINKS 386 Pro* with Harbour Town for the IBM 386/486 computer for just \$69.95. If I'm not completely satisfied, I can return it for a full refund. **FREE** air shipping within the U.S.

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New Features for Links 386 Pro!

- Seven different viewing windows, with over 345 different combinations.
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- Statistics recorded for each player, game and course, with optional print out.
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- All new sounds! Supports SoundBlaster, SoundBlaster Pro, Adlib and other compatible sound cards & RealSound.
- Improved swing indicator for more realistic putting.
- Male or female golfers, with 10 different shirt colors to choose from.
- Spectacular texturing of fairways, rough, sand, water not offered in other golf games.

ON DISK

Tony Roberts

DOING THE IMPOSSIBLE

This issue, COMPUTE's PC Disk lets you do the impossible. How would you like a configuration menu that lets you select drivers on boot-up? Maybe you want the data that's heading for LPT1 to end up on LPT2? Wouldn't it be convenient to pluck an address right off the screen and plop it down on an envelope?

Read on. This issue's disk has all of that, plus a quick file-find utility and a bonus Win-

selection within a short period of time. Finally, for maximum control, you can have your CONFIG.SYS create an environment variable that can be accessed by your AUTOEXEC.BAT file.

Armstrong created the program to assist in the development and testing of a variety of drivers. With MultiConfig, he says, he could always access a *safe* configuration if one of the drivers under development locked up the system. MultiConfig makes it easy to keep separate setups for DOS, Microsoft Windows, games, or disk defragging.

MultiConfig, made available as shareware, carries a registration fee of \$15.

Qfind

Qfind is a hard disk file-search utility that's both fast and versatile. Programmer Jim

Bell knew he needed a solution when he found himself repeatedly trying to track down files on his two hard drives and eight network drives. Traditional file-search utilities were too time-consuming to use in such a complex environment.

It is inefficient to have the system rebuild entire directories with every search, when very few of the files have actually changed location. Qfind builds file directories only upon request. Subsequent searches reference the data file created by the build module. An occasional rebuilding of the master directory is all it takes to allow the Qfind search modules to do their work in a flash.

Qfbuild, which creates the master directories, is a DOS

application, but Bell provides both DOS and Windows interfaces for the search module. The program can catalog single drives or combinations of drives. In addition, Qfind can catalog the files that are in ZIP and ARC files.

Qfind is shareware with a \$10 registration fee.

SetEnv

SetEnv is a handy utility that permits you to change the contents of environment variables without retyping long strings or rebooting. This program is especially helpful in making quick, temporary modifications to the PATH variable, which is exactly why programmer Brian Nash created it.

SetEnv is quick and easy to use, with all the documentation you need included on the program's help screens.

SetEnv is freeware.

instantADDRESS

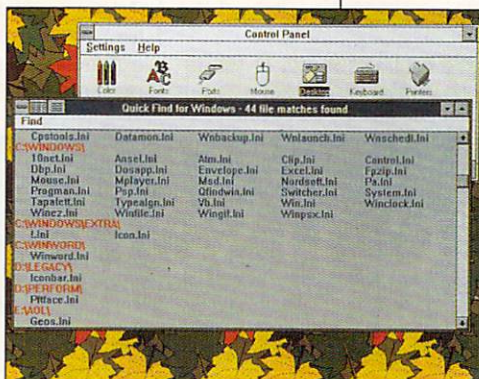
Here's a program to help brush away the envelope-addressing blues. instantADDRESS lets you lasso an address on your computer screen and send it to your printer.

instantADDRESS is a TSR program that uses a meager 5.5K of memory. When you press its hot key, it scans the screen and puts a frame around the first likely address it finds. You can either move the frame to another address, resize the frame, or press Enter to send the address to the printer.

The program works with dot-matrix and laser printers and, for maximum customization, allows printer setup strings to be sent to the printer both before and after the address is delivered. instantADDRESS will only work with DOS text mode software.

Kai Laurinalli's instantADDRESS is shareware with a \$20 registration fee.

Qfind is a fast and versatile file-search utility for Windows and DOS.



dows clock program.

Anyone who's gone beyond the casual-user stage has wished for an easy way to store and select multiple configurations for the computer.

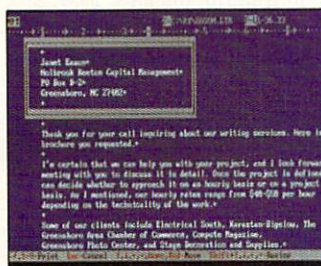
Randy Armstrong has approached the problem differently with his program, MultiConfig. With MultiConfig, all your configuration options reside in your normal AUTOEXEC.BAT and CONFIG.SYS files. The solution is selective execution.

MultiConfig

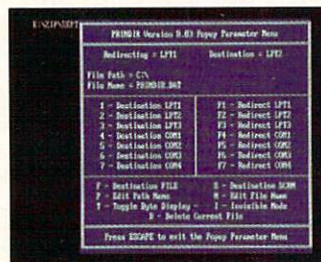
Upon boot-up, MultiConfig offers you a menu of possible configurations. Select one of the offerings, and the appropriate drivers are loaded. If you like, you can specify a default configuration that will automatically be used if you make no



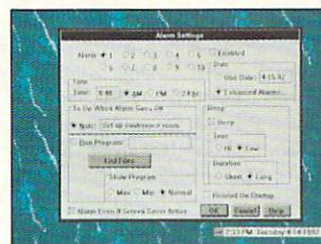
SetEnv



instantADDRESS



Prindir



WinClock

Prindir

Prindir is memory-resident printer redirection software. The program allows you to redirect output destined for one port to any other printer or communications port. Output also can be redirected to the screen or a file.

Prindir, a creation of Michael A. Hotz, can be in-

stalled in conventional, expanded, or extended memory. The program includes an invisible mode that allows it to remain in memory even when redirection is not desired.

The program is made available as shareware with a \$20 registration fee.

VPRINT

VPRINT is a virtual printing utility created by David Whitman. This utility captures printer output in disk files, which can be viewed or printed out later. It can be used effectively with software that doesn't include options for printing to disk. Instructions are included for using the utility under GEOS.

VPRINT can intercept the output to LPT and COM ports, and can actively monitor more than one port at a time. The program also includes a filtering option that permits you to screen out carriage returns or linefeeds.

VPRINT is shareware with a \$20 registration fee.

WinClock

If anyone pops into your office and starts singing 'Does anybody really know what time it is?', you won't be stuck for an answer with WinClock on your system.

First and foremost, WinClock is a digital clock that can be positioned anywhere on your Windows display, but the program is more than just a timekeeper. WinClock also includes an alarm system which can be programmed minutes or months in advance to remind you of important appointments or events. At alarm time, you can have WinClock either sound an alarm, flash a message on-screen, or even run a specified program.

David Feinleib's WinClock is shareware and carries a \$15 registration fee. □

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COMPUTE/NET

Troy Tucker

A FUTURISTIC NEANDERTHAL?

I believe online services are the wave of the future. Better compression methods and new hardware advancements will be the final springboard, but the underlying power is already there. The possibilities are endless. However, while we wait for the sleeping giant to awake, the online service companies should at least try to keep up with new market trends—Microsoft Windows, for example. If an online service doesn't change, it can become stagnant.

The popularity of Windows continues to increase. COMPUTE's January 1992 readership survey shows a significant increase in the number of Windows users, growing from 14 percent in 1990 to 31 percent in 1992. Almost every computer manufacturer packages Windows with its products. Software companies that once supported only DOS now sport a complete line of Windows products. Everything seems to be moving toward Windows. Everything, that is, except online services.

Why haven't GEnie, CompuServe, and America Online developed a Windows interface for their online services? I'm tired of shelling out of Windows to run my communications software. I want to access my favorite service from within Windows. Interfaces like CompuServe's Information Manager (CIM) and GEnie's Aladdin are good DOS programs that make dealing with the services easier, but that's not enough.

An online service is a product, just like any other product that you purchase. If you, the consumer, remain complacent with the final product, it will never change. On the other hand, if you'd like to see some chang-

es, like Windows versions of Aladdin, CIM, and America Online, then let them know. I have. If enough people badger the online service companies for new products, then maybe we'll see some real changes in the near future. Remember, you have to ask first.

Whether you're running Windows or not, COMPUTE/NET has several exciting new programs featured this month. You'll find them in the New Uploads section on COMPUTE/NET. Our all-star feature is The Levy Adventure Development System. With this unique program, you can design and compile your very own adventures. Trade your games with friends, use them in school, or entertain your family for hours. Your imagination is the only limit.

Here's what else to look for on COMPUTE/NET: Autocon, Solvelt, Waiter Menu System, Geewhiz, and QHelp.

Autocon allows you to set up as many as 50 pairs of AUTOEXEC.BAT and CONFIG.SYS files and choose them with an easy-to-use menu. A simple setup and installation program makes using it easy for the novice. When you need to boot without TSRs or with an EMS driver installed, just call up the Autocon menu and select the appropriate setup file; then allow Autocon to reboot your computer for you.

Solvelt makes calculating financial matters easy. This program gives you a wide range of valuable functions. Included in the package are loan assessment, real estate investment planning, profit and loss projections, net worth, budget planning, and much more. Its easy-to-use interface makes it a snap to put to work.

Waiter Menu System was designed to make your computer simpler and more powerful. You can set up multiple menus

to launch applications on your computer. You can even customize the menu system by changing the colors and the text strings for custom titles and menu entries.

If you're tired of leafing through your BASIC manual during programming sessions, then Geewhiz is for you. Load the program before you run BASIC, and you'll have an online manual waiting. With a single keypress, you can call it up to answer your questions as you program. It's easy to use and it saves time.

Our last program, QHelp, is an extremely valuable help file creator. You can create your own pop-up help screens—and you don't need to know how to program, either. It's as easy as typing in the text and keywords with your word processor or text editor and then compiling the file. You can pop up your custom help file with a single keypress. With QHelp, you can add professional-looking help screens to all of your programs.

COMPUTE/NET offers many high-quality shareware programs that you can download. These programs are written by talented programmers who, by placing their software online, trust you to compensate them for their efforts. Shareware is not free, but it is the best deal in town. You are given the opportunity to view hundreds of programs on a trial basis. And, if you find them useful, you send a small registration fee to the author. This system works only if you hold up your end of the bargain, so please register.

If you have any questions or comments about COMPUTE/NET, you can write to me here at COMPUTE in Greensboro or send E-mail to me on GEnie, address TROYGT, or on America Online, screen name TROY GT (that's with a zero). See you online! □

Online services should prepare for the future. Market trends provide insight into what the consumer wants.

TOP SECRET

KGB

To ALL NEW KGB AGENTS
From CENTRAL CONTROL
Special Instructions:
DESTROY INFORMATION ONCE
RECEIVED AND REPORT TO YOUR
COMPUTER TERMINAL FOR FURTHER
INFORMATION ON YOUR MISSION

It's your first day at Department P, Moscow KGB and you can't help but think that whoever arranged for your transfer here either has a strange sense of humor or hates your guts. Despite all the upheaval in the Soviet government in recent years, the KGB, or Committee for State Security, is still the most feared and pervasive intelligence-gathering network in the world. Only now the KGB itself is under secret surveillance - by you!

Questions lead to more questions but one thing is clear - the KGB reeks of corruption and you're about as safe as a long-tailed cat in a room full of rocking chairs. Be advised, comrade - you must act quickly and shrewdly to uncover the conspirators before they uncover you.

FEATURES:

- * Movie-like storyline filled with surprising twists and intrigue
- * Intuitive Icon-based Interface - that means no more wading through menu
- * VCR-style "REWIND" option for keeping track of important clues and information

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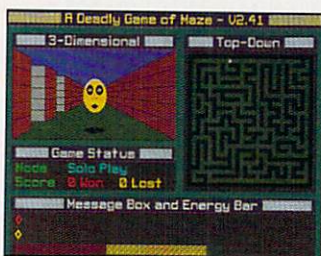
SHAREPAK

Steve Draper

COOL OFF WITH THESE HOT PROGRAMS

Give yourself and your computer a break with this month's SharePak disk. To help you get away from the tension of your workplace, September's disk offers two exciting games to help you relieve that built-up stress. If you're looking for something a little quieter to pass the time, check out Aquarium, a colorful screen saver guaranteed to relax

September's SharePak relaxes and revitalizes.



Fight to the finish with a Deadly Game of Maze.



Rest and relax with Aquarium.

both you and your computer. And to help ease your worries, we also include 2COL, a powerful printer utility that will easily and quickly save you both time and money.

We screen hundreds of programs each month to bring you the best shareware available. If you downloaded these programs yourself, the connect-time charges would be much more than the cost of this disk. You also don't need to spend days looking through shareware catalogs to find top-quality software. You'll

find the best programs on our disk, each and every month.

A Deadly Game of Maze 2.41

A Deadly Game of Maze gives you and a friend the chance to go head to head in a deadly game where only one of you will survive. Maze provides beautiful 3-D and top-down views of the maze in which you and your human or computer opponent must fight. The computer is a formidable challenger, but the game is more fun when you play another person via modem or null-modem cable.

At the start of each game, both you and your opponent are placed in a randomly selected labyrinth at random positions. You don't know where your opponent is hiding. All you have to work with is a 3-D view of the corridor you're standing in, a top-down view of the labyrinth, and a changing sonar blip that can guide you to your opponent if you interpret it properly.

Sneak up on your opponent to get close enough to fire your lasers. There is only one problem. This is a real-time game. While you're shooting at your opponent, he gets to shoot back at you. Whoever is fastest with the laser beams and has the strongest nerve wins.

Maze runs on any PC or compatible with EGA or better graphics. The registration price is \$15.

Jumpjet

Jumpjet is pure highflying arcade excitement, reminiscent of the popular commercial game Defender. Your mission is to destroy enemy bombers, oil refineries, and other strategic targets and return safely to base. Each new level gives you a different mission and different targets. After each mission is successfully completed, there's a bonus

round where the object is simple: Destroy as much as you can before time runs out.

Jumpjet runs on any PC or compatible with CGA or better graphics. The registration price is \$15.

Aquarium 1.031

Aquarium is an efficient screen saver with an amazing bonus. Watching tropical fish has been shown to be an excellent method of relaxing. When you want a break, just start the program. There's nothing to feed and no water to change. Simply tell the program the number and type of vividly colored fish that you want or use the default and start the program. Your screen fills with tropical fish and all of the usual tank trimmings. You can even display messages that float in the water.

Aquarium runs on any PC or compatible with 260K RAM and EGA or better graphics. The registration price is \$14.95.

2COL 2.9

2COL is a powerful utility that greatly reduces the huge amount of paper that you end up with when you print reference manuals and text files. You can cut the volume of paper you need by 60 to 70 percent if you use the program regularly. That means a big savings at the office supply store.

Unlike other compressed print programs, 2COL provides excellent readability. Many 2COL users actually find it easier and faster to read the compressed versions than the originals; they can take in more words at one time without having to scan across the page.

2COL runs on any PC or compatible. A dot-matrix printer is required. The registration price is \$20. □

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Back Issues Available

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JAN 90: *Directory Master*, customize with this DOS shell; *Quick Type*, improve your typing skills; *Skulduggery*, tricky game of mystery; *MathMagic*, four educational games. (#CDSK0190)

MAY 90: *QHELP* and *QHCOMPIL*, create TSRs to give online help; *Levy Adventure Development System*, create your own adventure games; *GEEWHIZ*, TSR BASIC manual; *Sounds Good*, make sounds for programs. (#CDSK0590)

OCT 90: *Amado*, match scrambled blocks to the computer pattern; *Captain Comic*, great EGA graphic adventure game; *Funny Face*, Mr. Potato Head-type animation faces; *Fusion*, great game similar to *Tetris*; *Power Poker*, create poker hands in two dimensions. (#CDSK1090)

MAR 91: *Cash Control*, simplify financial recordkeeping; *Personal Inventory 2.11*, maintain a record of household items. (#CDSK0391)

APR 91: *Schedule*Master*, manage your daily schedule; *Meal-Master*, menu-driven database system for managing recipes; *The Monuments of Mars!*, great graphic arcade/adventure game. (#CDSK0491)

AUG 91: *TurboPaint 1.5*, full-featured paint program; *Math Voyager*, guide starship by answering math problems; *EARTH-WATCH*, graphically displays 24-hour day-and-night cycles. (#CDSK0891)

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

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By Gregg Keizer

Think of a word processor as a tool to slice and dice words into infinite forms, and you'll begin to understand its power

A

word processor may seem like a glorified typewriter to some, but the comparison is inaccurate. Each has a keyboard, but the resemblance ends there.

Word processing is the most popular use of a PC, with 1991 North American word-processing software sales topping the billion-dollar mark. Only spreadsheets have altered America's business landscape more dramatically than word processors have. In schools and homes, word processing is the leading application of microcomputer technology. That's no accident.

Deleting, moving, or copying text takes just one or two keystrokes or the click of a mouse and a yank on a menu. You can rearrange words, check their spelling, call up the perfect synonym, merge documents, and more—long before you commit to putting words on paper. And once you've created a document, it's forever available, ready to reprint or, if you want, ready to metamorphose into something specifically targeted to the reader.

PICK YOUR INTERFACE

No one said that writing was easy. Writing is a seemingly endless series of difficult decisions. And one of the hardest is picking the perfect word processor.

Your first decision may be your most important. Do you stick with older software technology—a character-based word processor such as WordPerfect 5.1—or do you head for the newest Windows writing tool, such as Microsoft Word for Windows 2.0? The choice depends on two things: the PC on your desk and the reason you write.

Graphical word processors that run under Windows demand a faster, better-equipped personal computer than programs that launch from the DOS prompt. If your home, classroom, or home office PC is an older model with a slow microprocessor (80286, 8086, or 8088 machines), 1MB or less of memory, and a small (under 40MB) hard disk or no hard disk at all, forget Windows.

The writing results you're after are harder to quantify but just as crucial. If the presentation of your words is almost as important as your message, or if you want a tool that does double duty as a desktop publishing program, go with a full-featured Windows word processor. But if writing and editing speed are more important and you mainly produce relatively plain and straightforward documents, a DOS word processor is all you need.

Working With Words

THE RIGHT TOOL

You have your pick of more than a dozen excellent word processors to help you craft your words.

Word processors may differ in ease of use, speed of such typical tasks as searching through long documents, and ability to produce attractive output, but all hand you a complete set of writing instruments, from text-formatting tools to spelling checkers. None of them will make you a writer (as a hammer won't make you a carpenter), but depending on its features, a word processor can make you either a more or a less productive writer.

A worthy word processor includes several key features that fit your writing work. Check out these six traits before you buy a new program or

Illustration
By Greg Manchess



upgrade to a new version.

- Text shifting. How easy is it to select and then delete, move, or copy text? This feature is crucial to efficient editing of what you've already written.

- Scroll speed. Much of your editing time is spent moving through a document. The faster the program scrolls new text onto the screen, the more productive your time.

- Merge. Can you easily take material from one document and meld it with another? Can you view multiple versions of the same document simultaneously?

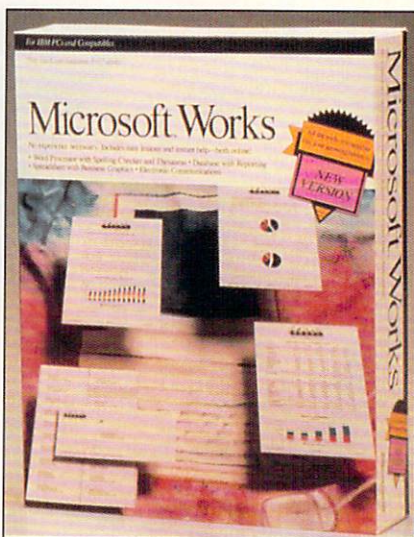
- Automated writing. If you spend much of your writing time in repetitive tasks, make sure the word processor lets you write automated scripts or macros to simplify the process.

- WYSIWYG. Can the program display the document exactly as it will print? This built-in feature of Windows gives Windows word processors an edge, though some DOS programs can also preview the document before it's put on paper.

- Printing. How broad is the program's printer support? Even if it matches your current printer, don't forget that you may update that peripheral. If you're using the word processor for page-layout duties, it's especially important that the program print to a PostScript device.

ADD AN AID

Word processors have duplicated the development trends of other



Works gives you a suite of applications in one package at a low price.

productivity software. They've taken on features and absorbed elements that once were provided by outside utilities. Spelling checkers, for instance, though now part of every self-respecting word processor, once had their own booming third-party market.

But even though today's word processors can do much more, they're not perfect. If you're serious about writing on the computer, you'll need to flesh out your word processor with several add-ons to make writing easier and more attractive on the page.

- Grammar checkers. Though some word processors now include an integrated grammar and style checker (Word for Windows and Professional Write Plus are two that do), most do not. Still not a substitute for careful proofreading, these automated utilities alert you to some aspects of subpar writing and then recommend changes.

- Wordmasters. Virtually every word processor comes with a spelling checker. But this tool, as valuable as it is, doesn't include definitions. Before you toss out the paper dictionary, add an electronic one to your hard disk. The best not only hand out definitions but find the correct spelling even if you know just part of a word.

- File translators. Word processors typically import and export documents in the most popular formats, such as Microsoft Word and WordPerfect, but to cover all the bases, you need a file-translation utility if you frequently share writing with others.

- Special needs for special times. Specialized writing tasks such as screenplay and fiction writing require special tools. Scores of software packages are available to format your work in a specific fashion (as with screenplays), and a few even teach the rudiments of writing. Microsoft Works might be thought of as a word processor with a spreadsheet and other important applications added on. It has everything a small business needs in a word processor, along with

WRITING ADD-ONS

Desktop publishing has put such powerful demands on word processors that an entire industry of third-party developers has sprung up to fill the gaps, providing tools to make writing easier and more effective. Here are a few software and hardware accessories that'll make word processing even more rewarding.

Adobe Type Manager. This font rasterizer scales fonts for both the display and the printer to generate sharper, clearer type on paper and on the screen. If you're using a Windows word processor, you need Adobe Type Manager.

FirstAid for Writers. This five-module program, created by a book editor, works like a writer's version of 911. You import your writing into FirstAid, fix the problems it pinpoints, and then export the "fixed" writing back to your word processor. This mechanical approach to writing may seem artificial to some, and with a list

price over half the cost of the most powerful word processor, FirstAid is out of the reach of those who could benefit most—beginning writers.

Grammatik. No grammar checker can replace a thorough understanding of the English language, but Grammatik, which comes in both Windows and DOS flavors, pinpoints at least some of your problems. Grammatik notices passive writing (the bane of good prose), spots incorrect usage (it's for its), and has multiple styles to fit various kinds of writing. Grammatik works within several of the most popular word processors, such as WordPerfect and Word, and is compatible with more than two dozen others.

Random House Webster's Electronic Dictionary & Thesaurus. DOS word processor users will appreciate this TSR, which includes a 180,000-word dictionary and a 275,000-word thesaurus. The press of

a hot key brings up the definition of the word at the cursor position. Random House Webster's Electronic Dictionary & Thesaurus works from within most word processors and requires approximately 10K of RAM to stay memory resident.

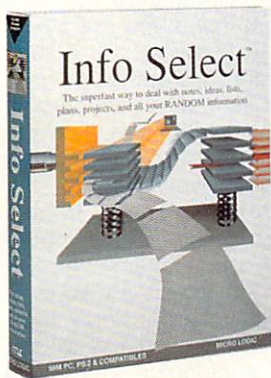
The Writer's Toolkit for Windows. This collection (also available for DOS) includes a grammar checker, a 117,000-word electronic dictionary, a thesaurus, a one-volume online encyclopedia, a quotation dictionary, and two other writer's helpers. Through the magic of macros, The Toolkit works from within popular Windows word processors such as Word, WordPerfect, and Ami Pro.

Word for Word. For sheer number of formats (90), nothing beats Word for Word in translating files. This DOS program is fast and, with a new interface, easy to use. It even turns PC word-processing files into formats for several Macintosh applications.

How this \$149 software will:

- 1) Improve the way you work and think,
- 2) Instantly find the info you need, and
- 3) Help you make brilliant decisions ...

Surprisingly, there is a whole new world of uses for your computer! You can use your computer to deal with all the countless bits of "random" information scattered across your desk: plans, notes, lists, actions, contacts, ideas,



and much more. INFO SELECT™ will not only give you instant access to this important information ... it will help you make better decisions and see important new relationships. Try INFO SELECT risk-free and discover a whole new dimension of computing.

Photographic memory

INFO SELECT is like having a 'photographic memory' that gives you perfect superfast recall of up to 64,000 items of information.

Telephone notes

When Harry calls you on the phone, you'll display the six windows on Harry before he finishes his first sentence! No more embarrassing pauses or scrambling for information.



INFO SELECT is easy to use - yet powerful.

INFO SELECT also includes the world's first "3-D" word processor. You'll be amazed at how it works.

Instead of one window or

ten, imagine up to 64,000! The uses are endless.

Are you forgetful?

Were you born with a memory situated squarely on the tip of your tongue? Do you forget things like which day you placed an order or important numbers? If you are forgetful you especially need INFO SELECT - the software that remembers almost everything for you.

Thinking tool

Have you ever worked on a complex project and felt lost? With INFO SELECT you'll group, scan, and cross search through all your notes so fast you'll see the big picture in seconds.

Will I be better off doing this now or that later? Keeping priorities straight can make or break your career or your business. INFO SELECT lets you keep on top of what's hot.

Should you use an east or west coast supplier? To make decisions you need facts. Now you can view the facts any way you like ... as fast as you can think. You'll make the best decisions ever -- and fewer expensive mistakes.



Phone notes



Client info



Decisions



Management

The #1 PIM

What's all the fuss about PIMs (Personal Information Managers)?

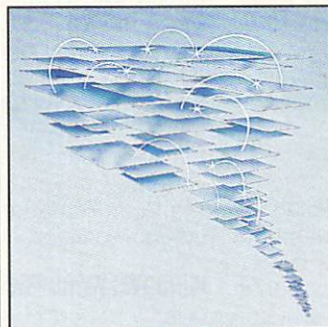
Simple - you probably have more RANDOM information than any other type and you need a PIM to properly handle this kind of information. The right PIM will save you time and make everything you do go smoothly.

Why is Info Select the #1 PIM? Because Info Select is based on ideas you can identify with - like stacks of paper. And it's free-form too. You

won't waste days or weeks learning complex structures. Instead you'll be up and running in minutes. Info Select also does more and costs less than other PIMs.



If you have notes, ideas, contacts or other unorganized RANDOM information, you need Info Select.



Owners of our TORNADO software (symbolized by the famous "blue tornado") can trade up to the second-generation Info Select under our special offer. There are over 200 improvements.

Feature packed

INFO SELECT is memory resident (if you choose), so you can quickly jump in from other programs. Info Select windows can hold: notes, plans, lists, facts, letters, contacts, and much more. You can search for a window or a group of windows related by a word or phrase. There are five ways to see overviews; hypertext, a fast sort, and line drawing. Save time with the dialer, date tickler; and searching by text or date ranges.

Info Select allows you to: add columns of numbers; store data in EMS; use template or free-form windows; import and export files, screens, and databases; move, join, and duplicate windows and much more.

LAN option

The new LAN version allows integrated E-mail, sharing company rolodexes and distributing company policies. You can share any kind of information. It's your first step into the exciting new world of groupware! Ask about the five node LAN starter pack.

Easy power

Info Select is easy to use yet offers the power you need with infobases up to 10 megabytes; text searches up to 700kb/sec; up to 32,000 characters per window; and up to 64,000 windows per infobase. Even better, Info Select can swap down to as little as 7K memory!

TORNADO owners

INFO SELECT is based on the pioneering TORNADO™ software PC World called "Excellent, Excellent, Excellent, Excellent" and PC Magazine awarded Editor's Choice - twice. Call about our special trade-up offer.

The next generation of **TORNADO** is here at last!

"The most useful software program I have ever owned."
Steve Gibson, InfoWorld

Endless uses

Info Select can do much more than manage all your RANDOM information. Use it to manage business correspondence, sales leads, orders, and client notes. Track facts, plan projects, or interrelate all your ideas. You can catalogue parts, documents, and inventory items. Match buyers and sellers or doctors and patients. Setup an information desk. Edit E-mail. Store notes on magazine articles, software operation techniques, or just names and addresses. Whether you are a lawyer tracking court cases or a zoologist collecting feeding habits you'll find countless uses for Info Select.



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Patrick Marshall,
Info World

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Editor's Choice
"First rate"
PC Magazine

a suite of important business tools.

- Fonts, fonts, fonts. No matter what word processor you use, your documents look only as good as the fonts you can punch from your printer. Font rasterizers sharpen the output, and font collections give you a wider selection of type options. Windows 3.1, which includes TrueType, Microsoft's outline font technology, is a tremendous advantage to Windows word processor users.

THE WRITING MACHINE

It's time to dispel a few fallacies about computers and writing. Some say a computer won't make you a better writer. Others are of the opinion that you don't need a powerful computer if all you're doing is writing.

Lies, all lies.

A computer *can* make you a better writer. No, not because it turns the words you type into deathless prose—it can't do that. But it can work as an electronic assistant that eases research, remembers details, and helps you assemble magazine features, novels, biographies, reports, and memos. Anything that helps you spend more time on writing and less time on the mechanics lets you concentrate on the actual crafting of words.

Does a writer need a computer as fast and powerful as an engineer's or an accountant's? Just like any computerized chore, writing benefits from a powerful computer. Any computer and word processor, no matter how slow, can keep up with your typing, but that's not the true test of power. A faster, better-equipped computer lets you work with a Windows word processor, cuts editing time, stores volumes of information, and connects you to other writers, among a host of other things. If you're serious about writing, get a serious writing tool.

You can put together an outstanding writer's PC—one that can handle both DOS and Windows software—for around \$2,200 simply by following this shopping list. Items are listed in the order of priority—buy until your budget says stop.

- IBM PC or compatible, equipped with a 33-MHz 80386 processor, at least 4MB of RAM, and a 100MB (or larger) hard drive. Most PCs come bundled with a video card, a VGA or SVGA monitor, a keyboard, a mouse, and Windows. Cost: \$1,800–\$2,200.

- Ink-jet or laser printer. Hewlett-Packard's DeskJet 500 and LaserJet IIP Plus are both excellent choices for churning out good-looking manuscripts. The DeskJet costs a bit more than half the price of the average laser

printer, but it's slower, and its type is a tad fuzzier. Cost: \$450–\$800.

- Modem and communications software. A 2400-bps modem is your best bargain; connect to CompuServe's excellent reference databases with CompuServe Information Manager. Cost: \$75–\$110.

- Optical character recognition (OCR) software and a scanner. When you come across a great clip from a magazine and want to store it electronically (sure beats a filing cabinet), you need a way to turn the print into digital information. A scanner-OCR combo works great. Cost: \$270–\$400.

WINDOWS WORD PROCESSORS

Over a period of less than two years, word processing has become one of the most important Windows applications. Here are a few of the products that took it to the forefront.

Ami Pro. One of the two best Windows word processors around, Ami Pro is not only a great writing instrument but also a superb tool for creating charts, graphs, and other

graphics—its image-processing tools let you vary the brightness and contrast of TIFF images, for instance, as you assemble newsletters. And it's almost as easy to use as Word for Windows in straight text entry and editing. Ami Pro also offers a built-in grammar checker and drag-and-drop editing in its latest version.

JustWrite. This bargain Windows word processor may not be able to boast the desktop publishing tools included in its full-featured competitors, but it does hand you everything you need for writing short-to-medium-length documents and takes up only a half or a third as much room on your hard drive as Word, Ami Pro, or WordPerfect. The lack of a draft-writing mode is its biggest weakness.

Word for Windows. In any Windows word-processing competition, it's a tossup between Ami Pro and Word for Windows. "WinWord" is a fast, powerful, but surprisingly easy-to-use program that covers all the bases. Its most intriguing writing tool lets you select text and then drag it

TEN TIPS TO BETTER, MORE PRODUCTIVE WRITING

Many writers are in top form every time they sit down at the keyboard. But many shoot themselves in the foot by ignoring simple procedures that would make their writing look more polished. Here's how to get the most from your time.

1. Proof your writing yourself.

Spelling and grammar checkers can't catch everything.

2. Keep in touch with editors, other writers, and your correspondents via electronic mail. Letter writing may be a dying art, but E-mail is its 1990s replacement.

3. Save substantial rewrites as separate files so you can track changes. That way, you can revert to a previous version if you need to.

4. Electronic word processing makes editing a breeze. Don't let this bog you down in endless changes. Know when to call it quits.

5. Use the power of the word processor to rearrange sections, paragraphs, and sentences as you rewrite. If you're writing nonfiction, look for a lead paragraph buried in the body of the article; looking for the buried lead is a common practice among writers.

6. Run Windows or a task switcher under DOS. Then you can drop out of the word processor and flip into

another application—a telecommunications program to connect with an online database, for instance—without having to exit your primary writing tool. Some writers are now using OS/2 as a powerful tool for multitasking DOS applications.

7. Outliners, especially those built into word processors, are powerful tools. Don't be put off by bad memories of Roman-numeral outlining in school. Use the outliner to jot down ideas as they come to you, and then flesh them out in the word processor.

8. Invest in an add-on thesaurus, or buy a word processor that includes one. It'll be invaluable as you struggle to think of the perfect synonym.

9. If you find it difficult to edit and rewrite on the screen—a common problem for beginning writers—print out a copy, do your edits on paper, and then enter changes at the keyboard. An alternative that works for some is to invest in a full-page monitor so that you can see more on the screen. Full-page monitors are specially designed for this purpose.

10. If you spend lots of time doing research away from your desk, consider an inexpensive notebook computer to use for taking notes. It saves rekeying later. An alternative is a good scanner-OCR combination.

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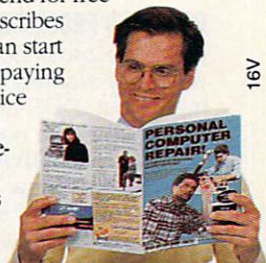
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and drop it anywhere in the document for instant editing.

WordPerfect for Windows.

WordPerfect for Windows shares file formats with WordPerfect 5.1, accepts most of the same keystrokes, and even runs some of the DOS version's macros. Other than these compatibility strengths—which, for many, are more than enough—there's little to recommend WordPerfect for Windows to the first-time Windows writer.

DOS WORD PROCESSORS

Long the province of serious writers who only wanted to get words hammered out, DOS word processors are facing up to the new competition from Windows' WYSIWYG interface with their own preview features. Because of the interface's demand on system resources, Windows word processors will probably always eat the dust of DOS word processors. Here are some of the top DOS offerings.

Word. A bit of a hybrid, Word 5.5 runs under DOS but looks more like a Windows program than any other DOS program here. Full mouse support and lots of dialog boxes and pull-down menus make for a quick start. Like its Windows counterpart, Word's outliner

is a boon to writers who want to organize their work before they begin.

WordPerfect. Famed for its clean screen and unparalleled support, WordPerfect 5.1 costs as much as the top-of-the-line Windows programs and delivers almost as much—all under DOS. Once you get beyond its awkward keystroke demands, you'll find that WordPerfect can tackle virtually any writing task you have in mind. And if you're sharing files with others, it doesn't hurt that WordPerfect is the country's most-used word processor. No one can match the support, either.

XyWrite III Plus/Signature. Just as difficult to learn as WordPerfect, XyWrite III Plus and its upgrade, Signature, are favorites of professional writers who crank out reams of copy. Their scrolling and searching speeds are blazingly fast, and they produce clean ASCII-format files that can be opened by virtually any other program. You can use XyWrite for desktop publishing, but most people use it as a front-end for a dedicated desktop publishing program.

WRITER'S BLOCK

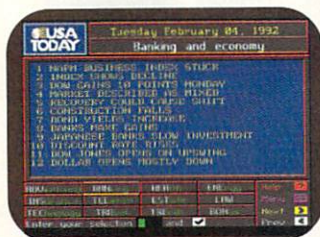
A tool may not make a profession, but it sure helps to ease you over the

rough spots. Word processors and their add-ons turn the PC into a spelling champ, a supertypist that cranks out perfect copies, and an organized assistant that helps you search through databases and file the information you find.

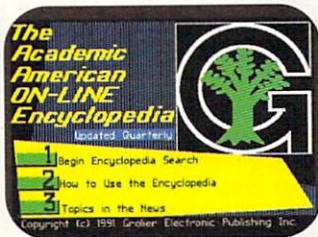
If you've never written without a PC, you can't appreciate the benefits the computer revolution has provided. At one time, the writer's best friends were scissors and paste pot, with which a manuscript would be literally patched together. Spouses, secretaries, and friends would be pressed into service to help with sometimes mammoth retyping jobs. No one can guess how many fledgling writers and half-completed novels ran aground because of the sheer difficulty of putting words on paper in a presentable way. And, since virtually every profession involves at least a little writing, word processing has made life easier for countless millions who would never even think of themselves as writers: students, teachers, professors, people in sales and marketing, doctors, lawyers, social workers, engineers. A rare boon with few boondoggles, word processing is your key to perfect prose and hours saved. □

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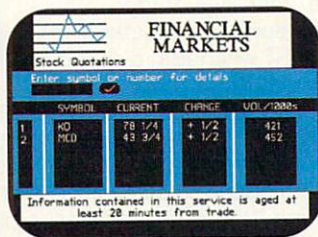
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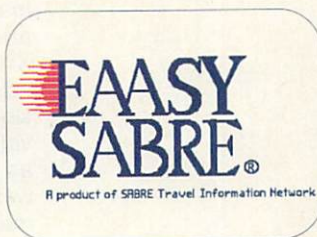
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PRODUCTIVITY CHOICE

Finally—here's a word processor with the full range of features, ease of use, and graphical capabilities XyWrite and Displaywrite users have been asking for.

Herbert L. Tyson

SIGNATURE 1.02

Signature, XYQUEST's upgrade for XyWrite and IBM Displaywrite, is the full-featured word processor many of us have been waiting for. And it isn't just another jam-packed program; it's fast, too. Version 1.02, the latest release as of spring, has a search-and-replace feature 16–20 times faster than the one in XyWrite.

If you missed Signature's release last November, you aren't alone. Bequeathed to XYQUEST when IBM disbanded its desktop software division last year, Signature was virtually unadvertised. It's just as well—the original release wasn't the lean, mean writing machine it is today. Version 1.02 is fast, efficient, and well worth looking into if you're in the market for a word processor or have been wanting to upgrade the one you have.

Signature has replaced XyWrite's arcane and illogical interface with the CUA (Common User Access) interface. CUA lets users move among diverse applications without having to learn a new interface for each one. XyWrite converts who don't want CUA can move their old keyboard setups to Signature using the transition utilities provided with the XyWrite upgrade package. XyWrite command line aficionados need not despair, either—the command line is still there, enhanced with a built-in command stack. The stack remembers the latest commands and will recall them with a simple keystroke.

Most of the core features expected in today's industrial-strength word processors are here. These include indexing, tables of contents, condition-

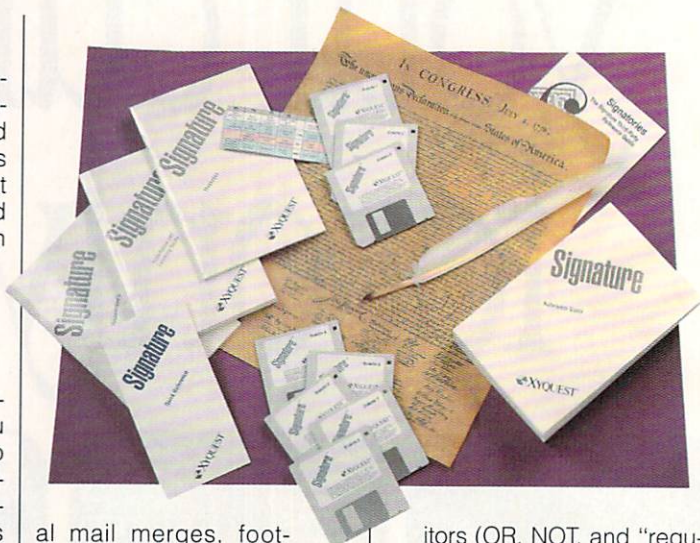
al mail merges, footnote and endnote control, automatic numbering, styles, snaking columns, column tables, spelling, thesaurus, context-sensitive help, document summary information, macros, and user programming. Signature has built-in file and directory management, file find, and multifile text search, plus side-by-side document comparison. Integrating Word for Word's conversion modules, Signature provides robust (but imperfect) document conversion between itself and Microsoft Word for DOS, WordPerfect, Microsoft Rich Text Format, dBASE, Lotus, Excel, and a wide variety of other text and graphics formats.

One exceptional aspect of Signature is its search-and-replace function. Its wide array of wildcards and special search characters enables users to specify virtually any search pattern imaginable. Included are wildcards for punctuation, line separators, word separators, letters, numbers, and more. Improved over XyWrite, Signature now sports search capabilities usually found only in programming ed-

itors (OR, NOT, and "regular expressions"), as well as the ability to protect wildcard matches when replacing.

Signature's biggest accomplishment is WYSIWYG editing at zoom levels from 5 to 400 percent. The program incorporates Bitstream's scalable Speedo fonts for on-screen display and for printing. Speedo fonts provide nearly 800 characters at virtually any point size in three typefaces: Courier, Swiss, and Dutch. Signature is the only "pure DOS" word processor that lets you create and edit documents while working in a graphical WYSIWYG mode. Even in graphics mode, Signature still seems livelier on a 286 12-MHz CPU than Word for Windows is on a 386 20-MHz system.

One of Signature's big strengths is style handling. One particularly interesting facet is the ability to embed text as part of a style definition. Suppose you have a style called Chapter that always has the same leading text. You can include the word *Chapter* and a chapter counter as part of the style. Any-



time you apply that style, *Chapter* and the incremented chapter number automatically appear in the document.

Flexibility with styles wouldn't mean very much if you were limited to one style per paragraph—a limitation of Microsoft Word for Windows and Lotus Ami Pro. Signature lets you use multiple styles within a paragraph. Consider a recurring passage (such as a warning or a notice) whose format differs from surrounding text in several respects. Signature lets you handle the transition to and from that passage with styles, rather than with a series of individual formatting commands. This can greatly ease the task of formatting complex documents. Using styles is easy: Ctrl-Shift-S drops down a list of all currently assigned styles for point-and-shoot insertion at the cursor.

A key reason for the popularity of XyWrite—and now Signature—with the writing and publishing community is the completely customizable keyboard. Don't like CUA? Get rid of it. Would you like to be able to use the left and right Alt keys as distinct shift states? No problem. You can even tell Signature to use non-standard keys as Shift keys.

Signature's menu interface is also fully customizable and programmable. In addition to letting users modify the main menu and help files, Signature supports user-created stand-alone dialog boxes that reside in separate files. These creations can be invoked with key assignments or directly from the command line using the DLG (DiaLoG) command. Skilled users can create sophisticated new capabilities, adding features such as address and tele-

phone books, customized lists, boilerplate selection, and customized search facilities.

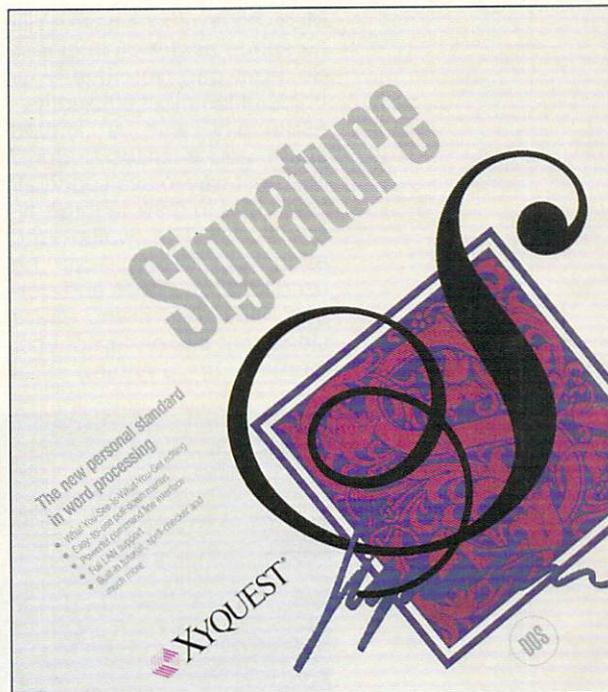
Sure to be one of Signature's least utilized but most powerful aspects is Signature Programming Language (SPL), an improved version of XyWrite's XPL. For most simple editing chores, the built-in macro recorder lets you record and replay macros on the fly, without learning any SPL at all. For users who need more horsepower, however, SPL has much to offer.

Like most products, Signature could stand improvement. The speller and thesaurus are slower and less thorough than XyWrite's. Plus, if you spell check *w ant*, Signature has no qualms about the *w* just sitting there all by itself.

The slowness of the spelling checker is ameliorated somewhat by the fact that you can instruct Signature to spell check a document in one pass, placing all questionable words into a file. It's then a quick job to edit that file. I edited this article in about half a minute.

Another issue is manipulation of graphics—which is not itself a graphical process in Signature. The ability to size and scale graphics and manipulate tables using a mouse would add immeasurably to the interface. This isn't likely for the DOS-only version, but it will probably be included in the Windows version, which XYQUEST is now preparing. Users who work with graphics and tables may find the advantages of a graphical user interface (GUI) compelling enough to move to the Windows version.

Even without a true GUI, Signature now stands well above the non-Windows versions of



WordPerfect 5.1 and Microsoft Word, Signature's main competitors. Since the introduction of their Windows counterparts, the evolution of WordPerfect and Word has slowed.

For fast WYSIWYG editing without Windows' overhead, Signature is now the best (and perhaps only) product on the market. Of course, with fierce competition between OS/2 and Windows, some may question the very existence of a market for non-GUI word processors; aware of this, XYQUEST is readying the Windows version of Signature for a late-summer release.

Whether you want to wait for the Windows release or not, you'll be hard-pressed to find a word processor that's as fast and feature-rich as Signature 1.02. I highly recommend it for any serious writer. □

Circle Reader Service Number 303

IBM PC and compatibles; 384K RAM (640K recommended; up to 256K expanded memory can be used); CGA, EGA, VGA, or Hercules; one floppy drive and one hard drive—\$495; upgrade from XyWrite—\$199; upgrade from Displaywrite—\$119; upgrade from competitor—\$129

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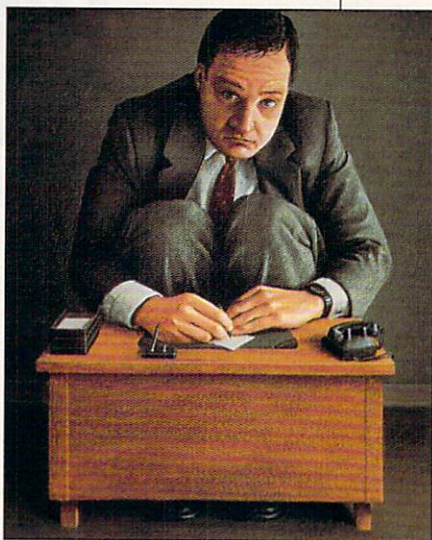
PERSONAL PRODUCTIVITY

Philip Chien

THE FRONTIERS OF SPACE

Many home offices have as little space as a walk-in closet. So how can you use your home office most efficiently—especially with a limited space and a limited budget? The best way to use space efficiently is to think in three dimensions. The walls—and even your ceiling—can be used for accessories and storage. However, if you use a stand that sits on top of your monitor or anything that

Feeling the squeeze? Careful selection of equipment can make the tiniest room into an efficient, low-cost office.



squeezes components close together, be extremely careful not to cover cooling vents.

Tower cases occupy less space than conventional computers. If you don't have a tower, you can set a PC on its side to reduce its footprint (the space occupied on your desk). Most office supply stores sell special stands to use with upended PCs. Power, keyboard, and video extension cords permit you to place your keyboard and monitor where they are most useful, and the computer wherever it will fit. A stand that holds your monitor above the desk

will give you more desk space for papers and notes.

A mouse is one of the biggest users of space. You should consider other pointing devices, such as trackballs.

Portable computers and accessories occupy less space than their desktop equivalents. However, they have their disadvantages. Most portable computers don't include numeric keypads. Many have slightly smaller keyboards. Their displays are often limited and hard to read. While standard accessories can be used with a variety of different PCs, portable accessories are usually machine-specific, proprietary, and expensive.

Some peripherals work well with portables, though: external modems, for example. If your portable has a video output jack, you may want to use it with a monitor in your office.

A hybrid between a portable computer and a normal desktop computer is a portable with a docking station. A docking station

consists of a power supply expansion chassis with space for accessories which normally wouldn't work with a portable computer. Docking stations are expensive, but they may be worth it, if you need the flexibility of a portable and the capabilities of a desktop computer.

A printer takes up a lot of space in a small office. You can save space if you use a standard-width rather than a wide-carriage printer. Kodak, Star, and others have introduced portable ink-jet printers that are truly tiny. And some laser printers occupy only half

the space of early models.

If you use both a fax machine and modem, consider connecting them to the same phone line. SendFax modems are excellent for documents created on your computer. If you're working in a dorm room, think about your computer's noise level. A typical computer and printer probably won't keep anybody from sleeping, but the speaker might—especially if you're playing a noisy game or running a program that beeps to alert you. It's easy to disconnect your computer's speaker or add a volume control so you can turn it down when necessary. Modems with variable volume levels or speakers that can be shut off via software are also desirable.

Besides hardware considerations, you should also think about your software and documentation. The documentation for three or four large programs may occupy more space than your computer! You may want to choose software that includes online documentation or purchase keyboard templates for your most-used programs.

If your office is in your home, security shouldn't be much of a problem. But if you're working out of a semi-private or public area where others have access, don't forget that many a portable has magically "grown legs" and walked off on its own. A portable should be locked in a desk drawer or closet. You should tape your business card or a piece of paper with your name and driver's license number to the inside of the case to prove that it's yours if you misplace it or if it's stolen and eventually recovered.

Your home or dorm room can be an effective office, and careful selection of components can keep your cost within a reasonable budget. □

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'SIEGE' is a medieval style castle assault game. You are given four castles to attack and defend in one castle scenario or an extended campaign. Includes historical troops (French, English, Celtic), mythical troops (Elves, Trolls, Giants), siege towers, battering rams, catapults, and oil. **\$38**



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Pacific Theater of Oper	\$42	Police Quest 2 or 3	\$34	Reel Fish	\$12	Flames of Freedom	\$28	Silent Service 2	\$74	Strike Commander	\$34	Team Yankee	\$34	Team Yankee 2	\$65	Test Drive 3	\$32																		
Perfect General	\$34	Rex Nebular	\$34	Tom Landry Football	\$29	Elvira's Quest 2 or 3	\$38	Strike Commander	\$34	Team Yankee	\$34	Team Yankee 2	\$65	Test Drive 3	\$32																				
Perfect General Disk 2	\$23	Rise of the Dragon	\$34	Tony LaRussa Baseball	\$29	Hyperspeed	\$37	Team Yankee	\$34	Team Yankee 2	\$65	Test Drive 3	\$32																						
Populous 2	\$38	Secret Mnkly Islnd 1vg2	\$32	T LaR Fantasy Managr	\$15	Immortal	\$17	Team Yankee 2	\$65	Test Drive 3	\$32																								
Power Monger	\$34	Secret Mnkly Islnd 2	\$38	T LaRussa Stadiums	\$15	Legacy of Necromancer	\$29	Test Drive 3	\$32																										

Sex Olympics	\$24	Sierra Adventure Bundle	\$39	Space Quest 2	\$28	Space Quest 1, 3 or 4	\$34	Space Quest 5 VGA	\$39	Space Quest Bundle	\$39	Spellcasting 101	\$19	Spellcasting 201	\$36	Spirit of Excalibur CD	\$39	Startrak 5	\$12	Startrak 25th Anivrsry	\$36	Time Quest	\$19	Uninvited	\$9	Where Amrcas Pst CSD	\$37	Where Europ, USA, time\$30	\$30	Where World CSD	\$27	Where World CSD Dix	\$49
Sex Vixens from Space	\$12	Sierra Adventure Bundle	\$39	Space Quest 2	\$28	Space Quest 1, 3 or 4	\$34	Space Quest 5 VGA	\$39	Space Quest Bundle	\$39	Spellcasting 101	\$19	Spellcasting 201	\$36	Spirit of Excalibur CD	\$39	Startrak 5	\$12	Startrak 25th Anivrsry	\$36	Time Quest	\$19	Uninvited	\$9	Where Amrcas Pst CSD	\$37	Where Europ, USA, time\$30	\$30	Where World CSD	\$27	Where World CSD Dix	\$49
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'BRAVO ROMEO DELTA' gives you the role of Chief Target Planner at the Strategic Air Command. It is your duty to launch a limited nuclear strike against the forces of the Soviet Union in order to gain a military advantage without precipitating a full scale war. Features ability to play either side. **\$34**

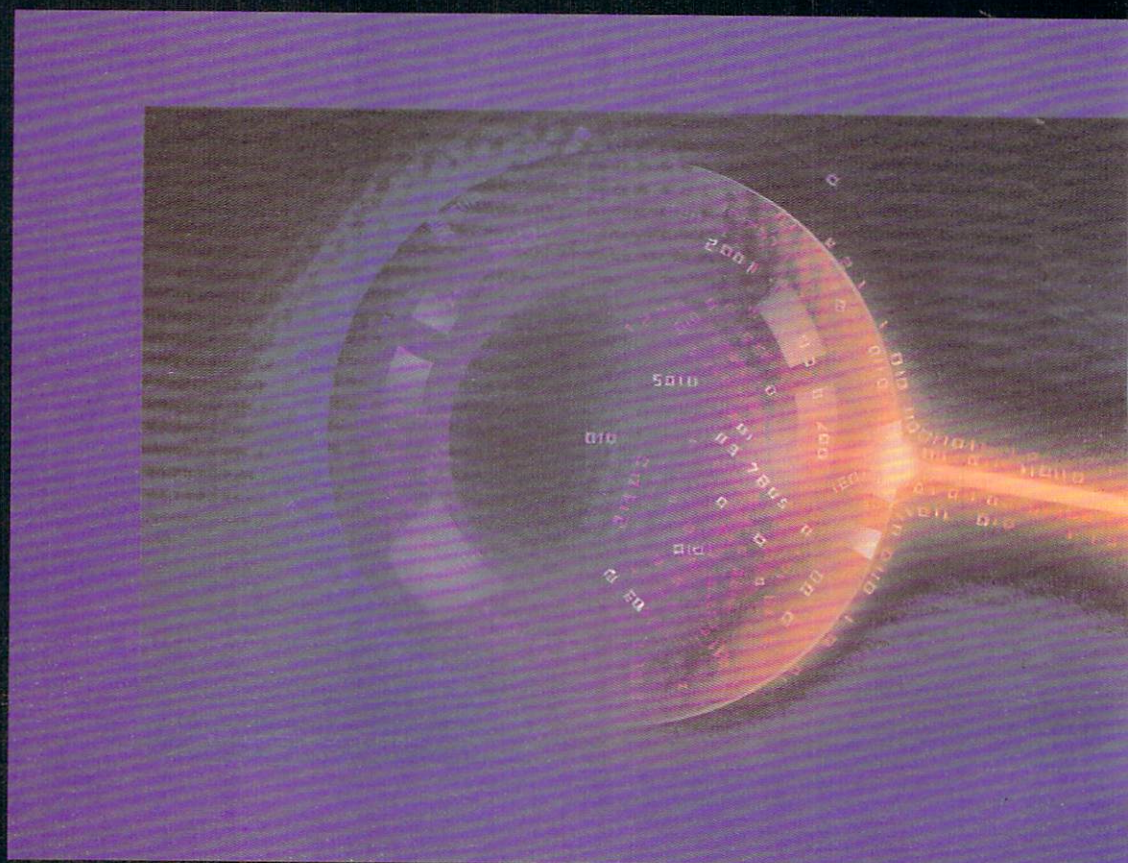
'THUNDER BOARD' is a sound board that is 100% compatible with Soundblaster and Adlib. It reproduces digitized sounds using an 8 bit DAC. Features dynamic filtering, 11 Voice FM music synthesizer, sampling rate up to 22 KHz, microphone input, joystick port, and a 2 watt power amplifier. **\$84**

'BIRDS OF PREY' could be the most complete flight simulator ever. There are 40 different aircraft including the MIG 29, B1-B, and F117A. Choose between 12 mission types; bomb runs, troop drops, & reconnaissance. Features a real world environment with 3 terrain types, airports, & carriers. **\$32**

T LaR Teams 1901-68	\$15	Lord of the Rings 1	\$34	Birds of Prey	\$32	TD3 Road & Car Disk	\$19	2 Day Air \$12: Airmail Europe	\$12
Weaver Baseball 2.0	\$21	Lord of the Rings 2	\$37	Buzz Aldrin Race Spc	\$37	Ulratbots	\$37	\$12 first item plus \$6 per additional item.	
Weaver Commisn 2.0	\$21	Loremaster	\$39	Campaign Strategic FI	\$37	Virtual Reality Studio	\$49		
Weaver 2.0 Comm Edit	\$41	Lure of the Temptress	\$37	Car & Driver	\$38	Wing Commander 1	\$39		
World Circuit	\$34	Magic Candle 1	\$15	Design yr own Railroad	\$29	WC1 Mission 1 or 2	\$19	All Sales Final. Check compatibility before you buy.	
APBA Baseball	\$28	Magic Candle 2	\$12	Dynamics Bundle	\$39	WC1 Bundle	\$45	Shipping times not guaranteed. Defectives replaced with same product.	
APBA 1908 - 91 Ea	\$28	Magic Candle 3	\$38	Elite Plus	\$19	Wing Commander 2	\$39	Price & availability subject to change.	
APBA Baseball	\$28	Megatraveller 2	\$12	Eye of the Storm	\$29	WC2 Operations			

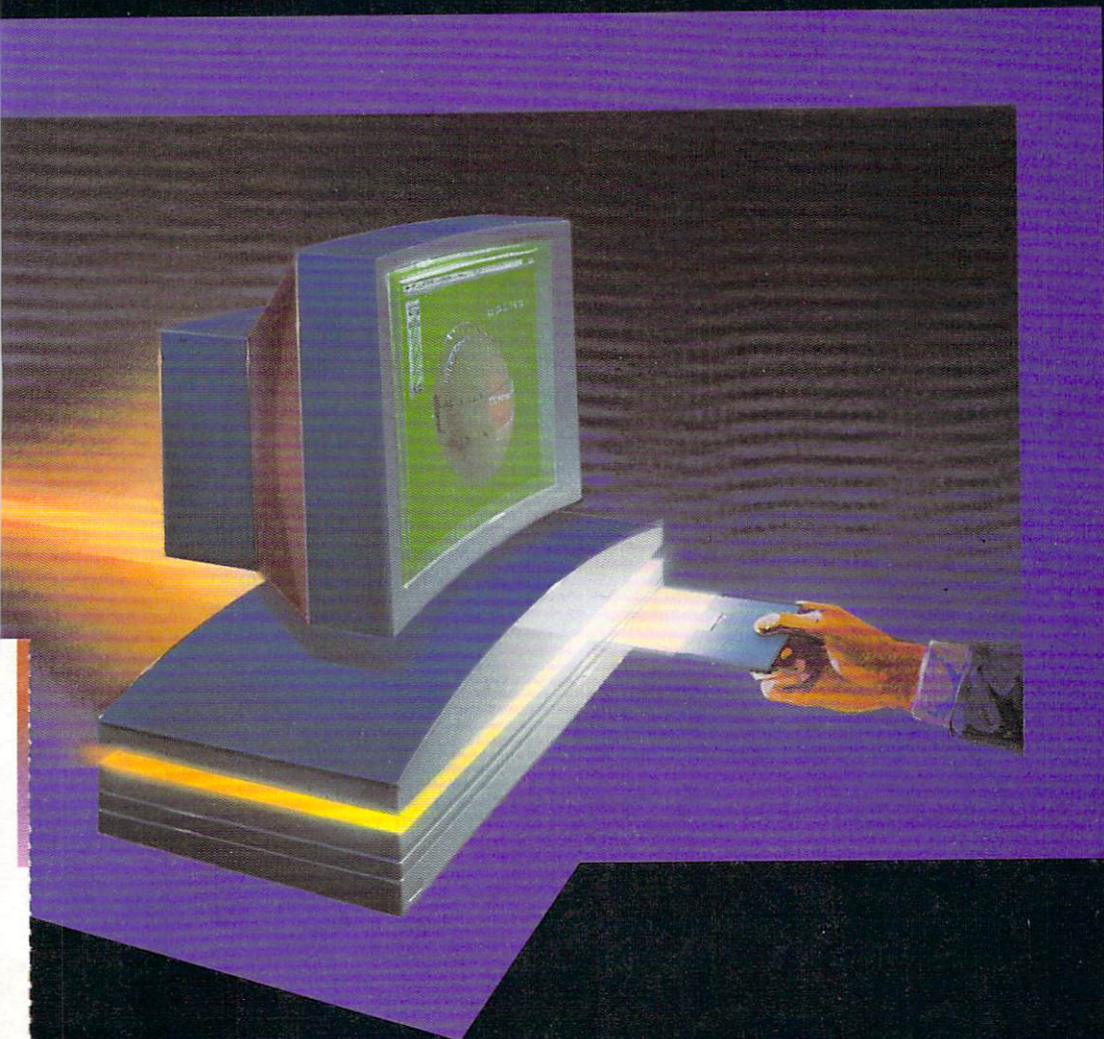
MINDING YO

BY KATHY



UR BUSINESS

YAKAL



It should be simple. By all expectations, accounting and computers should be perfect partners.

But for many reasons, the evolution and acceptance of accounting software has been slow and troubled. The earliest products available could be divided into two general categories:

- Expensive (often several thousand dollars) high-end packages designed for users with the accounting knowledge of a CPA
- Inexpensive (a few hundred dollars) low-end packages designed for users with the accounting knowledge of a CPA

While these programs were functionally sound, their operation required knowledge of accounting principles and terminology that many users—even in business settings—didn't necessarily have. Simpler, friendlier user interfaces would've helped, but the fact is that many people preferred to retain their old style of bookkeeping, generally a ledger book for figures and a shoebox or filing cabinet for receipts.

Over the last couple of years, accounting software has changed more dramatically in a shorter period of time than any other type of software. User interfaces have improved, prices have dropped, and people are actually understanding and using the accounting software they buy.

Though many other software vendors have contributed to this move toward inexpensive, understandable accounting software, we can thank two software vendors in particular for this shift: Microsoft, for developing Windows, an operating environment that lends itself to accounting operation, and Intuit, for its revolutionary financial program Quicken.

Operations in a Friendly Environment

In the late 1980s, the price of many high-end accounting packages started to drop rapidly, sometimes by thousands of dollars overnight. At the same time, some leaders emerged in the low end of the market offering high-powered software products that could be used by individuals or small businesses with some accounting knowledge, packages like DacEasy Accounting and One-Write Plus.

Quicken, a simple single-entry accounting package, was originally introduced in 1984, but it didn't hit its stride until about 1989. Users liked it because it matched their bookkeeping style more closely than most other programs. Quicken is based on a checkbook metaphor. It doesn't require its users to know any more about account-

Qty	Item Code	Description	Rate	Amount
0	31 Landsc	Landscaping Architect hours	40.00	320.00
12	Project Mgt	Project Management hours	21.00	252.00
42	Labo	Manual labor hours	8.25	346.50
130	3211 Land	Quality soil amendment, cubic yds	5.99	778.70
	Sales Tax	Sales tax	8.25 x	64.24

QuickBooks provides a simple and intuitive approach to business accounting.

Date	Cycle No.	Cycle Name	Frequency	Counter	Next Due On
	1	Consulting	Weekly		<10/92
	2	Bookkeeping	Monthly		<12/92
	3	Tax Services	Monthly		<12/92

Pacioli 2000 is a personal and small business double-entry accounting package with big capabilities and a low price.

ing than how to write checks and fill out a checkbook register. Later versions of Quicken added more powerful features like asset and liability management, investment tracking, and sophisticated reporting.

The introduction of Microsoft Win-

AVERTING DISASTER

Here are five ways to avoid cataclysmic results when you implement a new accounting package.

1. Run paper and computer accounting systems concurrently until you're confident of your proficiency. Consult your CPA if necessary.
2. Back up your data with more care and regularity than seems necessary. Businesses have folded as a result of financial data loss.
3. Read the documentation carefully—all of it. Use help screens. Don't hesitate to call technical support if you're at all unsure of a particular procedure. If you're careless or if you don't completely understand how your accounting package works, it will catch up with you.
4. Take the threat of viruses seriously. They're out there. Run scan programs regularly.
5. If more than one person is allowed to access and alter accounting data, set each user's boundaries early on, and enforce them strictly. Few people intentionally try to hurt their employers, but a casual, honest mistake often can be disastrous.

dows 3.0 provided the groundwork for even more positive changes in accounting software. Since the process of bookkeeping often requires fast access to figures that may be stored in many different places, three capabilities of the Windows operating environment offered application developers new and powerful tools.

These three tools—multitasking, the Multiple Document Interface (MDI), and Object Linking and Embedding (OLE)—have not yet been fully implemented by most software vendors. However, they offer tremendous potential to accounting software. Financial information stored in any module of a Windows accounting program (and any Windows application with the required capabilities) can be accessed in a few seconds, automatically updated everywhere necessary, and merged easily.

Quicken for Windows retains the checkbook metaphor that made its DOS version such a hit, and it includes enhanced features for visual input and output, including an icon bar and access to fonts for printing customized reports and checks. Dynamic Data Exchange (DDE) makes it possible to link Quicken data with Windows spreadsheets like 1-2-3 and Excel, and its other import and export capabilities are generous.

While Quicken has had tremendous success basing accounting on a new metaphor, most accounting products retain the double-entry accounting system, along with its terminology and methods. In tandem with Windows, they offer an alternative for users who prefer a graphical user interface. M.Y.O.B., based on a Macintosh product, offers seven main modules (General Ledger, Checkbook, Sales and Receivables, Purchases and Payables, Inventory, Card File, and Administration) for \$249 suggested retail.

The strength of both the Windows and DOS version of Access to Platinum lies in their ease of use and their ability to simplify accounting for the beginner while incorporating features that normally require more bookkeeping knowledge. Suggested retail price is \$249 for the Windows version and \$169 for the DOS version.

Microsoft Money is often compared head to head with Quicken for Windows, and with good reason: Its checkbook-based user interface is similar to Quicken's, as are its features and suggested retail price (\$69.95).

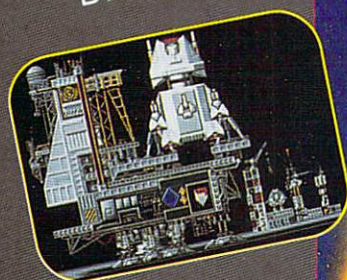
DOS Isn't Dead

Revolutionary as it is, Quicken has two limitations that have kept many businesses from installing it. First, the program has no automatic invoicing capa-

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DESIGN



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bility (though data can be exported into a word processor and invoices generated that way). Second, its account and transaction limits are not sufficient for many bigger companies.

Intuit's QuickBooks is a more serious contender for businesses that need more power. For a suggested retail price of \$139.95 (\$49.95 upgrade charge for current Quicken users), the product was designed—like its forebears—to be used by nonaccountants. Accounting data is entered on familiar forms like check blanks and invoices, and then automatically posted in the appropriate areas.

But many accounting professionals simply aren't comfortable working outside the traditional double-entry accounting system. And the majority of PC owners do not use Windows as their sole operating environment. There are many inexpensive DOS-based accounting products that use terminology and processes similar to today's standard bookkeeping methods.

Pacioli 2000, named for the monk who invented double-entry accounting, was written by the same designer responsible for the popular DacEasy accounting product. It stunned the market when it appeared at a suggested retail price of \$49.95 in 1990, and it's an excellent double-entry accounting package, especially considering the price. It contains eight standard accounting modules and requires some understanding of accounting principles, but the company offers a brief primer and excellent technical support to help the beginner along.

M-USA, the publisher of Pacioli 2000, also offers Cash Biz (\$49.95), a cash-based accounting system that lets the user choose between operating it as a double- or single-entry system. It, too, is targeted at users who need sophisticated capabilities despite the fact that they are not necessarily experts in accounting.

DacEasy Accounting has been the best-known name in small business accounting for a long time. It's a solid all-around accounting product especially well suited to manufacturing and other inventory-based businesses. Online help and technical support are available for users less familiar with accounting applications. Easy integration of the modules further simplifies use. Suggested retail price is \$149.95.

Money Counts 7.0 Personal (\$49) is a brand-new release from Parsons Technology, one of the leaders in high-value, low-cost software. This financial-management program for home and small business features a checkbook metaphor. Soon after you read this, Money Counts 7.0 Business will be avail-

able, including modules such as general ledger, accounts receivable, and accounts payable. Parsons offers free technical support (you have to pay for the long-distance call to Hiawatha, Iowa, though).

Hooper International offers Takin' Care of Business in several versions intended for small business and personal use. The Business Kit costs \$149.95 and features general ledger, accounts receivable, accounts payable, bank reconciliation, and a financial utilities calculator. Support is free for the first 90 days. After 90 days, you call a 900 number and are charged on a per-call basis. However, Hooper International also offers unlimited free fax and BBS support. A slightly heftier LAN version of Takin' Care of Business costs \$399.95 and has all the same modules plus payroll, inventory, and point of sale. The LAN version is a real bargain despite its higher price because there is no site license required and you can have as many users as you want.

Teknon has a unique entry in this field. Teknon Accounting is a DOS-based product that looks like a Windows product—or, more precisely, a Macintosh product. It was ported over

to DOS from the popular Mac accounting package At Once!. Teknon Accounting is a double-entry accounting system with four integrated modules (General Ledger, Accounts Payable, Accounts Receivable, and Payroll) that's exceptionally easy to use. The suggested retail price is \$249.95.

Let the Buyer Be Aware

The features chart accompanying this article is not comprehensive. It provides information on some of the inexpensive accounting products available at this writing; you can expect to see more introduced this year, as well as upgrades of existing programs. Once you've narrowed your choices to a few that offer the kind of solution you're looking for, try to see a demo, or at least get a more detailed list of the software's capabilities and limitations.

Don't fire your CPA. Include him or her in the process of automating your accounting practices. While accounting software will help you track your financial progress more closely, there will still be times when you'll need to call on a professional.

As you switch to computerized accounting, take the opportunity to make a fresh financial start. Don't look at accounting software simply as a new, flashier way to organize the same old information. Combine the best of your current bookkeeping methods with the simple power of the microprocessor. Be willing to look at things in new ways—you may find solutions to problems you didn't know you had.

Before Looking at Accounting Packages

You should take the time to ask yourself these ten important questions before you even start looking for an accounting software package.

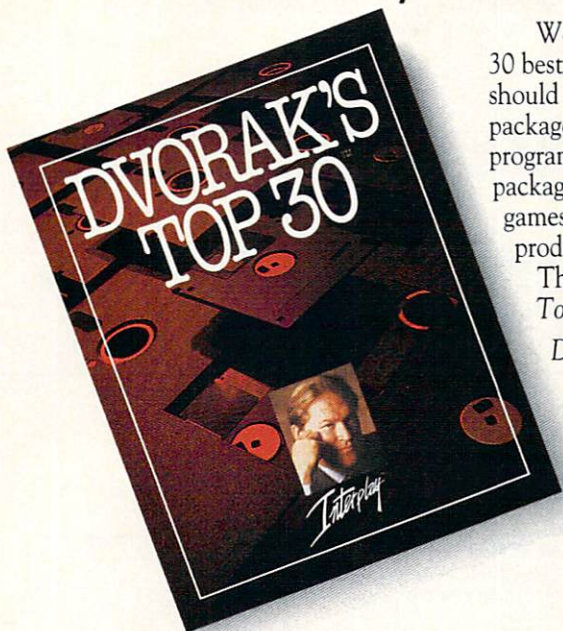
1. Are you willing to make a commitment to using a computer regularly for tracking your individual or business finances? If your current non-computerized system is working well, don't make the move yet unless you know what improvements you expect from automation.
2. Exactly why are you considering accounting software? Be very clear about this, or you'll be overwhelmed by products offering solutions for problems you may or may not have.
3. Are you willing to change your present bookkeeping methods if the software requires it? You may find a product that will wrap itself well around your money-tracking methods, but you may also discover a more efficient way to do things. Can you adapt?

COMMON ERRORS

No matter how hard you try to evaluate your needs and the capabilities of your accounting software, you're likely to make mistakes. Recognizing these common pitfalls might help you avoid them. Here are five common mistakes people make when choosing accounting software for their personal or business use.

1. They buy much more power than they'll ever need and spend more than necessary as a result.
2. They buy software with fewer features than they require to meet even their current needs and pay more later to buy a beefier product.
3. They buy the product that has the most features for the price, regardless of whether or not it actually provides a solution for their problems. Eventually, they end up purchasing something else that more closely matches their specific application.
4. They assume the software will take control of their finances, not realizing that they themselves have a great deal of control over the success of the implementation. Disappointed, they may turn their backs on computerized bookkeeping, thus further delaying their enjoyment of its benefits.
5. They balk at the thorough setup and training time often required and implement the package without really understanding it. Later, they discover that the resulting errors and oversights are costing them time and money.

John Dvorak Brings You Thirty Of The Finest Productivity Packages, All In One Box!



World-renowned computer columnist John C. Dvorak has chosen the 30 best shareware programs he believes everyone who operates a computer should have. And he's put them all together in this single, powerful package. *Dvorak's Top 30™* contains essential, 100% fully functional programs including a database, spreadsheet, word processor, accounting package, communications program for modem access, several fun computer games and other useful utilities that make your computer more efficient, productive and friendly.

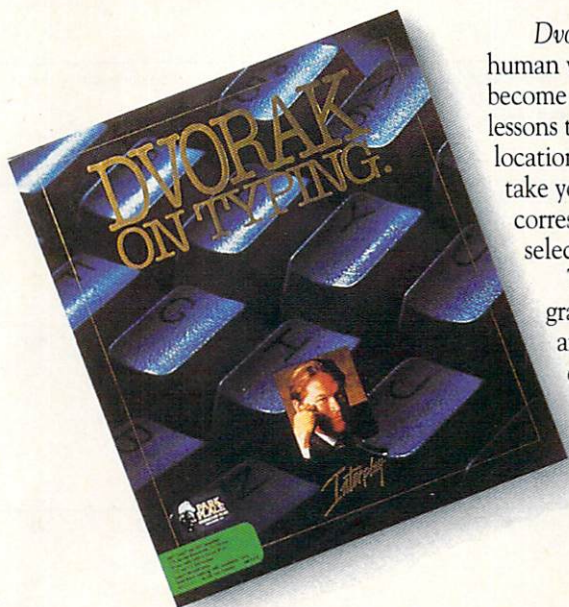
Thirty programs conveniently packaged at one low price. *Dvorak's Top 30™* – the shareware collection no computer should be without.

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- An extensive database program
- User-friendly word processor
- Communications program
- Printer utilities, exciting games and much more

If you like and use any of the shareware products, a registration fee will be required.

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Dvorak On Typing™ is the first major typing program to feature a human voice that sounds out the letters as you type, helping you to become confident with touch typing. The user-friendly skill-building lessons take you step-by-step through the basics – hand placement, key location, shifting, etc. As you progress, the program's brilliant graphics take you easily through the formation of sentences, paragraphs and full correspondence. The program's voice works with you through menu selections, and later lessons even dictate to you verbally.

The program constantly monitors your progress in easy-to-read graphs, allowing you to track your speed, accuracy, problem keys, and level of improvement. Most importantly, it makes learning an enjoyable experience, with encouraging lessons and games that make practice fun.

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- Program's memory charts your personal speed and accuracy progress



To order *Dvorak's Top 30™* or *Dvorak On Typing™*, see your local retailer or call 1-800-969-4263. *Dvorak's Top 30™* is available on MS-DOS for \$59.95. *Dvorak On Typing™* is available on MS-DOS for \$49.95. Coming soon on Macintosh. School Edition and Lab Pack available on MS-DOS, coming soon on Macintosh.

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Interplay™

Interplay Productions
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(714) 549-2411

Program	Suggested retail price	LAN version available?	Sample chart of accounts? Accounting tutorial?	Modules included	Technical support pricing options	Imports data? Exports data?	Demo available?
BusinessVision II BusinessVision Management Systems 5000 Birch St., Ste. 3000 West Tower Newport Beach, CA 92660 (800) 433-3384 (714) 476-3770	\$225.00 (DOS)	Yes	Yes/Yes	GL, AP, AR, Inventory, Order Entry and Invoicing, Point of Sale Billing, Sales Analysis, Payroll	\$99.00/year	No/Yes	Yes
ACCPAC Simply Accounting Computer Associates International 1 Computer Associates Plaza Islandia, NY 11788-7000 (800) 225-5224	\$199.00 (DOS) \$199.00 (Windows)	No	Yes/Yes	GL, AP, AR, Payroll, Inventory, Job Costing	First 30 days free; \$100.00/year	Yes/Yes	Yes
DacEasy Accounting DacEasy 17950 Preston Rd., Ste. 800 Dallas, TX 75252 (800) 322-3279	\$149.95 (DOS)	Yes	Yes/Yes	GL, AP, AR, Inventory, Cash Management, Billing, Purchase Order, Payroll (add-on)	\$75.00/year or 900 number	Yes/Yes	Yes
Takin' Care of Business (Business Kit) Hooper International P.O. Box 50200 Colorado Springs, CO 80949 (800) 245-7789 (719) 528-6500	\$149.95 (DOS)	No	Yes/Yes	GL, AR, AP, Bank Reconciliation, Financial Utilities Calculator	First 90 days free; 900 number, free fax and BBS support	Yes/Yes	Yes
Takin' Care of Business (LAN Version) Hooper International P.O. Box 50200 Colorado Springs, CO 80949 (800) 245-7789 (719) 528-6500	\$399.95 (DOS)	Yes	Yes/Yes	GL, AR, AP, Bank Reconciliation, Financial Utilities Calculator, Payroll, Inventory, Point of Sale	First 90 days free; 900 number, free fax and BBS support	Yes/Yes	Yes
QuickBooks Intuit 155 Linfield Ave. Menlo Park, CA 94026 (415) 322-0573	\$139.95 (DOS)	No	Yes/Yes	GL, AP, AR, Payroll (add-on)	Free	Yes (Quicken)/Yes	No
Quicken Intuit 155 Linfield Ave. Menlo Park, CA 94026 (415) 322-0573	\$69.95 (DOS) \$69.95 (Windows)	No	Yes/Yes	Not module-oriented, handles six kinds of accounts and 20 reports	Free	Yes (Quicken)/Yes	No
One-Write Plus Accounting MECA Software 55 Walls Dr. P.O. Box 912 Fairfield, CT 06430-0912 (800) 388-8000	\$129.95 (DOS)	No	Yes/Yes	GL, AP, AR, Payroll (add-on)	First 30 days free; \$100.00-\$125.00 for one year	No/Yes	Yes
One-Write Plus Accounting Works MECA Software 55 Walls Dr. P.O. Box 912 Fairfield, CT 06430-0912 (800) 388-8000	\$199.95 (DOS)	No	Yes/Yes	GL, AP, AR, Payroll, One-Write Plus Collections (letter writer and library of professional prewritten collection and business letters), DataSave (automatic backup), @Accounting (seamless export link to spreadsheets)	First 30 days free; \$100.00-\$125.00 for one year	No/Yes	Yes
Money Microsoft One Microsoft Way Redmond, WA 98052 (800) 426-9400	\$69.95 (Windows)	No	No/Yes	Not module-oriented, offers six reports	Free by toll call to Washington	Yes/Yes	No
Cash Biz M-USA Business Systems 15806 Midway Rd. Dallas, TX 75244 (800) 345-4243 (214) 386-6100	\$49.95 (DOS) \$49.95 (Windows)	No	Yes/Yes	Not module-oriented; prepares invoices, statements, aging reports, financial statements	First 30 days free; \$75.00/year (comes with Norton Anti-Virus) or 900 number	Yes/Yes	Yes
Pacioli 2000 M-USA Business Systems 15806 Midway Rd. Dallas, TX 75244 (800) 345-4243 (214) 386-6100	\$49.95 (DOS)	Yes	Yes/Yes	GL, AP, AR, Inventory, Billing, Purchasing, Budgeting, Auditing, Payroll (add-on)	First 30 days free; \$75.00/year (comes with Norton Anti-Virus), \$1.50/minute with ten-minute minimum, 900 number, \$10.00/fax, or CompuServe	Yes/Yes	Yes

Program	Suggested retail price	LAN version available?	Sample chart of accounts? Accounting tutorial?	Modules included	Technical support pricing options	Imports data? Exports data?	Demo available?
MyBusinessCheckbook MySoftware 1259 El Camino Real, Ste. 167 Menlo Park, CA 94025 (415) 325-9372	\$39.95 (DOS)	No	Yes/No	Not module-oriented, does 15 business reports	Free	Yes (Quicken)/ Yes (1-2-3)	No
Money Counts 7.0 Personal Parsons Technology 1 Parsons Dr. P.O. Box 100 Hiawatha, IA 52233-0100 (800) 223-6925	\$49.00 (DOS)	No	Yes/No	Based on a checkbook metaphor, not module-oriented, does 25 customizable reports	Free by toll call to lowa	Yes/Yes	No
Peachtree Accounting for Windows Peachtree Software 1505 Pavilion Pl. Norcross, GA 30093 (800) 247-3224	\$99.00 (Windows)	Yes	Yes/Yes	GL, AP, AR, Payroll	\$99.00/60 minutes of support or one year, whichever comes first	Yes/Yes	No
Access to Platinum Platinum Advanced Business Microsystems 15615 Alton Pkwy., Ste. 300 Irvine, CA 92718 (800) 426-0469	\$169.00 (DOS) \$249.00 (Windows)	Yes	Yes/Yes	GL, AP, AR, Checkbook, Inventory, Job Costing/Time Billing, Payroll	\$2.00/minute or \$125.00/year	Yes/Yes	Yes
Service Industry Accounting SYBIZ International 39210 State St. Fremont, CA 94538 (510) 713-6742	\$249.95 (DOS) \$299.95 (Windows)	No	Yes/Yes	GL, AP, AR, Inventory, Job Costing, Payroll	First 30 days free; \$150.00/year or \$20.00/15-minute call	Yes/Yes	Yes
Teknon Accounting Teknon 8603 E. Royal Palm Rd. Scottsdale, AZ 85258 (800) 899-8603	\$249.95 (DOS)	No	Yes/Yes	GL, AP, AR, Payroll	First 30 days free; \$115.00/year (toll-free) or 900 number	Yes/Yes	No
M.Y.O.B. Teleware 300 Roundhill Dr. Rockaway, NJ 07866 (201) 586-2200	\$249.00 (Windows)	No	Yes/Yes	GL, Sales and Receivables, Purchases and Payables, Checkbook, Inventory, Card-file, Administration	First 30 days free; \$79.00 for one year or \$119.00 for two years	Yes/Yes	Yes

- Can you afford to purchase additional hardware if the software you choose requires it?
- Does your CPA support one particular product, or a group of them? Ask your accountant what he or she recommends and whether a different package would be acceptable. Most packages can import and export data in different formats.
- How flexible and knowledgeable are any staff members who would have to understand and use the software? If you don't know, include them in your planning and purchasing process.
- How much time do you have to devote to this project? If you have a fairly uncomplicated financial structure, it may not require too many extra hours. But if it does, can you spare them?
- Do you trust technology? Some people are wary of computerizing information as sensitive as financial data and will never be quite able to let go of their paper systems.
- Can you be honest about what you don't know, as well as what you do? You may have to ask for help and admit a lack of knowledge in

STREAMLINING

Accounting software can enhance your business. Here's how.

- Accounting software can save time by automatically posting a single piece of financial data in multiple areas.
- Instead of pawing through boxes and stacks of check stubs and receipts, you can compile reports quickly through standard or user-defined reporting formats.
- Windows-based accounting programs let you look up figures in other financial files without closing down your immediate task.
- Computer-generated reports, invoices, and other printed materials can be more attractively designed, using fonts, graphics, and other layout tools that can make your small business look big.
- Tax preparation will be significantly easier, both at filing time and throughout the year when you must run tax-related reports.
- Over time, you will feel a growing confidence in your understanding of your financial situation that will help you make overall business decisions more knowledgeably and competently.

fundamental areas of accounting principles.

- Are you willing to assign a high priority to the process of choosing and implementing software? While you'll likely see time savings and productivity gains down the road, the first few months of computerizing your bookkeeping functions may actually demand more of your time and attention. In return, though, you'll have a much clearer idea of where you are and where you're going financially.

Working Better/Working Smarter

That first step into computerized accounting is a big one for most home and small businesses. Be prepared to spend more time on bookkeeping, especially at first. Remember to make backups religiously and make a printout of any crucial items at least on a monthly basis. Look into an inexpensive tape backup system. Any backup system is less expensive than losing all your data due to a disk crash. There's one indisputable advantage to computerizing your books when your business is small—it would only be that much harder when your business becomes big. □

ART WORKS

Robert Bixby

MOSAIC AND COLLAGE

Every so often, I have such an accumulation of information that I need to present it as is, in discontinuous form.

I just returned from the Software Publishers Association (SPA) symposium in Seattle with a suitcase full of dirty laundry and a briefcase full of notes, the latter of which I'm going to share with you. But before I begin, I want to give some credit where it's due. The art that accompanies this article is a computer generated painting by David Em. Em's work was discussed in the November 1991 issue and one of his paintings, *Michele 2, 1990*, served as an opening for the feature "The New Renaissance." Em's work is represented by Roberta Spieckerman Associates, San Francisco. We've had some calls about it, and I wanted to make sure Em was given full honors.

Honoring achievement was the centerpiece of the SPA

symposium, where this year's awards dinner was hosted by Jon Lovitz, formerly of "Saturday Night Live." The four-day conference included workshops, addresses by the likes of Bill Gates and Trip Hawkins, and discussions among marketers, programmers, publishers, and journalists.

The agenda is so inclusive that I actually sat through a demonstration of how Fifth Generation Software puts its boxes together and makes sure that a complete disk set and manual go into each box.

Not all discussions were so mundane, however. I attended a round table on pen-based computing, for example, that was like a double shot of espresso. This simile is particularly apt because 1) Seattle is the coffee-and-espreso-drinkingest city in the world, and 2) as luck would have it, I was actually drinking a double espresso during the meeting—after the box demonstration, I figured I'd need it.

The discussion centered on acceptance. How large will pen computing be by the middle of the decade (only 2½ years away)? Some said that it will always be a small niche. GeoWorks' Brian Dougherty disagreed, estimating an eventual \$250 billion market in pen-based computing, including hardware and software.

Acceptance of new technology is said to follow a hockey-stick path. At first, sales are flat as people try out the new technology and think of ways to include it in their lives. As standards compete, prices have a natural tendency to come down precipitously (remember that less than ten years ago a VCR cost over \$1,000). When the utility of the technology surpasses the unit price, there is a nearly vertical increase in sales, which represents the shaft of the hockey stick. During this vertical move-

ment, fortunes are made and standards are set, so predicting the moment when it will begin is of vital interest to people investing in pen computing.

Conferees agreed that the pen computer of the future will not look like today's laptop but will more closely resemble a tiny version of the GRiD pen computer. The technology awaits useful software, low cost, and a nonrotating storage medium (that hard disk drive motor is one of the things that kills laptop batteries so quickly). Dougherty claims that GeoWorks is working with a computer manufacturer to bring out a pen-based computer for under \$500 and that he will be prepared to demonstrate this computer and operating system in about a year—and GeoWorks is a company with an uncanny knack for delivering on its promises.

An affordable pen-based palmtop could mean a lot to a computer artist who until now has been chained to a hundred pounds or more of desktop hardware.

Another important graphics advance discussed at SPA involves using CD-ROM as an applications medium. Corel Systems is leading the way in placing applications software on CD-ROM. The compact disc has so much data storage space that not only can it contain the complete application, clip art files, typeface library, and other attendant programs but it also contains CorelDRAW! in five different languages. This simplifies fulfillment by allowing the company to use a single disc for sales in the U.S., Canada, and all over Europe, but it's also a significant money saver because the cost of pressing a single CD-ROM is about the same as that of three or four high-density or high-capacity floppies. Look for an expansion of this practice in the future. □

Renowned computer artist David Em created this painting titled *Hoopoe*, 1991.



PATHWAYS

Steven Anzovin

LITERARY GAMESMANSHIP

Back-of-the-game-box copy you're not likely to see:

Experience the excitement and wonder of Little Women as it's never been played before on any computer screen! GirlSoft Productions presents the first role-playing game based on the genteel world of Louisa May Alcott's literary journey through a middle-class 1860s American girlhood! Battle for the attention of Laurie, the bashful boy next door! Race to buy a piano for Beth before she expires!

In the real world, *Little Women* is not prime computer-game material. Not only is it female-oriented, which makes it more alien to the typical male game programmer than any pixel-chomping star beast, but it lacks the fantasy/SF/epic adventure dimension deemed essential by many of today's top RPG designers.

I talked to the designers of forthcoming RPGs based on two well-known modern adventure fantasies, J. R. R. Tolkien's *Lord of the Rings* trilogy and Frank Herbert's *Dune*, about how and why these works were chosen for game development. David Bishop, director of game design at Virgin Games (18061 Fitch Avenue, Irvine, California 92714; 714-833-8710), is in charge of the *Dune* project. (The game itself should be out by the time you read this). The book was a favorite of Bishop's school years. "Herbert creates a wonderful physical environment, very richly talked about, with many different protagonists, each with his or her own values." So he jumped at the chance to work on a *Dune* game.

But the book ultimately played only a small part in the game design. Instead, the cult movie version, directed by

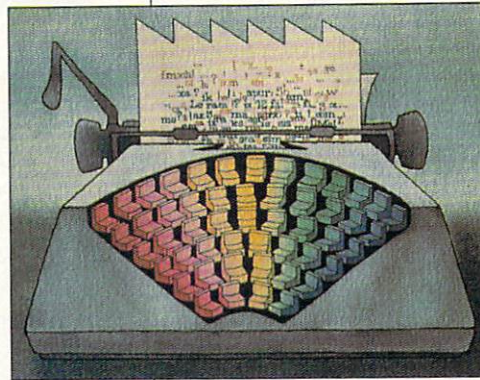
David Lynch, was the property that Virgin licensed. "Our artists kept the excellent look and feel of the film, using elements of art direction, sets, costumes, even images of actors to re-create the arid look of *Dune*." Did anything from the original *Dune* book find its way into the game? "Officially, nothing comes from the book We tried to be as faithful to the original material as we could, but our first duty is to make a great game for buyers to play for 40 or more hours. Our second duty is to stay faithful to the license. It's quite a fine line to travel down to keep everybody happy.

Whatever license you're working on, your creative brief is narrowed by what the license dictates." What are the most important aspects of a successful game? "Good versus evil is paramount," said Bishop. "The game should feed the ego of the player. Players need clear-cut goals and characters that they are controlling or have become, and they want to know who's against them." Hmm . . . That doesn't sound like the *Little Women* I read.

While the *Dune* game is primarily a movie adaptation, Interplay (3710 South Susan, Number 100, Santa Ana, California 92704; 714-545-9001) is publishing a three-game version of *The Lord of the Rings* trilogy based solidly on the books themselves. (The first game, *The Lord of the Rings*, was released last year; *The Two Towers* will be in stores by late spring.) Interplay producer Scott Bennie told me that he and the other game de-

signers didn't discard very much of the books; in fact, they added more than they took away, using elements from Tolkien's other works.

I asked Bennie, who is a student of Old English and modern fantasy literature, why Interplay chose to do a Middle Earth game now, when every second-rate D&D game pillages *The Lord of the Rings* left and right. "When you talk about modern fantasy," he replied, "you're talking about Tolkien or Robert E. Howard [creator of *Conan the Barbarian*]. Tolkien's books are the well-spring of modern fantasy. This is the pure stuff. If a crea-



Needed: games that women can respect and more female game designers and marketers.

tive property is to be adapted, why not adapt the best?"

What other literary works would he most like to turn into games? "*The Iliad*. I'd try to reflect the Homeric spirit. Of course, there'd be *The Odyssey* to do as a sequel, and somebody would probably come out with *Aeneid* as competition. How about James Joyce's *Ulysses*?" Would *Little Women* make a hit game? Or maybe *Little Men*? Bennie laughed. "There's a real need for games that a female can respect as much as a male, and, of course, we need more female game designers and marketers."

Adventurous game makers should take notice: Meg, Amy, Beth, and Jo await you. □

DISCOVERY CHOICE

Hunt for your body and pick up math skills along the way in this delightful game full of puzzles.

David Sears

THE SECRET ISLAND OF DR. QUANDARY

At carnivals you lose track of your money trying to topple milk-bottle pyramids with baseballs; in Dr. Quandary's shooting gallery you lose track of your body. But don't worry: In *The Secret Island of Dr. Quandary*, you have ample opportunity to reclaim your body and time to boost brainpower and wrist reflexes besides.

Despite the tongue-in-cheek humor found throughout *The Secret Island of Dr. Quandary*, most parents will agree that MECC doesn't kid around about educational values. This game looks great and plays well, but most important, it runs the gamut of learning experiences available on a personal computer. This diversity guarantees that younger players will return to the island again and again to solve simpler puzzles that always have different solutions and that somewhat older children will target the higher levels of play for real challenges to their logic.

The big attraction here is Dr. Quandary's Troggle Shoot, in which you try to shoot diminutive, bizarre troggles as they scroll past. Dr. Quandary will offer you a choice of three Kewpie dolls: B. Ginner, O. D. Nary, and D. Feecult. A decision in the gallery tempers the difficulties of the island. The beginner's level shouldn't pose any insurmountable problems to anyone and will serve as an excellent introduction to the island; the highest level might just cause some fits.

Shoot a Kewpie doll, and



your onscreen character leaves its body and is transported into the doll's body and to the island. Thus begins your islandwide scavenger hunt that will ultimately result in the reunification of your body and your errant ethereal self.

You awaken on a tropical island in the form of a Live Action Figure and remain trapped there until you can locate the ingredients for a Fixer Elixir. Certain obstinate characters and, well, quandaries, lie ahead, but a hard time's rarely been this much fun.

On one of the island's beautiful beaches, you'll encounter the Beach Dudette and her Disc Appear contest. Several rows of compact discs lie in the sand. Remove any or all from a single row; the object is to force the Beach Dudette to keep the last disc, usually a Don Ho or Wayne Newton recording. She'll try her best to force you to keep the last CD, but don't give in. While this exercise in reason may require some practice, *Quandary* allows you as many attempts as you need. Lose one round, and you may return with a new strategy later; to es-

cape from *Quandary's* island, you need more than just the components for a Fixer Elixir. You must prove to be the master of every puzzle.

Tax Factor clearly illustrates the concept of factors and in the process provides probably the most intriguing diversion on the island. From a sequential series of numbers beginning with 1 and ranging to a possible 50, players select numbers to earn points. A lisping tax collector picks up the factors of whatever number you choose. Click on 25, for instance, and the tax man will collect 1 and 5 for a total of 6, assuming you or the island equivalent of the IRS hasn't chosen these numbers already. When only prime numbers remain onscreen, the tax man scoops up those, too, and tallies his earnings. The highest score wins. After several attempts, most players will develop a scheme to beat the acquisitive varmint at his own game.

Take a respite from all the arithmetic and tackle something simple—geometry! Actually, *Quandary's* island isn't all mathbound, and Let's Make a

Door, HMSB Quandary, and Waxy Buildup prove it. In these puzzles Dr. Quandary presents you with striking visions of a portal, a sailboat, and a giant candle. He then shatters them; you pick up the pieces and fit them into the outline of their original image. Anyone playing with B. Ginner need only snag the pieces and put them in their places; D. Feecluts will need to rotate pieces using the right mouse button in order to make them fit. Success here clears the jungle pathway for further scavenging.

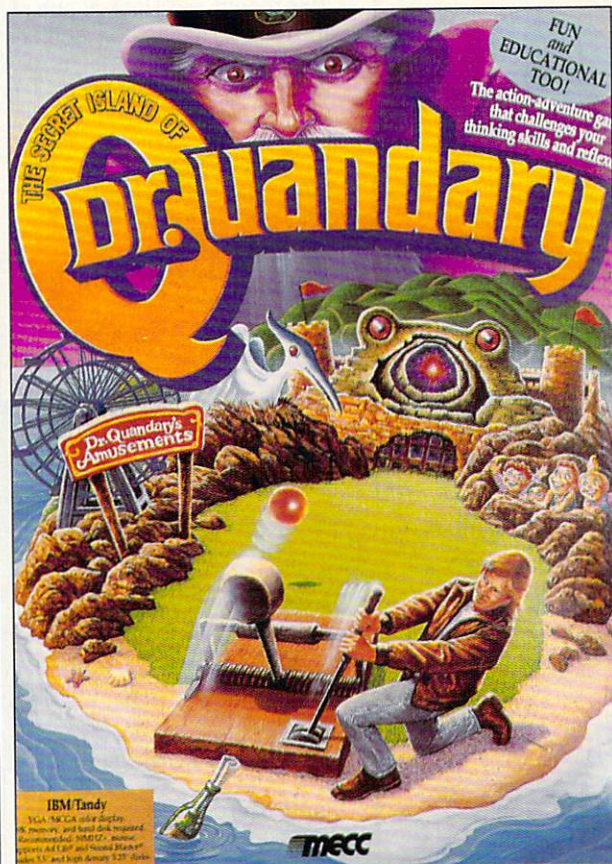
Not every dilemma centers on you, a Kewpie. Poor Edmund Pillory waits mournfully, hoping that a wandering stranger might guess the combination that opens the padlock standing between him and freedom. Quandary's loathsome magic prevents Edmund from telling you the combination, but know it he does, and he can wink or smile to indicate the accuracy of your guesses. This exercise will reveal either your intuitive gifts or the lack thereof. You'll have to practice educated guessing, and after only a few attempts to open the padlock, you'll begin to develop the necessary logic on your own. A handy list of your guesses and Edmund's reactions appears onscreen; you have no reason to keep pen and paper beside your mouse pad in this or any other Quandary brainteaser.

In Ape the Ape, you mimic a pattern of numbers and sounds as dictated by one William Apespeare on his musical vending machine. Patterns begin simply with a single number, but if you repeat a sequence exactly, William ups the stakes, adding more

and more numbers to the series. (Don't jot down the numbers as they come up. How can you improve your memory if you're unwilling to work at it?) Ape the Ape operates much like the early electronic game Simon, and anyone with a flair for that addictive hand-held will do well against this simian taskmaster.

Astute players might voice the legitimate concern that none of the microgames within Quandary are truly original. Take Tire Tower, for example. It has three posts and from three to five tires of varying sizes. You move the tires one at a time from post to post, never placing a larger tire over a smaller one, hoping to relocate the pyramid of tires from its original post to either of the other posts. Sounds familiar, doesn't it? Tire Tower is at best a variation on an ancient game, but execution counts for something.

Quandary puts only pointing and clicking between you and its puzzles. The keyboard commands work fine, and some numerical data entry is required, but surmounting most quandaries demands the spontaneity that only a mouse can provide. Besides, collected under the auspices of an island scavenger hunt, these tried-and-true games will improve your thinking, in a puzzle-solving sort of way. More important, though, kids will love the presentation of the puzzles. Blending 256-color digitized images with hand-drawn art, upbeat music, and playful commentary, Quandary sets a comic tone where the monotony of the same old math and logic could've been oppressive. Moreover, the necessity of completing each task can't be-



come overbearing; players have as many chances as they require to complete a problem. This sort of tacit encouragement will keep kids learning even when that final number in a series continues to elude them or that last tire just won't stack.

No one plots like Dr. Quandary. He plans to keep you coming back to his little educational paradise, and he'll probably succeed, no matter what your age. Admittedly, eight-year-olds stand to learn more from this island vacation than adults, but adults don't know everything. Take Dr. Quandary's challenge and learn to think again. □

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MULTIMEDIA PC

David English

THE ICONS HAVE IT

This month, we'll look at one of the leading multimedia authoring programs, IconAuthor. We'll learn how Windows 3.1 makes it easy for multimedia programs to work with sound cards, CD-ROM drives, and full-motion video adapters. And best of all, we'll see how you can harness most of the power of IconAuthor—for one-tenth the price.

Who needs a multimedia authoring program? Traditionally,

with any appropriate Windows application. As new drivers and variations of old drivers are developed, you can easily add them to your current applications. (Double click on the Control Panel icon in the Main group. Then double click on the Drivers icon. From there you can install, remove, or configure your multimedia drivers.)

IconAuthor (AimTech, 20 Trafalgar Square, Nashua, New Hampshire 03063; 800-289-2884) uses Windows' own drivers to support a variety of popular multimedia devices. It also directly supports many special-

purpose devices, including computer-controlled videotape recorders and videodisc players. As a programming environment, it takes a visual approach, using icons as building blocks. Its flow chart metaphor is especially well

sued to complex branching applications where the user chooses from a series of options.

With IconAuthor, each icon includes its own programming content. This makes it easy to create a basic multimedia program and quickly reorder its structure. You simply drag the appropriate icon and drop it on to the flow chart. For example, if you place an Input icon in front of another icon, the program will wait for a mouse click or keypress before advancing to the next icon. Double-click on an icon, and you can change its content.

The IconAuthor package includes six separate programs: IconAuthor, which lets you use content icons to define the overall structure of your application; Graphics Editor,

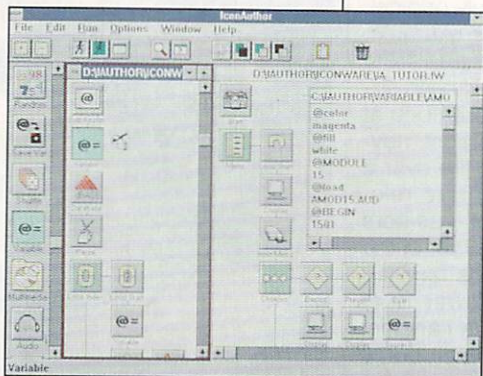
which works as a basic paint program; Icon Animate, which lets you create simple frame animations by dragging an icon across the screen; Smart Text Editor, which lets you apply special effects to display text; RezSolutions, which lets you alter the size and resolution of bit-mapped graphics; and Video Editor, which lets you create complex video effects using video-overlay cards. Speaking of video, I tried IconAuthor with a Super VideoWindows card from New Media Graphics, and the results were very impressive.

That's the good news. The bad news is that IconAuthor isn't cheap by consumer standards. It's \$4,995 for the entire package—though that does include four days of training from AimTech. There are also runtime fees if you plan to commercially distribute your application. While that is expensive for most users, it's not unreasonable for someone who does this kind of work professionally full-time.

I said earlier that I would show you how to get most of the functionality of IconAuthor for one-tenth the price. AimTech has recently released a consumer version of IconAuthor. It's called HSC InterActive (HSC Software, 1661 Lincoln Boulevard, Suite 101, Santa Monica, California 90404; 213-392-8441; \$495). It doesn't include the Smart Text Editor or Video Editor programs, IconAuthor's extensive database capabilities, or the four days of training, but it has just about everything else. You can also freely distribute your applications without paying a runtime fee.

If you're a full-time multimedia developer, you owe it to yourself to check out IconAuthor. For the rest of us, HSC InterActive is a more suitable choice. Both programs make powerful multimedia development easier than ever before. □

With IconAuthor, you create multimedia applications by moving icons.



multimedia developers have created applications for education, training, and sales. Computer-based training (CBT) has been especially popular, as it lets a student or trainee work at his or her own pace. CBT also allows the computer to track a person's performance during the training (which is either a boon for efficiency or an Orwellian nightmare, depending on your point of view). In the wake of plummeting hardware costs, today's multimedia development has expanded to include MPC (Multimedia PC) titles and an even larger market for education, training, and sales.

On the software side, Windows 3.1 has added system wide support for multimedia hardware. In theory, a single Windows driver from a hardware manufacturer will work

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ENTERTAINMENT CHOICE

Finally, a package that thinks your funny bone is more important than your productivity rating.

Ralph Roberts

THE LAFFER UTILITIES 4.01

Do you grow cross-eyed from word processing or number crunching all week long? By Friday, are you tired of being productive? Sierra On-Line has come to your rescue with America's newest (and only) leading nonproductivity tool, The Laffer Utilities 4.01. These utilities liberate your computer from work and optimize its entertainment potential. Billed as being "for everything you do at the office that has nothing to do with work," Laffer Utilities provides you with nonproductive pastimes that make you look busy when you're doing absolutely nothing worthwhile.

Al Lowe, creator of the award-winning Leisure Suit Larry games (starring that lovable loser, Larry Laffer), pumped his trademark humor into these zany utilities. Little wonder, then, that the first version of Laffer Utilities is 4.01 rather than 1.0. Or that the innocuous title was designed to slip easily through Purchasing and onto your desk. Lowe has done everything to trick your boss into thinking that this package will make you more productive.

Not that Laffer Utilities isn't just as useful, and even more interesting, than the popular productivity-enhancing Norton Utilities. Let's face it—how can you compare such a boring task as defragmenting your hard disk to the Laffer Jokes utility? Jokes is a database containing hundreds of jokes delivered in random order by Larry at your request. By setting the Filthometer (ranging from Pure to Filthy) and the Laffometer (ranging



from Dumb to Bust a Gut), you can control the jokes' color and humor content. Here's one of the clean jokes: "For years we thought my uncle was a hunchback. Turns out he just didn't know that suspenders were adjustable."

The Whattodo utility is for those who would rather let someone else, even Larry Laffer, make decisions for them. It's very easy to use, and it has some useful information. Here's a real example—and my first-time try, honest! The question: "Should I vote for Bush, Clinton, or Perot?" The Whattodo answer: "You really should not."

Excuses and Headline are also fun. The first offers a list of excuses you can use to explain why your review of Laffer Utilities or any other real work is late. Headline creates a humorous tabloid headline to entertain you—something like "Elvis Clones Write Book—Fortune-teller Reveals All." To make things even more interesting, and sometimes embarrassing, it will take names from Phone, another Laffer utility.

The Sayings utility presents you with the wit and wisdom of Larry Laffer (yes, he does have a little). You get sayings

like "If you laid all the economists in the world end to end, they still wouldn't reach a conclusion."

Check the Horoscope utility to discover why things are the way they are. Here you'll read humorous "horoscopes" such as this one for Leo: "Your evil twin from a parallel universe is wrecking your life. Oh well."

WDUWTGFL is perhaps the greatest, most utilitarian utility in the history of computers, helping you to answer one of the oldest and hardest questions of all, "Where Do U Want To Go For Lunch?" Set the Qualometer and Buckometer, and you can sort restaurants by quality of food and overall prices. You can, of course, add real local restaurants to the database and categorize them by type of food as well as by quality and price as already mentioned.

Pool will make you popular among the gamblers in your office and keep them reaching for their wallets. This utility helps you create and maintain office betting pools on football seasons, basketball

tournaments, or sports events. A related utility is Bracket, which lets you set up brackets for "office tournaments, hierarchies, and organized crime syndicates." And if your state has a lottery, you'll appreciate Windfall, which devises winning lottery numbers (if you run it enough times).

Falling into the semiuseful category is Announce, which puts a humorous yet appropriate picture of you onscreen while you've gone to see the boss, to use the bathroom, to get a cup of coffee, or even when you've just plain gone fishing. You also have the option of password protection and putting a horizontally scrolling message on the screen with the picture.

Though some might claim that the above programs are just for fun and offer little in the way of usefulness, Laffer Utilities actually offers six utilities that are truly useful to have. Of course, they too are flavored with the unique humor of Al Lowe.

Signs is an ever-useful utility for an office or any small business. It helps you to create and print signs quickly and easily. Hundreds of cartoons and borders are available to spice up your signs. You can select from a list of several canned messages, such as Sexual Harassment Allowed, but It Will Be Graded, or you can create more appropriate customized messages, such as Sales Meeting at 3:00 p.m., Frank's Office.

The Signup utility generates lined sheets with optional graphics. Use these forms for petitions, sign-out sheets for supplies, or anything else that requires a group of people to supply their signatures.

Forms provides you with a li-

brary of both useful and silly forms. Forms for petty cash withdrawals, phone messages, routing slips, memos, and so forth are some examples. Impress your boss by customizing these for your company. Forms for hot dates, things you won't get done today, and rumors might not be quite as necessary but are quite entertaining. Then again, if you think Laffer Utilities is funny, chances are you'll find the unnecessary useful.

Faxcover is a program that does just that—generate fax covers in varying degrees of seriousness. You can accomplish everything from annoying your associates to appearing to be thoughtful. Sending someone a funny fax birthday card created with Faxcover sure does cover up the fact that you forgot to buy a card in time to mail it.

Speaking of birthdays, Birthday notifies you of upcoming birthdays. Now you can remember them in plenty of time to send cards.

Finally, there's Phone, a database for names, phone numbers, and more. This program maintains a list of people and companies you call and allows you to search it using almost any criterion, enabling you to find the number you need easily.

The Laffer Utilities package offers a lot for its \$34.95 retail price, but it requires a lot of disk space as well. The hundreds of cartoons and other graphics help run up Laffer Utilities' hardware requirement to a hefty 6.1 megabytes of disk storage. There are those of us who think Laffer Utilities is worth the space. If your company is networked, you can always put it on the file server anyway. I

"If you can't get your broker on the line, blame Larry." - *Newsday*

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used the utilities without any problems across a Novell NetWare Lite network. A Windows version was released in the spring, so if your office requires that you spend time in that environment, you can benefit from Laffer Utilities, too.

In all, The Laffer Utilities 4.01 is the first of a new breed of nonproductivity software. Al Lowe and Sierra are to be congratulated for pioneering this field and bringing chuckles and stress relief into the offices of so many of us. □

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For those interested in finding out more about the humor of Leisure Suit Larry and Al Lowe, we suggest *The Official Book of Leisure Suit Larry*, available from COMPUTE Books.

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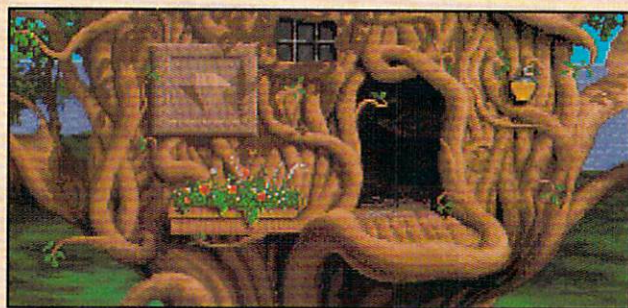
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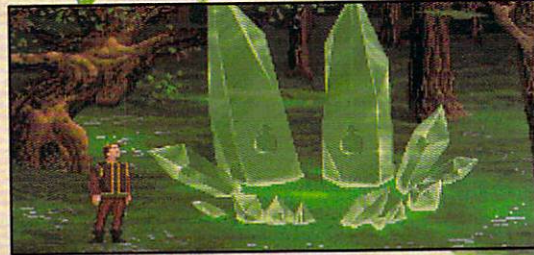
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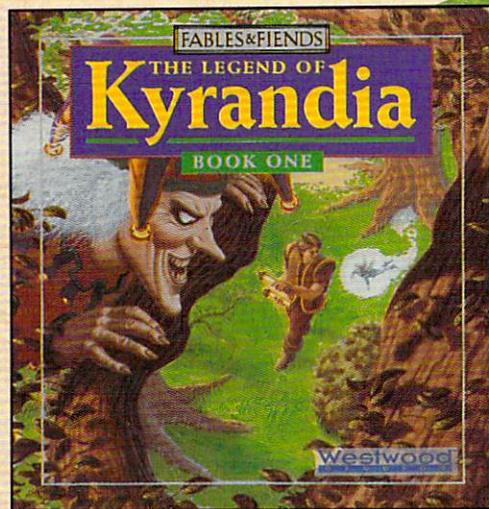
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Circle Reader Service Number 158

GAMEPLAY

Carol Ellison

THE DIGITAL DMZ: MANAGING THE PC TURF WARS

If you thought family turf wars over technology ended with the introduction of cheap TVs and call waiting, think again. The home computer opens a whole new battleground on the home front.

A burgeoning market in children's games has eliminated the age limit in computing. Once again, family members are in contention for the house-

games—and often more so.

The multimedia animated storybooks *Mixed-Up Mother Goose* from Sierra On-Line and *Just Grandma and Me* from Brøderbund (based on an endearing children's story by Mercer Mayer and, at the time of this writing, available only for the Macintosh) bring music, voice, and hi-res animated video to the computer. As children's programs, they delight with their animation and respect for detail in classic nursery rhymes and children's stories. But these are no more just for kids than the wonders

in Walt Disney's *Fantasia*.

Unlike the kids of our own generation, whose participation in fairy tales rarely progressed beyond running their Kool-Aid-stained fingers across the page of a Golden book, our own kids can

actively participate in the fantasy. They can explore castles and enchanted lands to help Little Miss Muffet unite her curds and whey in *Mixed-Up Mother Goose* or soar skyward toward adventure while grasping the handle of a beach umbrella on a windy day in *Just Grandma and Me*.

Plummeting prices have made an interactive combination of computer, sound, animation, high-resolution graphics, and CD-ROM practical for the home. But multimedia is still a pricey proposition. Fortunately, a few vendors have found ways of delivering multimedialike products on floppy disks that are easy to install on a hard drive and run on a less advanced system.

Knowledge Adventure, from the company of the same

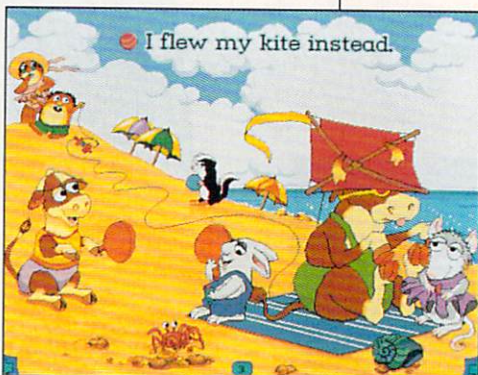
name, may be the most innovative such product to appear on the market this year. This \$79.95 floppy disk-based multimedia reference room makes research more fun than negotiating twisty little passages in *Colossal Cave*. It takes you on a hypertext sound-and-graphics tour of world history and does it in just 320K of RAM, 6MB of hard disk space, and EGA graphics. It's ideal for the budget-conscious home user who's not yet ready to upgrade. Knowledge Adventure uses the same approach in its two newer releases: *Sports Adventure* and Isaac Asimov's *Science Adventure*. The games aren't perfect. The entire history of Western civilization can't be squeezed into 6MB. But filling in the gaps can make for its own family adventure.

In fact, the beauty of the new crop of kids' games is that they offer opportunities for family interaction.

And alongside traditional games, multimedia effects are showing up in creativity products. With Brøderbund's *Kid-Pix* or Davidson's *KidWorks*, two hot new drawing programs for kids of all ages, it's possible to animate onscreen drawings and add sound and speech for cartoonlike effects or produce richly illustrated paper posters.

Programs like these cut across generations by presenting kids and parents with group play and the opportunity to go on quests away from the keyboard for learning and fun. They may never replace Disneyland. But they sure beat Super Mario. So why fight about it? Share the mouse.

Just Grandma and Me from Brøderbund puts a child into a fantasy adventure.

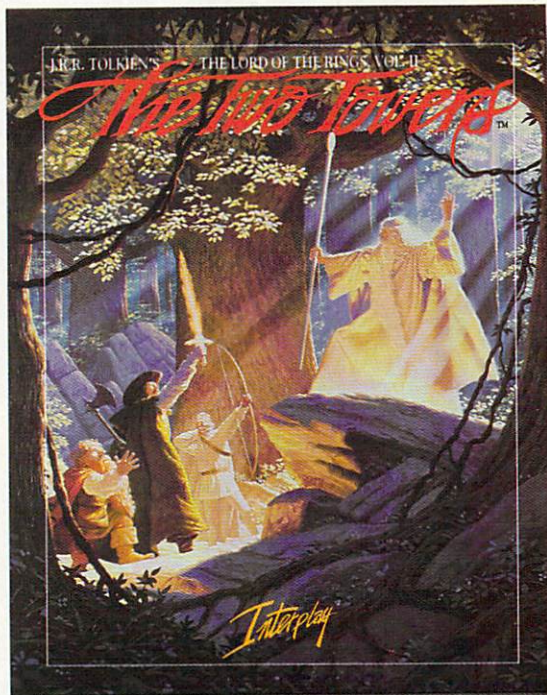


hold's most entertaining electronic device—the PC. And multimedia promises to advance the trend and push the minimum age for computing downward, making the computer as accessible and as much fun as Saturday morning TV.

If, as adults and parents, we hope to continue to control this territory, we'll have to find ways to explore it with the kids. In our book, *Parents, Kids and Computers: An Activity Guide for Family Fun and Learning*, Robin Raskin and I look at ways to turn the home PC into a family entertainment center. Harmony at the keyboard is not only possible, but also pleasurable. And software for children, once seen as simplistic, demands programming as sophisticated as that found in many adult

Carol Ellison is coauthor of the book *Parents, Kids and Computers: An Activity Guide for Family Fun and Learning* (Random House, fall 1992). □

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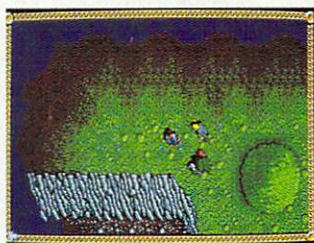
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Away from the dim projection rooms, away from the bright classrooms and close-walled weight rooms, before television begins the frantic circus of Monday night contests and Sunday play-offs, you can lead your own football team to victory—right from your PC.

Four computer football games released in the last year provide excitement and glory for football-coach wannabes. Three of the four—Mike Ditka Ultimate Football, NFL, and John Madden Football II—mix arcade action and joystick reflexes with strategy and play design. The fourth, NFL Pro League Football, combines strategy with complex football terminology to form a game with an intellectual challenge not unlike that of chess. Each of the four offers you a chance to coach and play your way to the Lombardi Trophy.

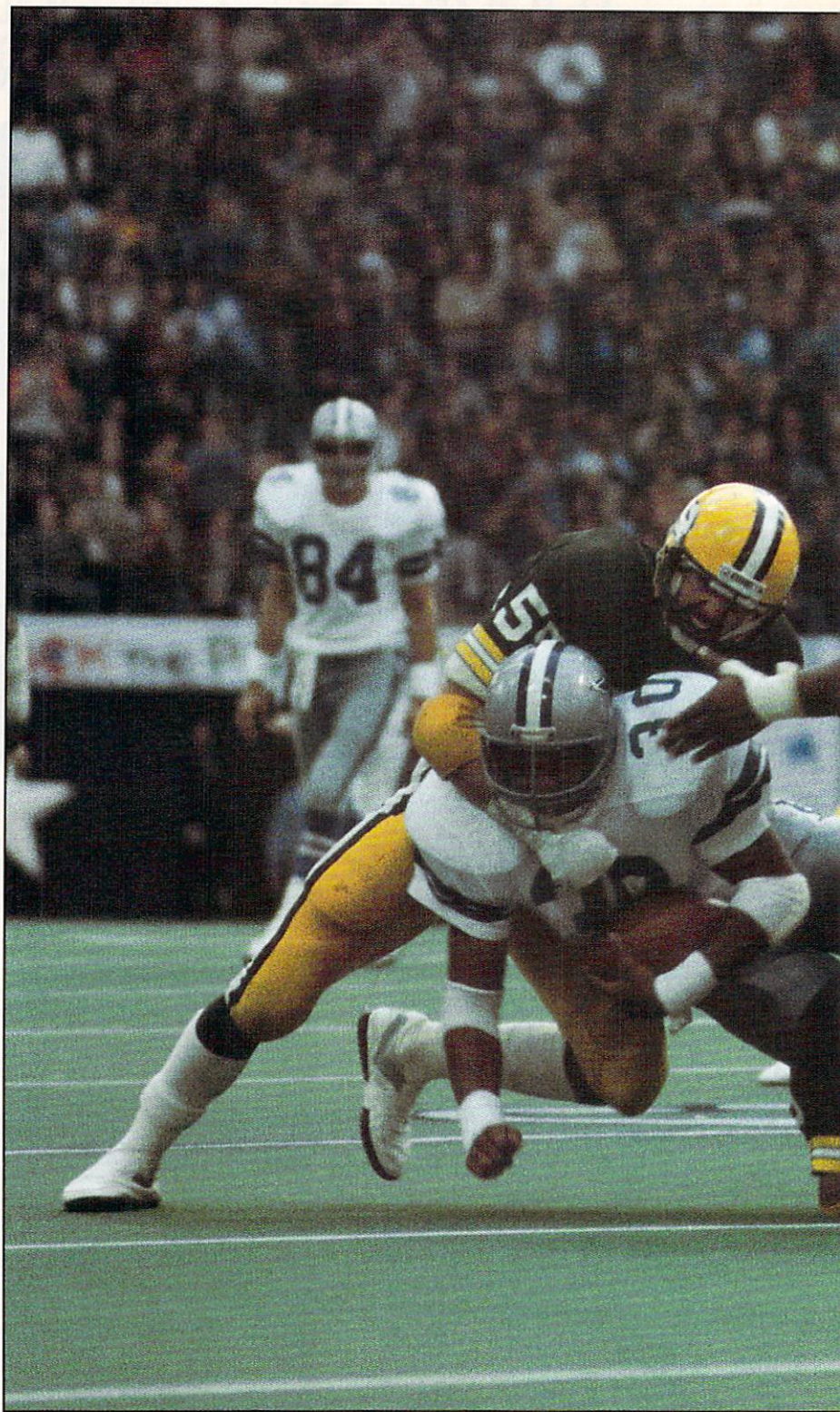
The Whole Nine Yards

A good computer football game is more than the sum of its parts. The best games in the league blend realistic action, firm grounding in statistics, innovative play features, editing capabilities, and state-of-the-art sound and graphics to re-create Sunday afternoon on your PC.

Mike Ditka Ultimate Football from Accolade has a simple design that lets you customize each contest to match your skill level and enables you to set the amount of control you want over the action on the field—you can play, coach, or coach and play. The game supports league play, team editing, player editing, and playbook design. Visually appealing and enhanced by solid sound effects, Ditka balances realistic presentation with arcade fun.

Like Ditka, Konami's NFL offers you choices over game control (Coach Only, Player, or Both). Unlike Ditka, however, NFL doesn't have separate skill-level settings. Instead, how you configure the game determines how the play-action control is divided between you and the computer. This interplay between human and machine is evident with the Choose Player option. In this mode, you command a particular player for each play; if you choose a receiver, you must run the pattern. If you can't get open, the computer-controlled quarterback will select a secondary receiver. This elegant division of labor provides a welcome solution to the sometimes overwhelming command structure of sports simulations.

NFL Pro League Football from Micro Sports offers only one mode of play—coaching. You don't control any of the action on the field; each contest is a straight-ahead strategy session in which you try to outguess your oppo-



BY PETER SCISCO

PIGSKIN



PREVIEW

ment in the selection of an offensive or defensive strategy. Graphics are limited to either a side view of a representative field-position display or an abbreviated overhead view of animated figures. The game's strength lies in its realistic play selection and its support of modem-based play. Although weak in graphics, sound effects, and interactivity, Pro League makes an excellent choice for portable systems.

John Madden Football II from Electronic Arts improves on the original with a more intuitive interface that makes the game's complex series of offensive and defensive sets and plays readily accessible. With three skill levels, Madden II will appeal to pigskin prognosticators and Monday morning quarterbacks alike. The plays available in Madden II rival in complexity those found in Pro League but are presented in a graphical fashion. The game's use of oversized animated figures—especially the huge comical football—hints at Electronic Arts' approach to video-game platforms such as the Super NES and Sega Genesis, where large figures compensate for a muddier television display. Madden II runs a good balance between strategic thinking and arcade reflexes. It supports team, player, league, and playbook editing.

Playing by the Book

Ditka's simplified team editor owes a lot to the editing system first developed by Accolade in 4th and Inches. Each player is defined by position, number, and name. His talent is represented by three numbers: one for speed, one for skill, and one for strength. The rating for these attributes falls on a scale of 50–99, with 50 being an average rating and 99 being near perfection. Each player in the Accolade league (the default league) has a preset number of talent points, which you can shift from one attribute to another. Editing Ditka teams involves making a series of trade-offs in order to strike an overall competitive balance.

Like most PC football games, Ditka allows you to modify existing plays or to create entirely new ones. After you select one of six formations, all you have to do is assign responsibilities to the main players (receivers, running backs, quarterback) and then draw patterns for them on the screen.

This "chalkboard" play editing is also present in Madden II; it was originally developed for the first edition of the game. In this updated edition, it's easier to make player assignments, create formations, and save plays into a playbook. A practice mode lets you run your plays against a defensive set of your choice; a Walk Through view lets

you see your plays unfold without having the animated players on the field.

The complex team and player editing in Madden II requires study, but don't let that keep you from creating rosters that mirror your own favorite pro or college teams. Player ratings are divided among four categories and set on a scale from 0 (worst) to 9 (best). Categories include General, Offensive, Defensive, and Special Teams.

In NFL, team editing is a simple matter of calling up the roster and editing player attributes. Because NFL is not endorsed by the NFL Players Association, real player names aren't used (nor are they used in any of the other three games considered here). But you can change the names and the skill levels as you wish. As in Ditka, each player in NFL has a total number of points that you can split among ten attributes including speed, agility, intelligence, injuries, and blocking. In addition, you can edit personal information such as weight, height, birth date, and experience. Konami constructed the player attributes from stats accumulated during the 1990–1991 season. Each of the five key players per team has a total of 700–800 skill points; all other players have a randomly assigned total of 600–700 skill points each.

NFL's Training Camp is the place to edit and practice plays. Konami has modified the chalkboard approach in this game with a push-button interface. Novices will soon be diagraming and inventing plays just like the pros. If you don't have a lot of experience assigning blocking patterns and pass routes, NFL's approach is an excellent compromise.

The playbook challenge in Pro League isn't in designing the play, but in fitting the right play to the right time in the game. With so many plays to choose from, it's difficult to imagine designing something more effective, but if you hunger to draw up a secret weapon, you're out of luck here. The game also lacks a team-editing feature; instead, you must purchase accessory team disks or download team stats during the season from the USA Today Sports Center network.

Monday Morning Armchair

Most of the time, Pro League's coach is pretty savvy, up on all of the intricate patterns and strategies that create a winning team. At other times, the computer coach seems downright dimwitted. A TV commentator might excuse a screen pass to the short side of the field on 3rd and 14 by referring to it as an innovative and gutsy offensive call, but the people in the front office probably wouldn't see it that way.

Because Pro League limits the computer to the personnel and statistics of actual teams, you can gain an edge if you're familiar with the computer team's offensive and defensive strategies and you have a good working knowledge of your own team's strengths and weaknesses. For example, in a game against the 49ers, you can bet that Montana will look for Rice in a 3rd and 11 situation. Your edge disappears in league play against human opponents, who can develop unique strategies for the teams they coach. A Scouting Report option available from the General Manager module during league play helps you set your competitive strategies.

With three levels of computer intelligence for handicapping the computer coach, Madden II provides the most flexible and versatile coach among computer football games. It's not easy to catch the computer on a bonehead play; when configured to Aggressive AI, the computer coach can be unpredictable—and downright dangerous.

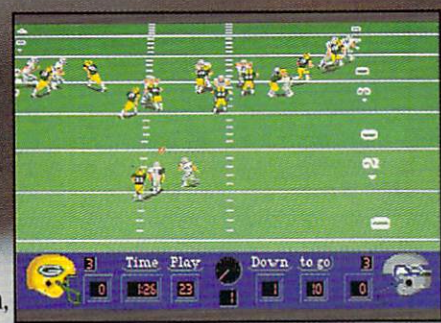
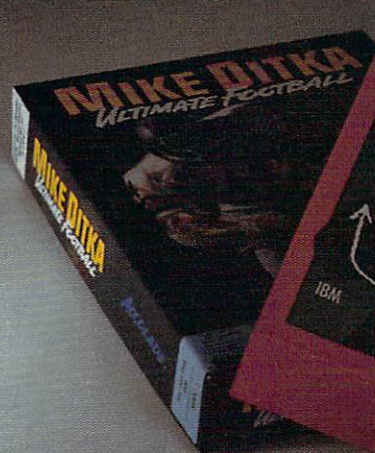
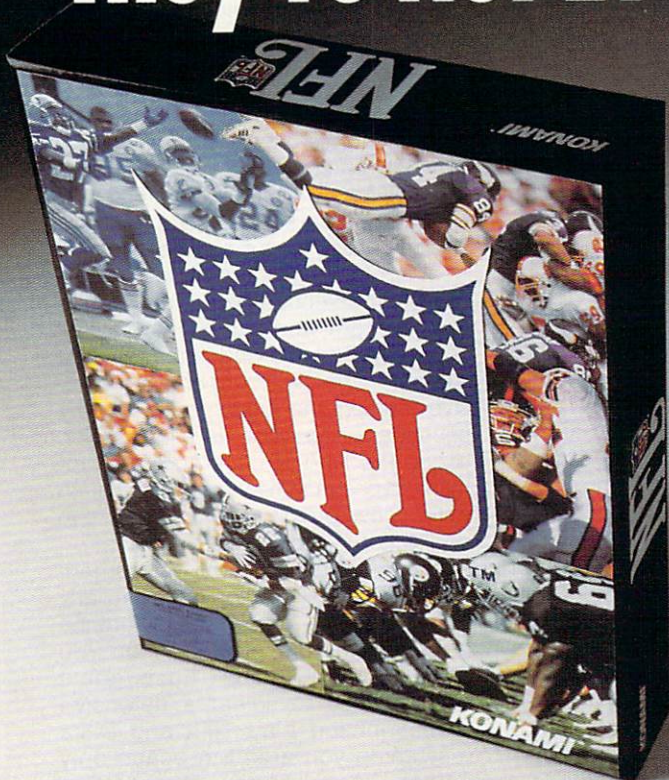
The new version of John Madden Football replaces the original game's complex play-selection process with a push-button interface complete with scroll bars and a pop-up window that displays the play on the screen. An added advantage of the new interface is that it puts detailed playbooks at your fingertips and reduces the separation between the player and the machine—instead of wondering how to play, you spend your time selecting a play.

Konami limits your play choices in NFL; this simplifies selection but slightly diminishes the game's strategic elements. The offensive side of the line has 32 plays (not including the kickoff); the defensive team has 24. Plays are grouped in sets of 8 on separate pages, which you can move through in making your selections. When you edit or create a play, it replaces one of the plays on page 2 of your playbook.

Ditka's playbook, like Madden II's, is divided into sets and plays. But Ditka's selection process is similar to the one used in NFL. You must first select a formation and then select a play to run from that formation. Both offense and defense have eight formations. The offense has eight plays that it can run from each formation; the defense has four.

Ditka's computer coach doesn't deviate much from standard, conservative football. Once you begin to recognize the patterns, you'll gain an edge. But that doesn't mean you can abandon your own strategies. Running a reverse on 4th and 3 won't necessarily get you a first down just because nobody else is crazy enough to try it.

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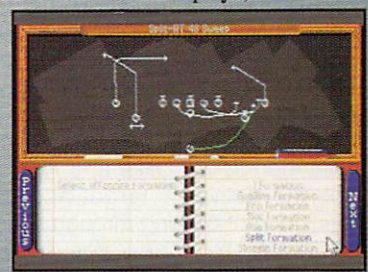
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	Bengals	Season Average
Rushing (No./Yds./Avg)	18/89/4.9	89/246/2.8
Passing (Comp./Atts)	10/209/20.9	40/545/13.6
Completion %	0.890	0.537
Yards Per Carry	4.9	2.8
Fumbles (No./Yds./Avg)	1/50/50.0	1/50/50.0
Fumbles (No./Lost)	0/0	1/0
Intercepted	0	0
Sacked	1	1
1st Downs	8	5
Net Yards	237	657
Touchdowns	2	7
Extra Points	2	7
Field Goals (No./Atts)	1/1	1/2
Safeties	0	0
Penalties (No./Yds)	0/0	1/5
Total Score	17	17
Total Plays	32	17
Time of Possession	12:30	14:58
Total Yards	401	1304

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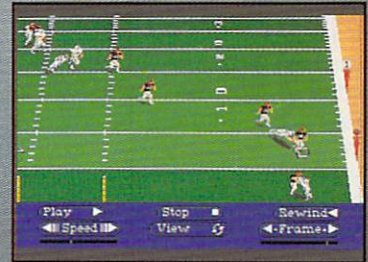


San Diego CHARGERS		Thomas Gass			
No.	Pos.	Height	Weight	Birthdate	Exp.
30	RB	5'11"	203 lbs.	01/25/57	8 yrs.
Intelligence		77			
Speed		73			
Agility		73			
Endurance		61			
Tackling		88			
Blocking		41			
Catching		81			
Throwing		53			
Kicking		41			
Injuries		56			

Team	Score	Plays	Time
SEAHAWKS BEARS	0	7	1
BUCCANEERS LIONS	0	7	2
EAGLES GIANTS	0	3	1

SPORTS UPDATE

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KONAMI®

Go Long

Passing is the most difficult offensive element to learn in computer football. The newest games for the silicon grid-iron share some elements but differ with respect to others. The biggest challenge of successful passing is using the means provided to select a receiver without becoming overwhelmed by the other action on the field. Three of the games examined here stress quick reflexes in a bid to capture the feel of standing in a pocket and delivering a pass downfield, while the fourth demands an exacting knowledge of pass routes and zone coverages.

With Ditka, you can set the passing game at any of four skill levels, allowing you to learn as you play. The Beginner mode stops the action as you examine potential receivers. As you move to more difficult skill levels, you must learn how to read defenses, cycle through receivers without pausing the action, and then, finally, hit the open man while eluding a fierce pass rush. NFL offers three ways to play the pass, depending on what level of control you have selected. If you elect to control the quarterback, you must drop back from the snap, press a button to enter passing mode, cycle through your eligible receivers, and then hit the fire button to throw the pass—all while avoiding the pass rush. If you elect to control a receiver, you must execute the selected pass route, break into the clear, and then complete the reception. Your third choice, and the most challenging, is to control both ends of the play, from calling the snap to running for the end zone.

Pro League avoids all player interaction with the receiver and quarterback. The computer implements the pass play you select. Just choose the drop-back pattern (rollout or shotgun, for example), select the receiver, select the pass pattern the receiver will run, and select the distance the play is designed to cover.

Madden II, like Ditka and NFL, also uses the deliver-to-target approach, but instead of clicking through your targets one by one, you position crosshairs on the field of play to aim your pass. To overcome the difficulty of finding the open man while also watching the pass rush, Madden II provides auditory feedback—a series of beeps that increase in volume and speed to indicate increasing defensive pressure. In a way, this mimics the third eye that NFL quarterbacks must develop in order to be successful.

Ground Control

Plays up the middle or around the side on a sweep are easier than pass plays, but they provide their own chal-

PRODUCT BOX

Mike Ditka Ultimate Football—\$54.95
Accolade
5300 Stevens Creek Blvd.
San Jose, CA 95129
(408) 985-1700

John Madden Football II—\$49.95
Electronic Arts
1450 Fashion Island Blvd.
San Mateo, CA 94404-2064
(415) 571-7171

NFL—\$49.95
Konami
900 Deerfield Pkwy.
Buffalo Grove, IL 60089-4510
(708) 215-5100

NFL Pro League Football—\$79.95
Micro Sports
P.O. Box 1178
Hixson, TN 37343
(800) 937-7737

lenges. Executing a well-designed running play is a matter of careful timing and scripted positions. If you do it right, you give the runner the chance to break one into the open field, where yards are more easily gained.

Pro League handles the running game the same way it handles the passing game: with plays numbered from 1 to 59. In a running play, you must select the ball carrier, the hole in the defensive line through which the run will be made, and the type of run, with corresponding blocking patterns. It's fortunate that there's no time clock to hurry your choices, since the sophistication and the detail of the plays make it difficult to select plays quickly.

Assuming that you've selected player-control and not coach-only mode in the other three games, executing a running play is similar in all of them. After selecting the proper play, you make the snap, execute the hand-off, and then guide the runner through tacklers and try to follow the blocking to gain yards. The differences lie in the amount of interaction and control you have over the hand-off.

Madden II makes the hand-off automatically, leaving you to control the runner after he has taken possession of the ball. Ditka, on the other hand, requires you to press the fire button to execute the hand-off. Your quarterback and running back must be close enough to make the hand-off work. If you don't execute correctly, the result is a broken play and probably a loss of yardage. With NFL, running plays are more open-ended. You can pitch, toss, lateral, or hand off to a runner. As in Ditka, a successful transfer in NFL requires timing and control. Once in the

open field, you can straight-arm defenders to pick up additional yardage.

Wall of Iron

Defensive play selection in Pro League mirrors the offensive side of the line. You make the selection and let the computer run the simulation. The range of plays is as complex as those available to the offensive team. Defend against running plays by typing in a number from 1 to 40 or from 80 to 85 (the 80-numbered plays are for goal-line defenses). Pass defenses use numbers from 41 to 79 and from 86 to 97. For each selection, you must decide the strength and pursuit pattern of your defense (slow and to the right, for example), the alignment of your defensive linemen, the runner to key on, the secondary alignment, and, for passing plays, the kind of coverage (man-to-man or zone, and how tightly the pattern will be covered). How would you like to do that for a living, week after week?

The other three football games handle defensive strategies quite similarly to one another—again, the difference is in the amount of interaction you have with the game. Each game requires you to select a defensive formation and play. NFL and Ditka (assuming you aren't in coach-only mode) then allow you to control a defensive player as he goes for the sack, the tackle, or the interception. You can even dive for the ball carrier if he's in the open field. Madden II automates the defensive players after you select the play you want to run. You have no control over defensive backs, linebackers, or linemen.

The Snap

These four football games address the problems inherent in computer football in various ways. Different levels of player control, different levels of complexity, differences in arcade sequences and interfaces, different graphical designs—all of these make for a healthy variety of games suitable for a wide audience. If graphics and animation are the most important elements to you, NFL and Ditka are the best games of these four. If complexity and strategy are the elements you look for, Madden II and Pro League should be on your roster. The diversity in this year's computer football games ensures that you'll find one or more that match your needs and preferences exactly.

Peter Scisco is the coauthor of *The Big Book of PC Sports*, a book of reviews, hints, and tips published by COMPUTE Books. He's still wishing for season tickets to the Bengals' home games. □

64/128 VIEW

Old Mother Hubbard went to the cupboard to fetch her poor dog a bone, but when she got there, the cupboard was bare—even the 64 products were gone.

Tom Netsel

A funny thing happened today at our cupboard for new software. When I got there and opened its doors, the cupboard was bare. There was no new software for the 64.

Uh-oh! How can I fill all those gaping review pages, when I don't have software to review? There must be something in there that I've overlooked. Desperation does wonders for one's powers of observation.

Aha! There's a package! It's a little dusty, but I haven't seen it before. Surely it's something worth reviewing. We can give it a good workout and milk it for a few thousand words. It's bound to be of interest to millions of Commodore users around the world.

As I wiped the grime from the faded software box, my hopes for filling the review section faded about as quickly as a smile appears on the face of a software rep when I ask, "What do you have new for the 64?" As I struggled to stay afloat in the cruel waters of the publishing business, I realized that this thin yellow package I was grasping was made of straw—and waterlogged straw at that.

The product must have slipped from the shelf above. That's where we put the software that never quite made it into Gazette review pages. That's the shelf where we stash titles such as Great Moments in Bowling for the Adam Coleco or the VIC-20 version of Thermodynamic Equations for LAN Designers.

In this case, the program turned out to be a spelling program from a guy in a

small California town who worked out of a post office box. Unfortunately, it was published in 1984, and was not the stuff to fill my review pages.

It's amazing how things have changed! A few years ago, when I assigned reviews for COMPUTE and Gazette, new software titles vied for attention on several shelves. The 64 titles were king. They filled several shelves at the top of the cabinet. Down near the floor, occupying half a shelf, were the IBM titles.

The 64 was at its peak. Dozens of new titles came in every day. An IBM still cost megabucks, and its software consisted of monochrome productivity titles that cost \$495 each. There were a few games that utilized CGA graphics and managed a puny beep or two, but they paled next to the 64's 16 colors and three-voice SID chip.

As the jiffy clock ticked away, and months turned into years, we had to reallocate shelf space. New titles for the 64 arrived steadily, but IBM products hit us with all the subtlety of a flash flood. Today we have a whole room reserved for IBM software, and the 64/128 shelf resembles Mother Hubbard's cupboard.

A few reviews are in the works, but it'd be nice to see more new things for the 64 again. So take note, software developers: If you have a Commodore product that's never been reviewed, now's a great time to let us and the rest of the Commodore world know about it. Send us a review copy; don't keep it a secret. □

GAZETTE

64/128 VIEW

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It's tough to review new 64 software when the software companies don't send anything new.
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ONE MAN'S WORK DISK

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Pull all of your often-used utilities together, and spend your time at the keyboard more efficiently with a customized work disk.
By Don Radler.

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ONE MAN'S WORK DISK

MAKE YOUR COMPUTING SESSIONS MORE
EFFICIENT BY CREATING
YOUR OWN CUSTOMIZED WORK DISKS.

BY DON RADLER

Over time, most computer users develop a collection of utilities that they find themselves using over and over again. Out of all the programs in a collection, these favorites are the ones that rise to the surface.

Usually, these gems reside on several different disks, arranged in whatever order seemed suitable at the time they were first saved. You have to remember where each one is, refer constantly to some master list, or load and list disk directories like mad in search of exactly the right program for this or that need. Then you have to recall whether program A is compatible with program B or just try it and see. As often as not, the computer locks up.

When I retired a few years ago, I started playing around with a 64. Through the dealer who sold me the machine, I bought someone's collection of several hundred programs on disk. There were utilities, applications, games, and a slew of unidentified—and for quite a while, unidentifiable—programs.

There was no documentation of any kind. The only way I could learn anything about the programs was to load 'em, run 'em, and list 'em. Painfully, bit by bit, I became familiar with the 64. For many people, to know it is to love it. I proved to be one of those people.

Like most people, I learned about the PRINT statement first. As something of a nut about color and composition, I modified the screens on most BASIC programs to make them satisfy my eye. I played with screen color, border color, POKEs, and so on. I started reading COMPUTE's Gazette, which became my only tutorial. And I began typing in the programs it published.

Then I had a stroke of luck: The local library sold off its holding of back issues of Gazette at ten cents a copy. I took advantage of that bonanza without hesitation, buying up the complete caboodle. It started with the February 1984 issue and ran slightly beyond the first issue I had bought on the newsstand. With those and my current subscription, I now have every issue from early 1984 to the present, with the exception of June 1989, which is unaccountably missing. (If anyone has one to spare, I'd love to have that issue. The issues before January of 1984 would be of historical value, but are probably too much to hope for.)

And I kept on typing in programs.

I've Got To Get Organized

Soon I had a truly formidable collection of programs on disk and a crying need to get organized. I was beginning to sell some articles and programs to magazines, so I needed to

make my programming sessions more efficient. This meant upgrading all my work disks, but especially the one I still keep in the front of the first disk case, the one I use all the time.

Many necessary utilities are stored on this disk, including Gazette's MLX and The Automatic Proofreader. Also stored are supporting utilities for those data-entry programs, which I'll discuss later in this article.

As I discovered new programs and learned more about using them, my work disk changed. As I added new programs, I deleted others. Today, my work disk doesn't look at all like the disk it was even a year ago—and it's

```

COLOR "ASC SS" " 98 2A" PRG
1 "ASC II SS" PRG
7 "ASC III SS" PRG
25 "ATHLETE ANIMATIO" PRG
65 "CALC" PRG
14 "COPIER" PRG
1 "DEMOI" PRG
10 "DUP SS" PRG
13 "FL SS" PRG
8 "FOOD" PRG
25 "BOYSTRIP" PRG
1 "GHOSTSTRIP" PRG
1 "HOT SS" PRG
1 "HOTEL SS" PRG
25 "PET TO ASCII" PRG
3 "POP SS" PRG
30 "SEQ FILE CNUT" PRG
16 "SPEEDSCRIPT" PRG
2 "SQRD" PRG
"STRIPINI" PRG
BREAK
READY.
  
```

Alphabetical directories are a big help.

```

DISPLAY DATA
STARTING AT? CCA2
PRESS SPACE TO PAUSE, RETURN TO BREAK
CCA2:08 20 7D CF A0 00 A2 00 01
CCAA:09 00 C8 C0 FF D0 F0 A0 01
CCB2:00 E8 E0 FF D0 F4 A2 00 01
CCBA:69 01 C9 A0 00 EC AD 06 01
CCC2:02 C9 2C D0 11 A0 00 B9 01
CCCA:07 02 C9 2C F0 00 99 35 01
CCD2:03 C8 C0 06 00 F1 4C 65 01
CCDA:FE 8C 34 03 06 0C 04 02
CCE2:20 4D CD AD A7 02 8D C2
CCA:02 AD A8 82 8D C3 82 AC
CCF2:C4 02 C8 B9 07 02 C9 2C
CCFA:00 DC A2 00 C8 B9 07 02
CDB2:C8 0B F0 07 06 35 03 E8
CDBA:C8 0B F0 07 06 35 03 E8
CD12:A8 88 88 8C 34 03 20 4D
  
```

Utilities such as MLX go on every disk.

still evolving—but it does make my computing life easier and more efficient.

It's no surprise to me that many of the programs now on that much-used disk are from Gazette. I've typed in a good many programs over the years. It might be of value to other Gazette readers to see how that disk is currently organized, so here's what works for me.

Work Disk

The first listing is Art Hunkins' Keyload from the July 1986 issue of Gazette. I use Epyx's Fast Load cartridge, which loads and runs Art's program when I hit the Commodore and Run/Stop keys simultaneously. Then I simply cursor down to the program I want and hit Return, and it loads and runs. This sequence can be repeated after I've finished with one utility and I'm ready to

use another one. (If I want to look over a listing rather than run the program immediately, I just type an L at the cursor and hit Return—the program loads and waits to be listed.)

Hunkins gets my thanks for writing a version for the Fast Load cartridge. For readers who don't use that cartridge, Art's regular version for the 64 lets you merely type LOAD "",8 to call up Keyload to be run or listed.

First Program

I save Keyload with the filename OKEY for alphabetizing purposes. It's the first program on most of my disk directories. It's great for use on my Sound Effects disk, calling up each sound and letting me hear it just by cursoring to the effect and hitting Return. It's really handy at the top of my Household Helpers disk, running First Aid (October 1984), Monthly Calendar (March 1989), or Speed Reader (February 1984) when I cursor to it and hit Return.

Save the Monitor

After Keyload, the next program on my work disk is Monitor Blackout. This program was printed in a Gazette "Feedback" column (March 1989). If you think you might be pulled away from the computer for a while, it pays to run this short utility at the start of the session to protect your monitor's screen from burned-in characters. If you don't touch your keyboard after a predetermined length of time, the program blanks the screen to the border color. As soon as you hit any key, the screen returns to normal.

Copy This Disk

Then there's C64 Fast Copy, a disk copier from Cracker Jax that's the smoothest I've tried. It's worth using in place of the disk copier on the Fast Load cartridge. This takes nothing away from Fast Load. I use it all the time to copy, scratch, lock, unlock, and rename individual files, but not to copy a disk. In fact, for formatting a disk and copying or scratching batches of files, I use "none of the above" and switch to my Fast Hack 'Em disk from Basement Boys Software. But its disk copier doesn't match C64 Fast Copy either.

Alphabetical Order

I keep disk directories alphabetized. This makes finding programs easier and speeds up the cataloging process with the disk-management program I use, which takes input from directories. The best program that I've found for this is a Gazette program called Disk Directory Sort by N.A. Marshall (March 1985). Although the program is short (35 lines), it runs too slowly for my

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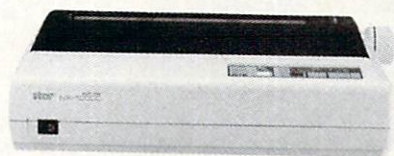
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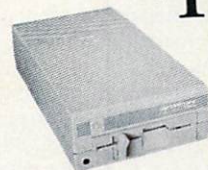
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taste. I compiled it with Blitz!, and now it moves right along. I can recommend the compiled version to anyone.

More Utilities

Next is Lou Sander's Disk Name/ID Changer, a public domain offering from the Tip Master himself. This program changes headers and ID's with a minimum of fuss and, so far, with no glitches.

If you have one program and want to add a subroutine or other code without having to type the program in again, then you need a good merge program to combine the two. The merge program I use is by G.A. Pearce, and it comes from an old Transactor Disk, volume 5, number 2. The program is hassle-free, and it works with Fast Load and/or with the K-prefix utilities mentioned below. The only true merge program I found in Gazette was Disk Merge (January 1985), but it was painfully slow.

Another great program is Randy Thompson's BSAVE Notepad from the April 1988 issue of Gazette. This supremely handy program lets you jot notes to disk at any time. When you run the program, it prints the most recent note on the screen. If you change that note, it replaces the old version with the new one on the disk. You

may enter a screen of text.

Jim Butterfield's sequential file reader in "Machine Language Programming: File Handling" from the same issue is next. This program is written in machine language and, as with most of Butterfield's work, is lean, mean, and useful. As written, it reads a sequential file and prints it to the screen. With one number change in line 350, it will send its output to your printer.

Then there's Quick Print by Chuck Webb from the May 1989 issue of Gazette. With this program, you can send lines to the printer one at a time without first loading a word processor. It will also work without disturbing whatever program you have in memory. It's great for writing notes about the current program or for addressing envelopes or making labels. All it takes to activate this program is a simple SYS address call.

K Utilities

If my work session is going to be one of writing or entering programs, I disable Fast Load and go to a group of utilities filed on the work disk with the initial letter K.

First on the list is Brøderbund's Kwikload. I use the Kwikload-1 option (load at 36096) for compatibility with the next several programs.

First among many is Multi-Utility Wedge, Jim Klitzing's fine multifaceted PD boon to programmers. Among many other goodies, this utility gives you a directory reader that doesn't disturb BASIC programs in memory, an autonumber, renumber, and delete-lines utility. It also has an instant UN-NEW command and abbreviated (two-key) DOS commands including SCRATCH, UNSCRATCH, RENAME, and so on. There's also a two-key screen dump to the printer. On top of all this, there's a simple text editor that loads and saves sequential files in standard ASCII or PET ASCII and can convert files from one format to the other.

For most of my writing chores I use Gazette's SpeedScript word processor. I use it especially for important or formal documents, but if I want to create a sequential file in the middle of a programming session, Jim Klitzing's text editor lets me do it. I can write a few lines; return to BASIC; and, with two key-strokes, go back into the text editor where the file sits waiting for me.

Compatible with this programming marvel (or with Fast Load if I'm not using the wedge) is Gazette's One-Touch Keywords by Mark Niggemann (June 1984). With Keywords you can use any of the letter keys in combination with either the Shift or the Commo-

WHAT WORKS AT GAZETTE

Of all the titles in your disk library, there probably are several that have risen to the top to become the cream of your collection. These programs, through their speed, reliability, and ease of use, have become the workhorses that handle the bulk of your computing chores. In this month's feature article, "One Man's Work Disk," Don Radler talks about his favorites and how they make his computer time more efficient and enjoyable.

His article started me thinking about my own work disk here at COMPUTE and how it's evolved. As editor of Gazette, I need a good word processor. It probably won't come as any surprise that the first tool I put on any disk is SpeedScript, COMPUTE's own word processor. (I used it before I started working here. I typed in the original version years ago.)

SpeedScript is a relatively small program. I like that because I can store a lot of files on a disk with the word processor and keep related material together.

Whenever we write or edit anything for publication, we usually have a specific length in mind. Knowing how many words an article contains is a big help in this regard. Reviews, for example, usually run 750-1000 words. A word processor that counts words is an indispensable tool for professional writers. I modified my word

processor to include this feature with Jonathan Bell's Word Count for SpeedScript (COMPUTE!, December 1986).

When rewriting or editing, I often like to compare the original with the revised version. This is where Larry Hagney's SpeedSwap (COMPUTE, September 1991) comes in handy. It modifies SpeedScript so you can load two files into memory at once and switch between them with a key-stroke. Best of all, SpeedSwap lets you cut material from one file and paste it into another. This great utility program makes SpeedScript even more useful.

Articles, program documentation, reviews, and columns are usually submitted in SpeedScript, ASCII, or Commodore ASCII, which is also known as PETSCII. If a file is in SpeedScript format, I load it into my 128, edit it, and then save it back to disk. From this point, the file must be converted to true ASCII for additional editing and typesetting on our PC-based local area network.

I can print a SpeedScript file to disk as an ASCII file, but I usually save it first and then convert it. For converting, I use Ron Carnell's Sequential File Converter for SpeedScript (COMPUTE!'s Gazette, October 1986). This handy program lets me convert from SpeedScript to ASCII or PETSCII and from PETSCII to SpeedScript.

Two other conversion programs I use are PET to ASCII by Joel Rubin and ASCII to PET by Dave Paul. Rubin's program was released in 1983, and Paul's must be nearly as old. These programs aren't fancy, but they're fast and accurate.

I upload files from my 128 to our BBS and then download them to my Gateway PC and its network. I use a terminal program that I think is called XMODEM Term. I'm not sure what it's called, where it came from, or who wrote it because there's no title or author on any of its screens. It consists of a compiled BASIC file and two machine language files. I needed XMODEM protocol because COMPUTE's old system would accept XMODEM transfers only. Other terminal programs are fancier, but this gem loads quickly and serves double duty as a sequential file reader.

After I fill a work disk, I store it away for safekeeping and create a new one. That's when I boot Ross Ouwinga's Fast File Copier (COMPUTE!'s Gazette, September 1986). I tag all the work programs I want—including Fast File Copier—and it copies them onto a new work disk.

These are the programs that work for me. I am comfortable with them. They make me more productive and my work easier. Isn't that the whole idea?

—TOM NETSEL

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dore key to print BASIC keywords to the screen. Once you've learned the 52-word language, it speeds up writing and entering programs enormously. Now I'm spoiled—I wouldn't want to type in a program without it.

Whenever I type in a program from Gazette, I always use The Automatic Proofreader. It's a handy program that helps me avoid typing errors. These three utilities are compatible with Proofreader, which I enter after the first three are installed. I've found that these utilities, when used with Jim Klitzing's autonumbering utility, make typing Gazette programs almost fun.

Avoid Typos

Whenever I type, I make errors. I do have a couple of ways to avoid the slowdowns caused by typing blunders.

I have two Cardco numeric keypads that I picked up somewhere along the line. Either one will plug into joystick port 2. On one, I pasted data-entry letters over the keys, and on the other I put the MLX keypad letters. I put Cardco's KBASIC program on the work disk, along with the sequential files it lets me create for each of these conversions. The MLX entry pad is a real timesaver, virtually wiping out the typos made by my fumbling fingers. With two keys devoted to commas, the

data entry pad almost eliminates the period-instead-of-comma hangup that plagues many data-statement entries.

Three Computers

Finally, there is Triple 64 by Feeman Ng, from the April 1985 issue of Gazette. This little (seven-line) program divides the 64's memory into three independent 12K sections, each accessible with SYS 40004 followed by the number 1, 2, or 3. Within these sections of memory, different modules of a program can be entered and tested, or three totally different programs can be tried out. It's like having three superfast 12K disk drives at your disposal and not unlike having a RAM disk. I use Hubert Cross's 64 RAMdisk from the Gazette 1988 Special Issue for several purposes, but not for ordinary program-entering or programming sessions.

Triple 64 works with Kwikload and the Klitzing wedge installed. Without that combination, it works with the Fast Load cartridge enabled. In either case, it installs itself where it fits and gives you the correct SYS address to toggle it on and off.

My Way

If you'd like to try out the Gazette program-entry setups, I've found the following combinations work well for me. If

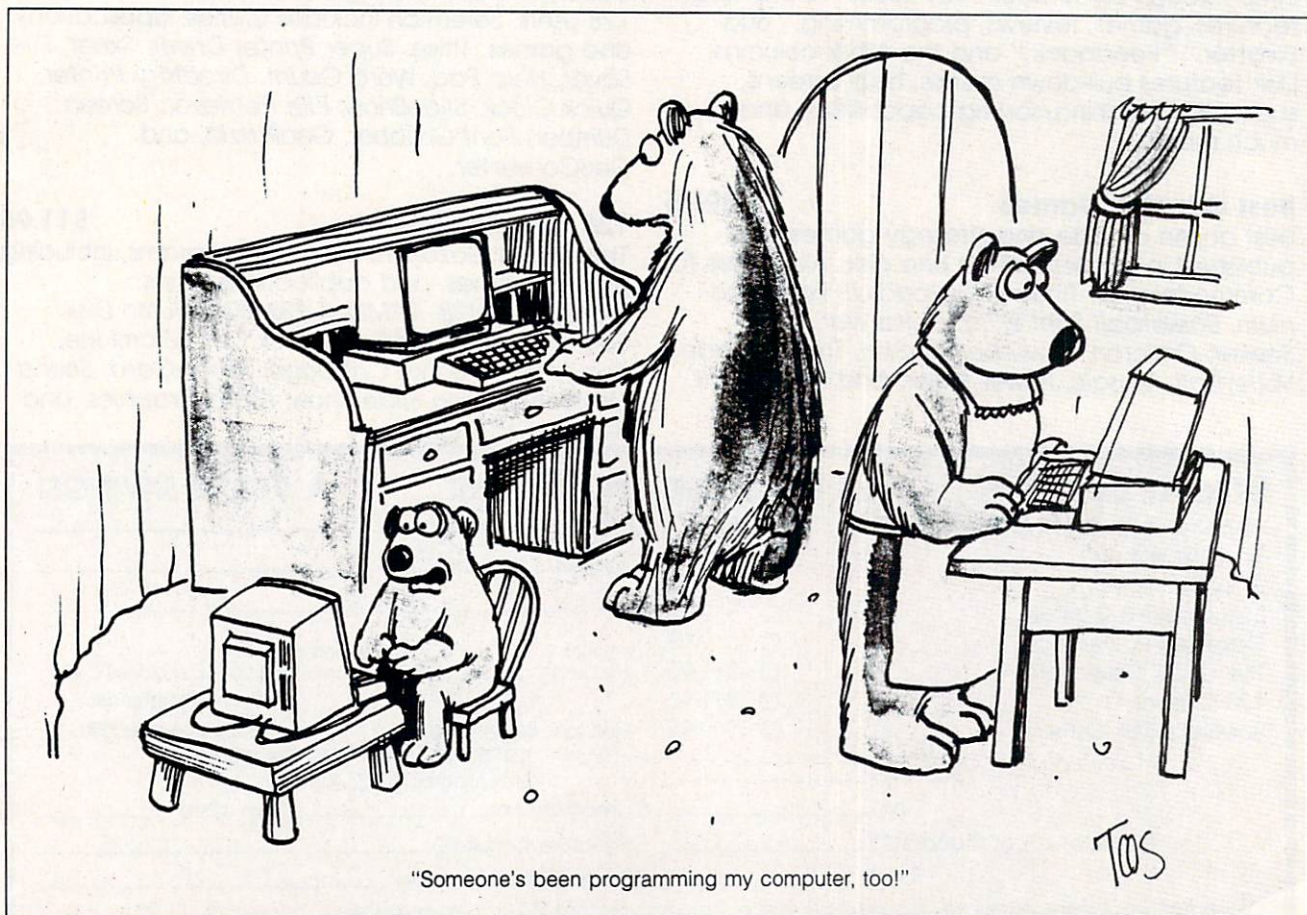
you're going to enter BASIC program listings from the magazine, run Kwikload-1, then Jim Klitzing's wedge, then Keyword, and finally Gazette's Proofreader.

When you want to type in machine language listings using MLX, run Kwikload-1 and then KBASIC (Cardco's keypad software); then call up the keypad modification for MLX; and, finally, load and run MLX itself.

By looking over the collection of programs you've downloaded or typed from Gazette or other magazines, you can probably come up with some gems of your own that you may have overlooked. By combining your most frequently used programs on one disk, you can customize a work disk that will let you work more efficiently.

You may have several work disks on hand, depending on your computer activity at any one time. While my work disk suits my programming needs, a computer artist would have an entirely different set of programs and utilities. Musical programmers, writers, and game designers would have their own customized disks.

So take a look at your files, your user group library, or local BBS offerings and put together your own custom work disk. It will make your computer time much more productive. □



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SUPRA 2400 MODEM

Supra 2400 is an external RS-232 modem that I can recommend. It's been around for several years, long enough for individuals, businesses, and BBSs to shake out any hardware bugs that it might have had.

It's smaller than a Beta videotape, is solidly built, and has eight LEDs that indicate the various modem operations. Supra 2400 is a Hayes-compatible smart modem that supports AT commands, extended & commands, and result codes. It has several internal registers for controlling modem functions. The modem works well with most popular shareware and commercial telecommunications programs, BellTerm, Bobs Term, NovaTerm, and Elite Term being some of the readily available ones.

Supra 2400 is cool running, which certainly adds to its ability to transmit data for long stretches of time without errors. At 2400 bps, transmission is obviously more likely to be affected by phone-line noise than it would at lower baud rates. Supra 2400 uses adaptive equalization and impedance matching like most other modems do and gives you long sessions of error-free transmissions.

Supra 2400 supports several modem tests. A power-on test automatically checks out the modem every time it's turned on. There are also manual and self-running analog and digital loopback tests in which the modem generates and sends signals to itself to check that everything is functioning. One interesting feature of the Supra 2400 is its

nonvolatile memory. Even after the power is turned off, the modem will store one telephone number. While this feature is welcome, it's overshadowed by the fact that many other terminal programs support their own phone directories and store dozens of numbers.



Supra 2400 is a cool-running external modem that can give you long sessions or error-free transmissions.

There's an error in the Supra manual regarding the store feature. The correct command sequence for storing a telephone number is AT&Z= followed by the dial type (T for tone or P for pulse) and the telephone number, as in AT&Z = T5551234. The equal sign character is missing from the documentation in the manual. This supposedly has been corrected by an addendum, but the addendum wasn't included with my modem. However, using the AT&W command for storing any modem settings is a more useful application of the nonvolatile memory. The settings with AT&W load automatically whenever the modem is turned on, which saves you the trouble of having to reach for the manual or the supplied reference card at each session.

I particularly like Supra 2400's power switch. It

used to be that whenever I turned on my computer, my old modem would scream like a cat in heat; now peace reigns with my Supra 2400. If I want to hear a call in progress without insulting my ears, I can control the volume of the modem's speaker via the software. Supra

users. However, a good telecommunications program takes care of the technical aspects of using a modem, and you never need to bother with all those AT and & commands and what registers do. Troubleshooting is very well covered. And the best news is that Supra 2400 has a street price of less than \$100 (cheaper by mail order) and comes with a five-year limited warranty.

RANJAN BOSE

Commodore 64 and 128—\$119.95

SUPRA
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Circle Reader Service Number 341

PANASONIC KX-P2123

Despite the progress made by 9-pin dot-matrix printers in improving their NLQ (Near Letter Quality) fonts, their output just doesn't match the quality of a 24-pin printer. A 24-pin printhead essentially has three offset columns of 8 pins each. By printing each line of characters in a single pass, it not only prints faster than its 9-pin ancestor, it also achieves smoother curves and diagonals on letters such as O, C, V and Y.

The downside is that most 24-pin machines are noisy. That's because they have more pins and they print faster. A typical 9-pin character uses a matrix of 18 x 18 dots, whereas a 24-pin character uses a matrix of 30 x 24 dots and gets printed at roughly twice the 9-pin speed. Most 24-pin printers sound like a dentist's drill and preclude any conversation nearby. Anything that could be done to make them quieter would be appreciated. Enter the new line of

2400 also has its own independent power supply. Now it takes me longer to warm my coffee on my 64's power supply, but I hardly call that an inconvenience!

The Supra company sells an RS-232 interface for the 64 called Peak Modem Interface (\$39.95); any similar interface will work with any RS-232 modem. The least expensive commercial model is the Com-Modem adapter (\$19.95) from Aprotek. You could even build an interface with the help of the designs and descriptions available on most online services. If you want to connect your Supra through the Com-Modem adapter, make sure that you order an RS-232 straight-through DTE cable with male DB25P (25 pins) connectors at both ends.

The documentation for the Supra modem is comprehensive, although somewhat technical in places for some

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REVIEWS

Panasonic machines.

Panasonic printers have always been known for their letter quality (LQ) fonts, and now it's comforting to see that their new product line has been made quieter as well. The new line's latest offering includes the 9-pin KX-P2180, the wide-carriage 24-pin KX-P2624, and the 24-pin KX-P2123. The KX-P2123 should be especially attractive to most Commodore owners.

Not only is the KX-P2123 quieter than earlier models, it also has several new features with hardly any increase in price. The new model has a 14K buffer, compared to 10K on the KX-P1123. The new buffer can hold approximately seven double-spaced pages of text! Adding a Xetec Super Graphics Jr. interface and a LQ speed of 40 characters per second means that your computer will become available about six minutes before the printer spills out the last line.

The earlier Panasonic fonts (Pica, Elite, and Micron in draft quality; Courier, Boldface PS, Prestige, and Script in letter quality) are all there, but some new ones have been added. There are lightweight Roman, medium-dark Sans Serif, and a (slower but darker and sharper) Super Letter Quality Roman font (not available in IBM emulation). For 64 users, resident LQ fonts such as these are vital. Although GEOS offers a variety of fonts, they don't look professional. It's nice to have a printer with a variety of crisp internal LQ fonts.

The printing speed of the KX-P2123 is said to be as fast as that of the KX-P1123, but the real improvement is in the significantly lower noise level. Sound is measured on a log scale and each reduction by 3 dB (decibels) represents a 50-percent reduction in volume. At 8.5 dB quieter than its predecessor, the KX-P2123 is about one-eighth as loud as the KX-P1123. This noise reduction has been achieved by adding thicker and bigger covers, foam blocks, and technology that Panasonic calls Quiet Touch. Panasonic has found that noise is reduced when the pins are fired in a random manner, rather than in the sequential manner used by conventional printers.

The KX-P2123 can load fanfold paper either from the rear (tractor push) or the bottom (tractor pull). Single sheets can be fed from the top, and an optional sheet feeder is available. Single sheets or envelopes can be used after first "parking" the fanfold paper. A "zero-inch tear off" is a convenient paper-saving feature that advances a recently printed sheet of fanfold for tear-

ing and then retracts the blank sheet back to printing position. The KX-P2123 becomes a seven-color printer by adding a relatively inexpensive color cartridge and motor option.

On the negative side, the KX-P2123 retains its predecessor's somewhat convoluted LED matrix front panel for setting a multitude of printer options such as the font, pitch, form length, quiet mode, margins, and macros. It does get easier once you work with it a while, but, initially, keep a bottle of aspirin and the manual handy.

The KX-P2123 emulates Epson LQ860 and IBM Proprinter X24E. GEOS users will be happy to note that the drivers for KX-P1124 (and also for the 24-pin Epson) work with this printer. Programs that allow you to define printer configuration files, such as The Write Stuff, also work with a minor effort. If your program supports only older Commodore printers, however, then you're limited to using the interface-based Commodore fonts that generally don't use the higher resolution of 24-pin printers. The Xetec Super Graphics Jr. (ROM version 1.3 and 1.46) works well in transparent mode as well as in Supergraphix and 1525 emulation modes. For 64 users, the primary advantage of using a 24-pin printer would have to be in text-based applications. You can easily churn out a professional-looking document with a KX-P2123.

Most 64 graphic programs don't exploit the highest density available on 9-pin printers (216 dpi); therefore, they can't use the higher (360 dpi) resolution of 24-pin printers. The 24-pin's finer dot size and arguably better linearity (alignment of dots), however, might improve the appearance of the hardcopy.

Although the nylon ribbons that are universally used by dot-matrix printers are economical and satisfactory, it's a pity that Panasonic and other manufacturers don't produce carbon film ribbons. These would offer a truly high-quality output option for those who want their documents to look their best. A conventional nylon ribbon actually reduces the apparent sharpness of a 24-pin printer. This can be quickly demonstrated if you print a few lines (without the ribbon) through a quality sheet of carbon paper placed over the printer paper.

Never print without the ribbon for more than a few lines, though. In addition to ink, ribbons carry lubricants that help cool the printhead and protect it from damage.

I found that, when using any of the double-pass printing modes, the output is better if the curved clear-plastic top of the removable pull-roller on top of the platen isn't clamped down. This is a gear-driven assembly that normally

pulls the paper and keeps it taut. When locked down, it tends to pull the paper a touch too vigorously, resulting in some characters having a dotted or broken appearance. The pull is gentler, yet adequate, when the curved top is resting on the paper, not down all the way.

Before using the tear-off feature or fan-fold parking or before loading for the first time, remember to set the top-of-form option. The manual neglects to mention this.

One way to reduce noise even further with this printer is to adjust the print-head gap with the supplied lever. The chatter appreciably diminishes as you move the printhead closer to the paper (subject to paper thickness).

If your computer system is used for any text-based application and you need good quality professional printouts but cannot afford or justify the purchase of a laser printer, then the color-upgradable Panasonic KX-P2123 with its two-year warranty is a reliable, efficient, and economical alternative.

RANJAN BOSE

Commodore 64 and 128, printer interface required—\$419.95

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Circle Reader Service Number 342

NOVATERM 9.3

NovaTerm is a powerful and well-designed telecommunications program that works well with Supra 2400 or any other modem. In addition to the 64's standard 40-column display, NovaTerm supports an 80-column ANSI (or VT 52/102) graphics screen. Nitpickers will always find fault with the clarity of an 80-column display on a 64, but at least that option exists. The program is easy to use and provides several protocols, XMODEM (CRC and checksum), YMODEM, Punter, and others, to ensure error-free transmission of data.

NovaTerm has a smallish buffer (8K), but you can automatically direct any buffer overflow to disk. Even if your system is equipped with DOS speed-up utilities, Commodore drives can slow down the data stream if you use large-block (1024 bytes) transfer protocols such as XMODEM 1K or YMODEM. NovaTerm supports RAM expansion units (REU) and can considerably enhance your system's efficiency. If your system doesn't have an REU and the file to be uploaded or downloaded is smaller than 8192 bytes, then the NovaTerm buffer (RAM disk) can be used to achieve the same end. The program works well

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Circle Reader Service Number 181

with JiffyDOS. While a CPU accelerator such as Schnedler System's 4-MHz Turbo Master CPU cannot be expected to increase the actual telecommunications speed (after all, 2400 bps is 2400 bps!), it does reduce the processing time required by the computer. This becomes apparent when you notice the faster scrolling and display. Unfortunately, Turbo Master isn't fully compatible with NovaTerm. YMODEM doesn't work when you're saving a file to the disk with the CPU running at 4 MHz. Saving to a buffer does work, however. XMODEM works well without significant improvement over native 1-MHz mode. Also, during half-duplex transmission, with the modem echoing characters that you type, the characters appear as garbage on your screen, but they're transmitted correctly. This can be confusing, so I'd recommend disabling the cartridge when using NovaTerm.

NovaTerm has the de-

sired complement of file editors and autorun scripts. By using the latter, your computer can go online at a certain time, collect messages, download or send files, and hang up without your having to baby-sit the process!

Aprotek distributes NovaTerm as shareware with its modems. You can also download the program from Aprotek's BBS at (503) 582-1225. Callers can download the documentation and the related files on the first call. NovaTerm is also available on QuantumLink and GENie.

Since this program is shareware, you're invited to try it at no charge. If you decide it's useful, send author Nick Rossi a donation of at least \$20. Version 9.4 should be available by the time this review appears.

RANJAN BOSE

Commodore 64 and 128—\$20 (requested)

NICK ROSSI
427 Avenue J
Snohomish, WA 98290

Circle Reader Service Number 343

BUG-SWATTER

Due to an error that occurred during printing, a portion of the documentation of Revelation (August 1992) was omitted. Here is the missing text, beginning with the third paragraph.

This is only a simple example; the technique opens up myriad possibilities for the programmer. For example, the technique can be extend-

ed to larger, expanded sprites occupying 21 x 21 pixels to reveal larger blocks of text or user-defined characters. Sprites can be used in conjunction to reveal whole sections of the screen display. More complex techniques can be produced by using sprites which aren't completely solid but are patterned or shaped. □



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64 to IBM Format

I have two 64s and two 1541 drives. I have been using them for about three years. During that time, I've built up a large collection of programs and SpeedScript files, which includes hundreds of recipes. Now I've purchased an IBM compatible. What do I need to convert these files so I can use them on my IBM?

CAMERON C. STEELE
SPENCER, IN

The first problem is the one of transferring your 64 files to the IBM. This transfer can be accomplished by using terminal software and modems to upload and download the files to a bulletin board or even to move them directly between the two computers.

If you have access to a 1571 drive, there are several utilities, such as SOGWAP's Big Blue Reader, that will copy a file from a Commodore-type disk and write to an IBM disk.

This process works quite well when transferring text files. Although the 64 uses its own set of characters, PETSCII, as opposed to IBM's ASCII, converting between the two is fairly easy to do. With word processors such as SpeedScript, you can save files as ASCII or convert them with utilities such as Sequential File Converter. Special codes for centering and underlining may be a problem, but these can be stripped out of the text before the file is converted to ASCII.

There's a real problem, however, if you want to convert programs that will actually run on the IBM. BASIC programs are tokenized, which means that keywords such as IF, THEN, and GOTO are represented by a special token, or single byte. When a program is listed, however, the token is converted to the appropriate

word on the screen, so that people reading the listing know what it is. The specific bytes used for indicating keywords are native to the 64, so these tokens must be replaced with their equivalent bytes or the actual set of characters before any transfer can take place.

Utilities that will take BASIC programs and put them into a text form do exist for the 64. Most computers have software available that will take a program in text form and convert it to a BASIC program, including the IBM. Unfortunately, not all BASICs have the same keywords, so there might be a compatibility problem. Only very simple BASIC programs can be converted.

If your 64 program contains POKEs and PEEKs, the addresses are going to mean totally different things on an IBM. Machine language code is definitely nontransferable because the 64 and IBM use different microprocessors with different sets of instructions.

ML Pokes to Screen

How can you make a small machine language program on the 64 that pokes values to the screen from a certain address range?

ROCQUE BEAUPRE
HAMMER, ON
CANADA

Let's say you have the values you want to have transferred residing in memory starting at hex address \$C123 and the target region starting at some other address. What's more, let's say that we have 32 bytes to be moved, a hexadecimal value of #\$20.

The high byte of the source address is \$C1, and the low byte is \$23. We'll symbolize this with source high byte (SHB) and source low byte (SLB). Similarly, we'll symbolize target high byte (THB)

and target low byte (TLB). The following assembler code shows how the transfer is done.

```
LDA #SHB ; source high byte,
           in this case, $C1
STA $FC
LDA #SLB ; source low byte,
           in this case, $23
STA $FB ; $FB,$FC serves
         as a pointer
LDA #THB ; target high byte
STA $FE
LDA #TLB ; target low byte
STA $FD ; $FD,$FE serves
         as a pointer
LDY #$00 ; Y register will
         serve as an offset
LOOP
LDA ($FB),Y ; load accumulator
            with the value at the
            ; address whose
            low byte is stored
            in register
            ; $FB and whose
            high byte is stored
            in register
            ; $FC and offset by
            the value in the Y
            register.
STA ($FD),Y ; load the accumula-
            tor with the value
            at the
            ; address whose
            low byte is stored
            in register
            ; $FD and whose
            high byte is stored
            in register
            ; $FE and offset by
            the value in the Y
            register.
INY ; increment the Y
    register
CPY #$20 ; have all 32 bytes
         been passed?
BNE LOOP ; if not, loop
         through the trans-
         fer again
```

Typing in Hex

Is there a trick or utility that will allow me to use hex addresses instead of decimal when typing POKEs and SYS commands in BASIC? The BASIC interpreter must convert

Questions
and answers about
converting
formats, poking ML
to screen,
typing in hex,
and more

Suggestions about computing languages and ways to show Gazette Gallery art in a slide show

the decimal address to hex or binary, so it should be possible to intervene in this process to handle hex addresses.

G. N. ADAMS
SACKVILLE, NB
CANADA

Your question obviously concerns the 64, since the 128 has functions for converting between decimal and hex.

Indeed, the BASIC interpreter does convert decimal addresses to the computer's own numbering system for its processing, but you can't simply feed it a hex value. Any hexadecimal value you type in must be processed just as a decimal value. After all, it's simply a string of characters when typed, and any string must be processed for meaning. After processing, the final form is in binary (base 2), not hexadecimal (base 16).

We use base 16 when doing assembler programming because it's more convenient for coding. Because 16 is the fourth power of 2, any binary number can be grouped in fours, each four bits receiving one hex digit.

If you want to use hex in your BASIC program, you'll need a subroutine for converting the hex to decimal. Here's one that'll do it.

```
5 REM INITIALIZE
  SUBROUTINE VARIABLES
10 L=LEN(H$): FAC=1:
  MIN=ASC("A"):DV=0
20 FOR X=L TO 1 STEP -1:
  CH=ASC(MID$(H$,X,1))
30 IF CH>=MIN THEN 38
35 V=VAL(MID$(H$,X,1)): GOTO
  40
38 V=CH-MIN+10
40 DV=V*FAC+DV: FAC=FAC*16
50 NEXT: RETURN
```

The hexadecimal number is sent to this subroutine as a string of characters in H\$, and the decimal equivalent is returned as a value in DV.

The subroutine makes use of the additional variables L, FAC, MIN, X, CH, and V.

To use this routine to poke the hex value #20 into hex address \$04EA, for example, you might set up a line of code like the following.

```
5 H$="20":GOSUB 10:
  XX=DV:H$="4EA": GOSUB 10:
  POKE DV,XX
```

Which Language First?

I am interested in becoming a computer programmer. I am 14 years old and in the 9th grade. What languages should I learn, and in what order should I learn them?

JASON SPINETTI
BUTLER, PA

Personal computers all work fundamentally the same way. Information is processed one step at a time. Processing may require looping back through a set of instructions or branching to another part of the program according to some test done upon the data. In this sense, one computer language is like another.

Since the first skill of a programmer is to think like a computer—breaking a problem down into terms the computer can understand—the choice of language isn't really important. It's only later, when your skills become more finely honed and the problems you present the computer with become more elaborate or specialized, that you need to worry about the merits of one language over another.

Probably the easiest language to learn is BASIC. It comes packaged with your computer, and its commands are easy-to-understand English words. People will argue and say that C is best or that they don't use anything but Pascal. Others will claim that to be really effective, machine language is the only answer.

Hogwash. Any language will do for starters, and no language has a monopoly on usefulness. Our advice is to start with BASIC.

Gallery Art

I am a subscriber to the Gazette Disk and really enjoy the Gallery art included each month. Keep it up!

I'd like to display all of the art in a slide-show program, and I noticed that there is a program called Super Slide-show in the May 1989 issue of Gazette. Is it possible to transfer Gallery art to another disk and use Super Slide-show to display it? If so, how do I go about transferring Gallery art?

BOB LYONS
SIMI VALLEY, CA

All of the art that you see on the Gazette Disk is in either Doodle or Koala graphics format. Both of these formats can be displayed by Super Slideshow. (By the way, we need more Gallery submissions; we pay at least \$50 for each one we use.) The only thing that would need to be changed is the name of the Koala-type files. Koala files use a 15-character name (padded with spaces if the name is less than 15 characters). The name's first 7 characters consist of CHR\$(129) (a reversed space), the letters PIC, a space, another letter, and then another space. The filename itself comes after these 7 characters.

The Gallery art viewer, in order to let us use longer filenames, looks only for that initial reversed space, and that's all Gallery art in Koala format has. In order to use Super Slideshow with Gallery art, therefore, the additional characters, PIC, a space, a letter, and another space, are needed. Any file copier will copy the picture files. □

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BEGINNER BASIC

Larry Cotton

WHAT DOES THIS KEY DO?

Back in March 1991, I asked you readers for some help in writing this column. I got lots of suggestions, for which I thank you! This column is in response to one reader who asked that I explain the keys unique to the 64 and 128.

The 64 and 128 are blessed with special keys that other computers don't have. (The 128 also has 26 extra keys, which give it even more functionality.) Some of the 66 keys common to the 64 and 128 have dedicated functions, some seem to work some of the time, and others seem to do absolutely nothing.

As a general statement, all keys are internally hard-wired to do particular things. By clever BASIC programming, however, you can override most of their normal functions until the power is turned off. For instance, in SpeedScript, which I'm using right now, the left-arrow key is programmed to move the cursor to the left, deleting as it moves. Epyx's Fast Load cartridge, however, programs that same key to save a BASIC program.

Those two examples happen to be programmed in machine language, but we can do the same things (albeit more slowly) in BASIC. To do this, we should know two things about each key: its CHR\$ code and its keyboard matrix value. The CHR\$ codes are contained in the computer's manual and other reference guides. The other values can be determined by entering this short program.

```
10 PRINTPEEK(197),PEEK(653)
20 GOTO10
```

When you run it, you'll see two values that represent what's in these memory regis-

ters, depending on which keys are pressed. When no key is pressed, 197 contains 64, and 653 contains 0.

Each key (except Shift, Ctrl, Commodore, and Restore) causes a unique value to appear in 197, based on the keyboard's wiring. If two or more keys are pressed simultaneously, one of the keys will dominate the others. Note that even the Run/Stop key has a value (63), which you can see by holding Shift and pressing the Run/Stop key.

The value in 653 depends on the status of the Shift, Ctrl, and Commodore (C=) keys; the values are additive, as shown below.

Key Pressed	653's Value
Shift	1
C=	2
Shift/C=	3
Ctrl	4
Shift/Ctrl	5
Ctrl/C=	6
Shift/Ctrl/C=	7

Let's write another short BASIC program that illustrates how to put this knowledge to work for us by programming the function keys to change background and text colors.

```
10 PRINTCHR$(147)
20 K=PEEK(197): S=PEEK(653)
30 IFK<30RK>6THEN20
40 IFS=0 THEN ON K-2
   GOTO100,110,120,130
50 IFS=1 THEN ON K-2
   GOTO140,150,160,170
100 C=5: W=0: GOSUB500:
   GOTO20
110 C=6: W=1: GOSUB500:
   GOTO20
120 C=3: W=2: GOSUB500:
   GOTO20
130 C=4: W=3: GOSUB500:
   GOTO20
140 C=7: W=4: GOSUB500:
   GOTO20
150 C=10: W=6: GOSUB500:
   GOTO20
160 C=11: W=5: GOSUB500:
   GOTO20
```

```
170 C=12:W=7: GOSUB500:
   GOTO20
500 POKE53280,C: POKE53281,C:
   POKE646,W
510 PRINT "LIKE THIS COMBI-
   NATION?[UP]": RETURN
```

Line 20 checks memory registers 197 and 653. Since we're looking only for function key activity, we weed out all other keyboard matrix values in line 30. Lines 40 and 50 determine whether the Shift key is pressed or not and then the ON-GOTO statement is used.

```
10 PRINTCHR$(147):POKE646,1
20 BG=53281:BO=53280
30 GETA$:IFA$=" "THEN30
40 V=ASC(A$): IFV<133 ORV>140
   THEN30
50 ONV-132 GOTO100, 110, 120,
   130, 140, 150, 160, 170
60 GOTO30
100 BG=5:BO=0: GOSUB500:
   GOTO30
110 BG=6:BO=1: GOSUB500:
   GOTO30
120 BG=3:BO=2: GOSUB500:
   GOTO30
130 BG=4:BO=3: GOSUB500:
   GOTO30
140 BG=4:BO=8: GOSUB500:
   GOTO30
150 BG=10:BO=6: GOSUB500:
   GOTO30
160 BG=11:BO=5: GOSUB500:
   GOTO30
170 BG=12:BO=7: GOSUB500:
   GOTO30
500 POKE53281,BG:
   POKE53280,BO: PRINT
   "LIKE THIS COMBINA-
   TION?[UP]":RETURN
```

Line 30 waits for a keypress. Line 40 gets the ASCII value of A\$, subtracts 132, and then uses ON-GOTO to choose the appropriate line.

Of course, you'll probably want to do more important things than just change colors with the function keys, but this should give you enough information to get started. Next month we'll look at more unique keys. □

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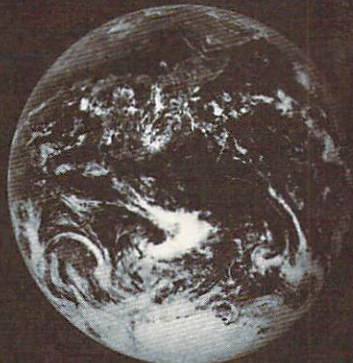
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MACHINE LANGUAGE

Jim Butterfield

SMOOTH SCROLLING

Pixel scrolling seems simple. Experimental POKEs on a 64 to address 53265 or 53270 (hexadecimal D011 or D016) will show how the screen may be shifted one pixel.

The tough part comes when you reach the limit of a pixel register, which goes from 0 to 7. At that time, you must move every one of the characters onscreen to a new location and then reset the pixel count.

So, can we move 1000 bytes in less than 1/60 second? Practically speaking, it can't be done, not even at the blinding speed of machine language. And if we are working with a high-resolution screen, we need to move 8000 bytes. So many bytes, so little time. It's out of the question.

There is a way around it, though: double buffering. Here's how it works. We have two screen areas set up in memory. One screen is being displayed, and the other is being constructed. When the second screen is complete, we tell the video chip to switch its attention to the new location. It now becomes the "real" screen, and we can start to build a new display in the former screen-memory area.

It still takes time to do this, but the switch won't take place until the new screen is completely built. Both pixel scrolling and the screen switch benefit from careful timing. We must pull the switch during retrace to ensure that there will be no flicker or screen jump.

The following is a simple smooth-scroll program for the 64 that demonstrates this technique. The code is stored in the cassette buffer memory area. Because of its size, we'll focus our attention on selected

parts of the program. You may enter the BASIC program, run it, and then disassemble the machine language code if you want to see details.

Our two screen buffers are located at 32768 and 33792, hexadecimal 8000 and 8400. We build the new screen by copying characters from the other, active, screen. The direction of our scroll is up, so we drop the first 40 characters from the old screen, copy the rest, and then fill the bottom line of the new screen with space characters.

The program uses two indirect addresses to do this copying: \$26/27 holds the "from" pointer, and \$28/29 the "to" pointer. As we flip between the two screens, the two pointers are set appropriately.

The first thing the program must do is copy the screen. That occupies code from \$033C to \$037E. A short loop follows to pad the bottom line with space characters.

At \$038A, we walk the old screen through its pixel scroll. Since we're scrolling in the up direction, our objective is to step the Y pointer from 7 down to 0. That pointer is stored in the video register at \$D011, which also contains the video-enable signal as bit 4. So the value that we stuff into that register will step from \$17 down to \$10; we hold this value in the X register.

Before each pixel scroll, we wait for a screen retrace. We do this by watching that same register, \$D011. Its two highest bits tell us about the raster. When the value of those two bits goes down, it's retrace time.

In fact, we wait for six retrace events. We don't want our pixel scroll to be too fast, or the user might miss it. Each retrace happens in about 1/60 second, so a loop of six retraces will slow our pixel movement to 10 per second.

; scroll seven pixel positions

038A LDX #\$17

; wait about 1/10 second

038C LDY #\$05

; wait for screen retrace

038E LDA

\$D011

0391 AND

#\$C0

0393 CMP

\$03D0

0396 STA

\$03D0

0399 BCS

\$038E

039B DEY

039C BPL

\$038E

; do pixel scroll

; set up

next

039E STX \$D011

03A1 DEX

03A2 CPX #\$10

03A4 BCS \$038C

Now the pixel scroll has reached its limit. Our screen characters are set; we simply flip to the new screen. We must also return the pixel counter to its highest value. Moving the characters is the equivalent of eight bits of scrolling, so we back off seven bits to produce a net one-bit scroll.

03A6 LDX #\$17

03A8 LDA \$D018

03AB EOR #\$10

03AD STA \$D018

03BD STX \$D011

The above coding puts the two store instructions close together to minimize possible screen jump. In fact, we're quite safe, since all this is being done in retrace time.

A small amount of extra coding is added. Its purpose is to reposition the cursor so that the next time we print, the information will go to the new screen and be printed at the appropriate place. This involves storing a new value in address \$0288. The Kernal

Use a double buffer to produce extremely fine scrolling on your 64's screen.

routines use this address to find the screen.

The program code shows a character screen moving in one direction only. Once you understand the principles involved, you can take on more ambitious jobs.

```

BX 100 DATA 169,40,133,3
      8,169,0,133,40,16
      2,128,160,132,134
      ,39,132,41,169,16
HP 110 DATA 44,24,208,24
      0,4,134,41,132,39
      ,162,0,160,0,177,
      38,145,40,200,192
      ,40
DC 120 DATA 144,247,24,1
      65,38,105,40,133,
      38,144,2,230,39,2
      4,165,40,105,40,1
      33,40
FM 130 DATA 144,2,230,41
      ,232,224,24,144,2
      18,169,32,160,0,1
      45,40,200,192,40
SF 140 DATA 144,249,162,
      23,160,5,173,17,2
      08,41,192,205,208
      ,3,141,208,3,176,
      243
EQ 150 DATA 136,16,240,1
      42,17,208,202,224
      ,16,176,230,162,2
      3,173,24,208,73
AB 160 DATA 16,141,24,20
      8,142,17,208,173,
      136,2,73,4,141,13
      6,2,169,145,32,21
      0,255
XS 170 DATA 169,13,76,21
      0,255
EB 200 FOR J=828 TO 964
DP 210 READ X
CG 220 T=T+X
FQ 230 POKE J,X
QF 240 NEXT J
MJ 250 IF T<>15776 THEN
      {SPACE}STOP
BD 280 POKE 55,0:POKE 56
      ,128:CLR
DX 300 POKE 53265,23
MG 310 POKE 56576,5
XB 320 POKE 53272,4
KH 330 POKE 648,128
KD 340 PRINT CHR$(147)
JE 350 FOR J=1 TO 22
CS 360 PRINT
PS 370 NEXT J
HK 380 PRINT "THIS IS AN

```

```

      EXAMPLE";
MQ 390 SYS 828
FA 400 PRINT "OF PIXEL S
      CROLLING";
HQ 410 SYS 828
AJ 420 PRINT "WITH DOUBL
      E BUFFERING";
XS 430 SYS 828
FF 440 PRINT "I HOPE YOU
      LIKE IT";
HX 450 SYS 828
DS 460 FOR J=1 TO 1000:N
      EXT J
ER 800 POKE 648,4
GJ 810 PRINT "END!"
JM 820 POKE 53272,20
FJ 830 POKE 56576,7
DF 840 POKE 53265,27
BD 850 REM NEXT POKE OPT
      IONAL
KA 860 POKE 55,0:POKE 56
      ,160:CLR

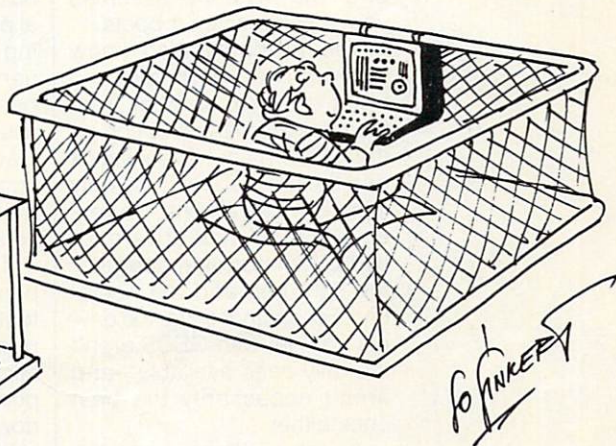
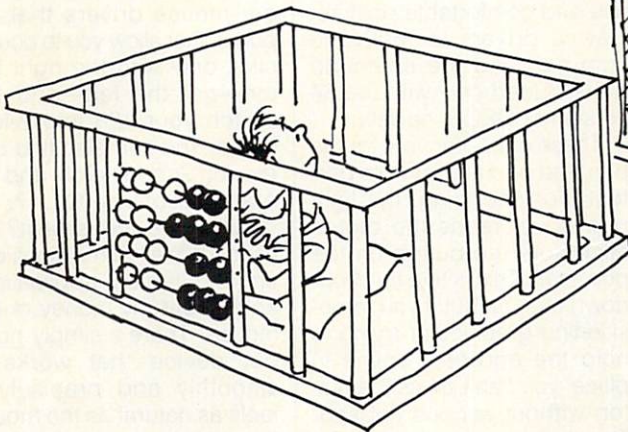
```

TYPING AIDS

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

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

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



GEOS

Steve Vander Ark

POINTERS AND DRIVERS

A graphical user interface (GUI) such as GEOS handles routine commands with a pointer on the screen, which makes the computer a friendly place to work and play. Just point and click, and the computer leaps into action.

There has to be a link, however, between your thinking and the computer's high-powered magic. You need some way to move the pointer on the screen, some gadget that will translate your actions into electrical impulses the computer can understand. GEOS refers to these gadgets as input devices; you most likely refer to them as a mouse and joystick.

In order for GEOS to know how to interpret the signals from the device you're using, you need to provide it with a small bit of code called an input driver. You probably know that the input driver you install on your boot disk will be the one the system assumes you're using when it boots.

You probably also know that you can switch from one input driver to another from the deskTop with an option on the GEOS menu. The joystick and the mouse aren't the only input devices around, however. GEOS 64 has drivers for two other popular gadgets: the light pen and the KoalaPad. For another thing, the drivers you get with GEOS aren't the only ones available—and aren't necessarily the best ones either.

As far as devices go, the best known are the mouse, the joystick, the Inkwell light pen, and the KoalaPad graphics tablet. Each device has its strong points.

The joystick is particularly well suited for games. Also, the Suncom Icontroller, a small joystick that attaches to

the side of your 128 or 64, lets you keep your hands near the keyboard while working; this is handy while using geoWrite.

The mouse is perhaps the most versatile of the bunch; its proportional movement (in other words, the fact that it speeds up as it moves) makes it superior for maneuvering around the GEOS screen. Since the mouse is held roughly the same way a pen or pencil is held—in one hand and moved about on a flat surface—it's very easy to use for graphics in geoPaint or for object placement in geoPublish.

If a natural drawing posture is what you're after, though, the light pen is a logical choice. You hold it like a pen, obviously, and actually draw on the screen with it. For some drawing tasks, the light pen is perfect. Freehand artwork using the spline tool in geoPublish is a good example. On the downside, you have to hold your hand up to the screen all the while.

With the KoalaPad, you hold the stylus exactly like a real pen. Since you hold the writing surface with your other hand, this device gives the best combination of intuitive use and comfortable posture. Device drivers for both the light pen and the KoalaPad are included only with the 64 version of GEOS, however.

These official drivers for the pen and pad are far from perfect. For one thing, the light pen driver reads the button click from the button on the pen itself. This is fine for drop-down menus, but if you're positioning graphics or trying to hold the end of a spline in place, you can't press the button without serious jiggling. This makes using the pen for graphics virtually impossible.

Q-Link has a solution in the form of an alternate driver called PenJoy (filename: PENJOY, uploaded by Mystic

Jim). Instead of reading the button on the pen, PenJoy reads the button of a joystick plugged into port 2. Even with the best of alternative drivers, though, the response of the pen to the screen in GEOS is poor. The pen frequently misreads the screen, which in geoPaint results in stray and scribbly lines.

The problem with the KoalaPad driver is that it translates the position of your pen on the pad literally to a position on the screen. If you don't have the pointer "attached" to your pen position, such as when a drop-down menu opens and the pointer is arbitrarily placed on the first choice, you have to scratch around trying to snag the arrow's position with your stylus. Chances are you'll miss it or accidentally move it away from where you wanted it. The precision with which you can move the pointer is less than exact as well.

A new KoalaPad driver available on Q-Link addresses these problems; its filename is KOALA PAD III, uploaded by SYSOP PH).

There are input drivers available on Q-Link for the mouse and joystick as well. You can get mouse drivers that use port 2, that allow you to double-click only with the right button—not the left—and that switch your 128 into 2-MHz mode. You can also find drivers for Supersketch and the Atari trackball on Q-Link.

Which device is best? I've used them all with various drivers and in most applications, and I'll put my money on the mouse. There's simply no input device that works as smoothly and precisely or feels as natural as the mouse. It works better for freehand drawing than either the light pen or the KoalaPad, and it scoots you around the desk-top more quickly and efficiently than the joystick. □

For GEOS to interpret the signals from your input device, you need to provide it with a bit of code called an input driver.

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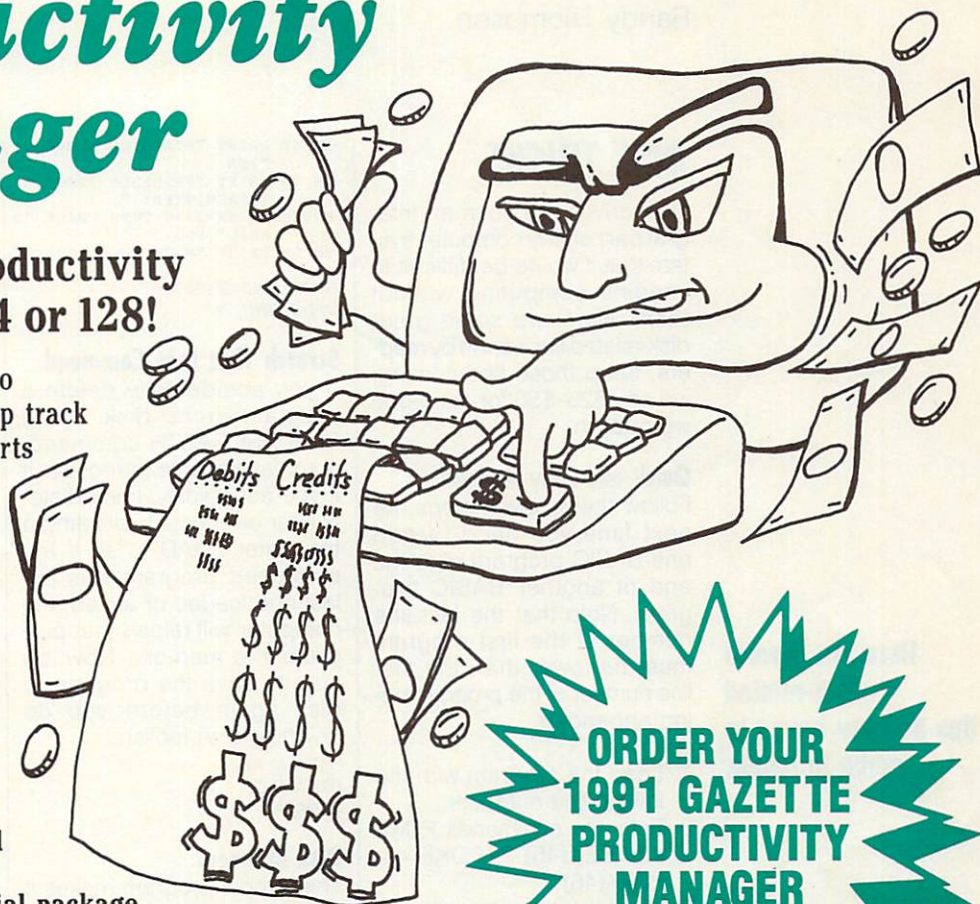
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PROGRAMMER'S PAGE

Randy Thompson

DISK TRICKS

Disk drives are such an integral part of any computer system that it would be difficult to imagine computing without them. Here are some great disk-related tips sent in by readers. Keep those tips coming; we pay \$25-\$50 for each one we publish.

Quick and Easy Append

Follow these seven steps the next time you need to add one BASIC program onto the end of another BASIC program. Note that the last line number of the first program must be lower than the first line number of the program being appended.

1. Load the program with the lowest line numbers.
2. Enter the commands POKE 43,PEEK(45)-2: POKE 44,PEEK(46)
3. Load the program with the highest line numbers.
4. Enter the commands POKE 43,1: POKE 44,8
5. Enter LIST to check your new, larger program.
6. If you get an OVERFLOW error message, enter a do-nothing line, such as 0 REM
7. Save your new program.

HELEN ROTH
LOS ANGELES, CA

What's Your Address?

The following program asks for the filename of a machine language program and then tells you where that program loads into memory. This is important information when you forget a program's SYS address because the address in which a program loads is usually its SYS address, too.

```
RB 10 INPUT "FILENAME";FS
RA 20 OPEN 8,8,8,FS+"",P,R"
SC 30 GET#8,LB$,HB$
QR 40 CLOSE 8
KH 50 HB=ASC(HB$+CHR$(0)):LB=A
SC(LB$+CHR$(0)):SA=HB*25
6+LB
```

```
JA 60 PRINT "STARTING ADDRESS:
";SA
QH 70 PRINT "PROBABLE PROGRAM
{SPACE}TYPE: ";
FS 80 IF SA=2049 THEN PRINT "B
ASIC":END
SM 90 PRINT "MACHINE LANGUAGE"
```

JOHN L. BERGERSHIRE
MANSTOWN, PA

Scratch That Last Command

If you accidentally delete a program from disk using DOS's SCRATCH command, you may be able to recover it if you act quickly. Immediately after erroneously deleting a file, enter LOAD "***",8. If the scratched program was the last one loaded or saved, the computer will reload that program into memory. Now, be sure to save the program to disk again before you do anything else foolish.

ROB MAXWELL
DELTA, B.C.
CANADA

Disk Manager

This simple program makes it easier to format disks and rename and delete files. Choose the desired menu option and answer the prompts.

```
KP 10 PRINT "{CLR}{RVS}
{6 SPACES}DISK MANAGER -
BRAD SCHULTZ{7 SPACES}"
:PRINT:PRINT
KK 20 PRINT:PRINT "{2 SPACES}
{RVS}1{OFF} RENAME FILE"
GH 30 PRINT:PRINT "{2 SPACES}
{RVS}2{OFF} DELETE FILE"
GS 40 PRINT:PRINT "{2 SPACES}
{RVS}3{OFF} FORMAT DISK"
GJ 50 PRINT:PRINT "{2 SPACES}
{RVS}4{OFF} EXIT PROGRAM
"
KS 60 PRINT:PRINT "ENTER YOUR
{SPACE}CHOICE: ";
SS 70 GET K$:IF K$<"1" OR K$>
4" THEN 70
JJ 80 PRINT K$:PRINT:PRINT:ON
{SPACE}VAL(K$) GOSUB 100
,200,300,400
AF 90 GOTO 10
PF 100 REM RENAME FILE
MJ 110 INPUT "OLD FILENAME";OF
$:IF OF$="" GOTO 160
FG 120 INPUT "NEW FILENAME";NF
$:IF NF$="" GOTO 160
MD 130 OPEN 15,8,15
XF 140 PRINT#15,"R0:";NF$;"=";
OF$
FF 150 CLOSE 15
KA 160 RETURN
FQ 200 REM DELETE FILE
MS 210 INPUT "DELETE WHICH FIL
E";DF$:IF DF$="" GOTO 2
50
BK 220 OPEN 15,8,15
DE 230 PRINT#15,"S0:";DF$
MP 240 CLOSE 15
```

```
SG 250 RETURN
GK 300 REM FORMAT DISK
PC 310 INPUT "DISK NAME";DNS:I
F DNS="" GOTO 370
CH 320 PRINT "PLACE DISK TO BE
FORMATTED INTO DRIVE 8
AND PRESS A KEY"
XA 330 GET K$:IF K$="" GOTO 33
0
PB 340 OPEN 15,8,15
XM 350 PRINT#15,"N0:";DNS;"",BS
"
SD 360 CLOSE 15
DR 370 RETURN
KS 400 REM EXIT PROGRAM
DR 410 PRINT "{CLR}":END
```

BRAD SCHULTZ
APPLETON, WI

Quick-Load Classic

Here's a classic load-and-run tip that's been around the disk block a few times, but it's so useful it bears repeating. Instead of entering a LOAD command, waiting for the designated program to load, and then typing RUN, try typing LOAD "program",8: and then pressing Shift-Run/Stop. As soon as you do, LOAD appears on the screen, and your program automatically loads and runs. You don't even have to press the Return key.

KEVIN REEVES
GROTON, CT

Vital Statistics

The BASIC code listed below allows you to determine a disk's vital statistics. You can determine the disk's name, ID, and number of free and used disk blocks from within a program without listing the disk's entire directory. The entire process takes three seconds or less.

```
FJ 10 SYS 57812"S0",8,0:POKE 7
80,0:POKE 781,0:POKE 782
,207:SYS 65493
SM 20 BF=PEEK(53025)*256+PEEK(
53024):BU=664-BF
EB 30 SS=52998:FS$=""GOSUB 10
0:DNS=FS$
KX 40 IDS=CHR$(PEEK(53016))+CH
R$(PEEK(53017))
DH 50 PRINT "DISK NAME: ";DNS
DE 60 PRINT "DISK ID: ";IDS
XJ 70 PRINT "BLOCKS USED:";BU
MD 80 PRINT "BLOCKS FREE:";BF
ME 90 END
HF 100 SC=PEEK(SS):IF SC=160 0
R SC=34 THEN RETURN
RD 110 FS$=FS$+CHR$(SC):SS=SS+
1:GOTO 100
```

CAMERON KAISER
LA MESA, CA

PROGRAMS

DRIXELLA'S DILEMMA

By Arthur Moore

Drixella's Dilemma is a game with deceptively simple rules, but it's a game that requires strategic planning. It's played on a 64 with one joystick.

The evil witch Drixella has taken you hostage. All is not lost, however; she dangles before you one chance for freedom. "Here you will remain," she shouts with a booming voice, "until you solve the puzzle!" The door slams shut, and her chilling laughter fades into silence.

You notice a clay board in a corner that consists of 96 squares, 12 across and 8 vertical. Nearby are a scroll and small velvet pouch. Opening the scroll, you see faint writing. You begin to read.

"Herein are 72 tiles that have been painted six different colors. On them are six different icons that represent the realm of witchcraft: broom, cauldron, beetle, black cat, crow, and Drixella's hat.

"Your goal is to place all 72 tiles on the playing board. The first 6 have been placed for you. To complete the task, you must follow these five rules.

- "1. Tiles are taken out one at a time.
- "2. To play a tile, you must place it next to an occupied square. Diagonals aren't included.
- "3. Surrounding tiles must match the played tile in either color or icon.
- "4. If a played tile touches more than one other, the matches must balance. If two tiles are adjacent, one must match by color and the other by icon. If three should border, two must have the same color or icon, and the other must match in icon or color. If four should border, then there must be two color matches and two icon matches.
- "5. You must play a tile before the timer runs out. After each play, the timer will be reset and will run a bit faster."

"Simple enough," you say to yourself. "I'll just play all the tiles, and I'll go free!" Little do you realize that this is the first of many days that you'll spend pondering Drixella's Dilemma.

Entering the Program

Drixella's Dilemma is written entirely in machine language. To enter it, use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX prompts, re-

spond with the following values.

Starting address: 0801

Ending address: 1608

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

Taking Control

Use a joystick in port 2 to play. Move the flashing cursor to the desired square and press the button to put the tile at the right on the playing board. A buzz indicates an illegal move, and the explanation will be highlighted below. Your timer ticks down at the left of the board. Scoring is based upon the number of adjacent tiles. One adjacent tile earns 10 points, two tiles earn 30 points, three tiles earn 90 points, and four tiles earn 200 points.

The plus sign (+) beneath your score counts the number of four-way combinations you have completed. These are tiles with all four adjacent squares occupied at the time of playing. These mark the gauge of a true champion.

Practice, Practice

At the title screen, you have the option of playing either a scored game as described above or a no-pressure practice game. In the latter mode, a timer won't be used, allowing you time to concentrate on every move. Score isn't tallied in practice.

You also have an undo key in practice mode. By pressing f1, you can take back your previous move. All moves are recorded, so you may undo as many as you wish. Of course, this action is frowned upon, and your computer will taunt a bit. In a practice game, you simply make as many moves as you can.

During actual play, the game will end should the timer run out before you make a move. Pressing f7 while playing either mode will return you to the title screen.

Hints

Go for points early. Look for moves that border more than one tile. This will free up moves when the board fills and moves become scarce.

Don't group too many of the same color in one area. Likewise, don't

group too many of the same icon in one area. This will make it difficult to make moves with multiple borders.

DRIXELLA'S DILEMMA

```

0801:0C 08 C8 07 9E 20 32 30 AC
0809:36 33 00 00 00 00 20 8D CE
0811:10 20 F1 08 20 0B 0A A9 DA
0819:A4 85 FB 85 FD A9 04 85 D8
0821:FC A9 D8 85 FE 20 C9 0A A3
0829:A9 6E 8D 54 15 A9 00 8D 7D
0831:8A 02 8D 59 15 8D 58 15 F2
0839:AD 0E 16 C9 48 D0 03 4C DA
0841:10 10 20 14 0C AD 53 15 75
0849:F0 06 20 37 0F CE 54 15 3C
0851:EE 27 D0 AD 53 15 F0 0B 73
0859:20 4F 0F AD 55 15 F0 03 ED
0861:4C F6 0F AE 54 15 A0 FF 5A
0869:88 D0 FD CA D0 F8 AD 00 24
0871:DC 29 0F 49 0F D0 34 20 F4
0879:E4 FF C9 88 F0 90 C9 85 A0
0881:D0 12 AD 53 15 D0 0D 4C BB
0889:11 0E A9 13 20 D2 FF A9 02
0891:00 85 C6 60 AD 00 DC 29 32
0899:10 D0 B5 20 32 0C AD 16 D1
08A1:16 30 AD F0 93 20 7B 0F B0
08A9:4C 51 08 C9 01 F0 19 C9 99
08B1:02 F0 22 C9 04 F0 2B C9 E3
08B9:08 D0 95 AD 0A 16 C9 0C D7
08C1:F0 8E 20 9C 0B 4C 51 08 EF
08C9:AD 0B 16 C9 01 F0 81 20 C1
08D1:F5 0B 4C 51 08 AD 0B 16 61
08D9:C9 08 F0 10 20 D6 0B 4C AE
08E1:51 08 AD 0A 16 C9 01 F0 BD
08E9:03 20 B7 0B 4C 51 08 60 43
08F1:AD 11 D0 29 EF 8D 11 D0 72
08F9:A2 3F BD B4 13 9D C0 37 F5
0901:A9 FF 9D 80 03 BD F3 13 AD
0909:9D 40 03 BD 33 14 9D C0 1C
0911:02 CA 10 E6 A2 07 BD 73 67
0919:14 9D F8 07 BD 7B 14 9D CD
0921:27 D0 CA 10 F1 A2 0F BD 4B
0929:83 14 9D 00 D0 CA 10 F7 7F
0931:A2 FF AD 53 15 D0 02 A2 12
0939:1F 8E 15 D0 A2 06 8E 17 8F
0941:D0 8E 1B D0 8E 10 D0 A9 CF
0949:7F 8D 0D DC A5 01 29 FB 6D
0951:85 01 A9 00 85 F9 85 FB B6
0959:85 FD A9 D0 85 FA A9 E0 3C
0961:85 FC A9 38 85 FE A5 FB 9D
0969:38 E5 F9 A8 A5 FC E5 FA C2
0971:AA A5 FA C5 FE 90 08 D0 19
0979:30 A5 F9 C5 FD B0 2A 8A 3A
0981:18 65 FE 85 FE 98 28 E5 E1
0989:FB F0 09 90 02 C6 FC 49 6E
0991:FF 18 69 01 85 FB E8 B1 86
0999:FB 91 FD 88 C0 FF D0 F7 F5
09A1:C6 FC C6 FE CA D0 F0 08 8B
09A9:2A 98 18 65 F9 85 F9 B0 DA
09B1:02 C6 FA 98 18 65 FD 85 37
09B9:FD B0 02 C6 FE E8 98 49 B9
09C1:FF A8 C8 F0 07 B1 F9 91 AA
09C9:FD C8 D0 F9 E6 FE E6 FA C2
09D1:CA D0 F2 A5 01 09 04 85 EF
09D9:01 A9 81 8D 0D C2 A2 5F 60
09E1:BD 93 14 9D 08 3A BD F3 AC
09E9:14 9D 08 3B CA 10 F1 A9 46
09F1:FE A2 07 9D 38 3F E0 07 6E

```

PROGRAMS

```

09F9:F0 03 9D D0 3F CA 10 F3 3F
0A01:E8 8E D7 3F A9 1F 8D 18 19
0A09:D0 60 A9 0F 85 B5 A9 01 1B
0A11:8D 0A 16 8D 0B 16 A9 93 A1
0A19:20 D2 FF A9 0D A2 04 20 A7
0A21:D2 FF CA D0 FA A9 00 8D 11
0A29:20 D0 8D 21 D0 8D 0E 16 34
0A31:20 AC 0A A9 04 8D 86 02 C1
0A39:A2 0C 20 B7 0A CA D0 FA 39
0A41:A9 0D 20 D2 FF 20 D2 FF C4
0A49:A0 06 20 AC 0A A9 04 8D 8A
0A51:86 02 20 B7 0A A9 07 8D 3B
0A59:86 02 A2 0A 20 B7 0A CA E4
0A61:D0 FA A9 04 8D 86 02 20 BC
0A69:B7 0A A9 0D 20 D2 FF 20 4E
0A71:D2 FF 88 D0 D5 20 AC 0A 9F
0A79:A9 04 8D 86 02 A2 0C 20 50
0A81:B7 0A CA D0 FA AD 11 D0 DB
0A89:09 10 8D 11 D0 A9 FC A0 B0
0A91:12 20 1E AB A9 BD A0 12 CC
0A99:20 1E AB A2 15 A0 06 18 34
0AA1:20 F0 FF A9 6B A0 13 20 C0
0AA9:1E AB 60 A2 04 A9 20 20 15
0AB1:D2 FF CA D0 FA 60 48 8A 0A
0AB9:48 98 48 A9 F1 A0 12 20 12
0AC1:1E AB 68 A8 68 AA 68 60 86
0AC9:A9 80 A2 8C CA 9D A7 16 22
0AD1:D0 FA A2 47 A9 06 38 E9 95
0AD9:01 A0 0C 9D 17 16 CA 30 C8
0AE1:05 88 D0 F7 10 F0 A2 47 05
0AE9:A0 05 98 0A 0A 0A 1D EC
0AF1:17 16 9D 17 16 CA 30 05 7D
0AF9:88 10 EF 30 EB A2 05 A0 EB
0B01:0D BD 17 16 48 B9 17 16 BE
0B09:9D 17 16 68 99 17 16 9E EA
0B11:18 69 0D A8 CA D0 EA A2 CB
0B19:FF 86 02 20 E1 0C A2 0B A2
0B21:20 9C 0B CA D0 FA 20 E1 11
0B29:0C A2 07 20 D6 0B CA D0 1A
0B31:FA 20 E1 0C A2 0B 20 B7 03
0B39:0B CA D0 FA 20 E1 0C A2 94
0B41:04 20 F5 0B CA D0 FA A2 03
0B49:05 20 9C 0B CA D0 FA 20 DD
0B51:E1 0C 20 9C 0B 20 D6 0B BA
0B59:20 E1 0C 20 F5 0B A2 04 A0
0B61:A0 1E 18 20 F0 FF A0 15 32
0B69:A9 6B 20 1E AB E6 02 A9 BB
0B71:80 8D 18 D4 8D 0E D4 8D 57
0B79:0F D4 8D 12 D4 A2 41 AD 80
0B81:1B D4 29 7F C9 41 B0 F7 24
0B89:A8 B9 1D 16 48 BD 1D 16 F0
0B91:99 1D 16 68 9D 1D 16 CA 5D
0B99:10 E5 60 EE 0A 16 E6 FB 9E
0BA1:D0 02 E6 FC E6 FB D0 02 18
0BA9:E6 FC E6 B5 AD 00 D0 18 D1
0BB1:69 10 8D 00 D0 60 CE 0A E1
0BB9:16 A5 FB D0 02 C6 FC C6 BC
0BC1:FB A5 FB D0 02 C6 FC C6 B7
0BC9:FB C6 B5 AD 00 D0 38 E9 BE
0BD1:10 8D 00 D0 60 EE 0B 16 4B
0BD9:A5 FB 18 69 50 85 FB 90 7C
0BE1:02 E6 FC A5 B5 18 69 0E 9B
0BE9:85 B5 AD 01 D0 18 69 10 BF
0BF1:8D 01 D0 60 CE 0B 16 A5 A3
0BF9:FB 38 E9 50 85 FB B0 02 DD
0C01:C6 FC A5 B5 38 E9 0E 85 D6
0C09:B5 AD 01 D0 38 E9 10 8D AB
0C11:01 D0 60 A5 FB 48 A5 FC 8D
0C19:48 A9 00 85 FB A9 06 85 30
0C21:FC AE 0E 16 BD 17 16 20 1D
0C29:90 0D 68 85 FC 68 85 FB C2
0C31:60 A9 FF 8D 16 16 A4 B5 C4
0C39:B9 A7 16 30 01 60 EE 16 5B
0C41:16 AC 0E 16 B9 17 16 48 51
0C49:29 0F 8D 10 16 68 29 F0 02
0C51:8D 0F 16 A9 04 8D 11 16 DF
0C59:A9 00 8D 13 16 8D 14 16 4E
0C61:A4 B5 B9 A8 16 20 D1 0D DC
0C69:B9 A6 16 20 D1 0D B9 B5 B8
0C71:16 20 D1 0D B9 99 16 20 28
0C79:D1 0D AD 11 16 D0 06 A9 2E
0C81:01 8D 16 16 60 AD 14 16 99
0C89:CD 13 16 D0 0A C9 00 D0 65
0C91:4F A9 02 8D 16 16 60 AD 4C
0C99:11 16 C9 03 D0 22 AD 13 A6
0CA1:16 C9 03 D0 0A AD 14 16 E9
0CA9:C9 01 D0 14 4C E1 0C AD F1
0CB1:14 16 C9 03 D0 0A AD 13 DF
0CB9:16 C9 01 D0 03 4C E1 0C 95
0CC1:AD 14 16 CD 13 16 90 07 6E
0CC9:38 ED 13 16 4C D7 0C AD C4
0CD1:13 16 38 ED 14 16 C9 01 6C
0CD9:F0 06 A9 03 8D 16 16 60 A2
0CE1:AD 53 15 F0 28 AE 11 16 8B
0CE9:18 BD 66 15 6D 59 15 8D 24
0CF1:59 15 90 03 EE 58 15 A0 E1
0CF9:1E A2 04 18 20 F0 FF A9 3A
0D01:01 8D 86 02 AD 58 15 AE 97
0D09:59 15 20 CD BD AE 0E 16 D0
0D11:A5 B5 9D 5F 16 A8 BD 17 FA
0D19:16 99 A7 16 20 90 0D EE 47
0D21:0E 16 A5 02 30 3F A9 0E 7D
0D29:8D 18 D4 A9 64 8D 00 D4 73
0D31:8D 05 D4 A9 32 8D 01 D4 27
0D39:A9 24 8D 06 D4 A9 21 8D 60
0D41:04 D4 A2 32 A0 00 88 D0 F0
0D49:FD CA D0 FA A9 10 8D 04 8B
0D51:D4 A2 32 A0 00 88 D0 FD 90
0D59:CA D0 FA AD 11 16 C9 04 BF
0D61:D0 03 20 9E 0E A9 01 8D 39
0D69:86 02 A9 18 20 D2 FF A0 3A
0D71:20 A2 12 10 20 F0 FF A9 76
0D79:48 38 ED 0E 16 C9 0A B0 01
0D81:07 48 A9 30 20 D2 FF 68 1E
0D89:AA A9 00 20 CD BD 60 A0 2C
0D91:06 48 29 0F 0A 18 69 41 98
0D99:91 FB 69 01 C8 91 FB A0 DD
0DA1:28 69 1F 91 FB 69 01 C8 77
0DA9:91 FB A5 FB 85 FD A5 FC 6C
0DB1:18 69 D4 85 FE 68 29 F0 02
0DB9:4A 4A 4A AA BD B7 12 47
0DC1:A0 00 91 FD A0 28 91 FD 05
0DC9:C8 91 FD A0 01 91 FD 60 21
0DD1:10 06 CE 11 16 4C 10 0E 70
0DD9:8D 15 16 29 F0 48 A9 00 51
0DE1:8D 12 16 68 CD 0F 16 D0 38
0DE9:06 EE 13 16 EE 12 16 AD 20
0DF1:15 16 29 0F CD 10 16 D0 DD
0DF9:06 EE 14 16 EE 12 16 48 EA
0E01:AD 12 16 D0 09 68 68 68 6B
0E09:A9 02 8D 16 16 60 68 60 FE
0E11:AE 0E 16 E0 06 D0 03 4C 9E
0E19:51 08 CA 8E 0E 16 BD 5F C5
0E21:16 A8 A9 80 99 A7 16 98 DF
0E29:A2 07 8E 86 02 C9 1D 90 94
0E31:15 C9 6E B0 11 A2 05 DD 1E
0E39:5A 15 F0 0A DD 60 15 F0 12
0E41:05 CA 10 F3 30 05 A2 04 B2
0E49:8E 86 02 A2 02 C9 0E 90 9C
0E51:08 E8 E8 38 E9 0E 4C 4E BA
0E59:0E 0A A8 C8 C8 18 20 F0 78
0E61:FF 20 B7 0A 20 66 0D A9 7B
0E69:64 8D 00 D4 8D 05 D4 A9 3C
0E71:28 8D 01 D4 A9 24 8D 06 71
0E79:D4 A9 81 8D 04 D4 A2 78 A4
0E81:A0 00 88 D0 FD CA D0 FA C3
0E89:8E 04 D4 A0 1E A2 09 18 38
0E91:20 F0 FF A9 7D A0 12 20 47
0E99:1E AB 4C 39 08 CE 15 D0 43
0EA1:CE 00 D0 A2 03 CE 00 D0 8D
0EA9:CE 01 D0 CA D0 F7 A9 00 ED
0EB1:A2 03 9D 06 D0 CA 10 FA C0
0EB9:8D 0C 16 8D D0 16 AD 0C 63
0EC1:16 D0 14 AE 06 D0 EC 00 D7
0EC9:D0 F0 09 EE 06 D0 EE 08 F3
0ED1:D0 4C D8 0E EE 0C 16 AD E6
0ED9:0D 16 D0 14 AE 07 D0 EC 7D
0EE1:01 D0 F0 09 EE 07 D0 EE 85
0EE9:09 D0 4C F1 0E EE 0D 16 C3
0EF1:A0 0A A2 FF CA D0 FD 88 53
0EF9:D0 F8 AD 0C 16 F0 BF AD D4
0F01:0D 16 F0 D3 A0 C8 A2 FF F3
0F09:CA D0 FD 88 D0 F8 AD 53 22
0F11:15 F0 03 EE 11 05 EE 15 D4
0F19:D0 A9 00 A2 03 9D 06 D0 9F
0F21:CA 10 FA AD 00 D0 18 69 BF
0F29:04 8D 00 D0 AD 01 D0 18 E4
0F31:69 03 8D 01 D0 60 A9 FF E1
0F39:A2 BF 9D FF 36 CA D0 FA C5
0F41:A9 15 8D 57 15 A9 00 8D 7D
0F49:56 15 8D 55 15 60 A9 00 5C
0F51:AE 56 15 9D 00 37 E8 9D 25
0F59:00 37 E8 9D 00 37 E8 8E 79
0F61:56 15 CE 57 15 D0 0F A9 F2
0F69:15 8D 57 15 E8 E0 C0 D0 CE
0F71:05 A9 01 8D 55 15 8E 56 E7
0F79:15 60 A9 0F 8D 18 D4 A9 80
0F81:2D 8D 05 D4 A9 A5 8D 06 8C
0F89:D4 A9 21 8D 04 D4 A9 39 49
0F91:8D 01 D4 A9 05 8D 00 D4 1F
0F99:A2 C8 A0 FF 88 D0 FD CA 9D
0FAl:D0 F8 A9 05 8D 01 D4 A2 A8
0FA9:64 A0 FF 88 D0 FD CA D0 8F
0FB1:F8 A9 00 8D 04 D4 A9 26 7C
0FB9:8D DA 0F A9 DB 8D DB 0F AD
0FC1:AE 16 18 A9 28 6D DA A4
0FC9:0F 8D DA 0F 90 03 EE DB 69
0FD1:0F CA D0 EF A2 15 A9 01 01
0FD9:9F FF FF CA 10 FA A9 06 39
0FE1:8D 15 16 A2 C8 A0 FF 88 4A
0FE9:D0 FD CA D0 F8 CE 15 16 99
0FF1:D0 F1 4C 9C 0A A2 04 8E B9
0FF9:16 16 20 7B 0F A2 02 A0 0C
1001:09 18 20 F0 FF A9 90 A0 27
1009:12 20 1E AB 4C 7C 10 A2 CF
1011:02 A0 0B 18 20 F0 FF A9 AB
1019:84 A0 12 20 1E AB A9 0F E9
1021:8D 18 D4 A9 11 8D 01 D4 D8
1029:A9 C3 8D 00 D4 A9 64 8D 64
1031:05 D4 A9 24 8D 06 D4 A9 58
1039:21 8D 04 D4 20 71 10 A2 A4
1041:20 8E 04 D4 20 71 10 A9 73
1049:21 8D 04 D4 20 71 10 8E A0
1051:04 D4 A9 1A 8D 01 D4 A9 43
1059:9C 8D 00 D4 A9 21 8D 04 69
1061:D4 20 71 10 20 71 10 20 2A
1069:71 10 8E 04 D4 4C 7C 10 39
1071:A2 C8 A0 00 88 D0 FD CA 77
1079:D0 FA 60 A9 A0 A0 12 20 33
1081:1E AB 20 E4 FF C9 88 D0 F6

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1089:F9	4C 0F 08 A9 00 8D 20 A4	12B9:05	06 02 0C 81 13 0D 20 75	14E9:FC	F8 FC FE FE FE FE 7E CE
1091:D0	8D 21 D0 8D 15 D0 A9 BA	12C1:20	20 20 20 20 20 44 52 60	14F1:7E	3E F0 F8 F8 F4 ED C0 CE
1099:17	8D 18 D0 A2 FF E8 BD 5D	12C9:49	58 45 4C 4C 41 27 53 1F	14F9:7F	00 0E 0E 06 12 8A CE E0
10A1:72	15 F0 17 C9 0A 90 06 6D	12D1:20	95 44 49 4C 45 4D 4D E7	1501:FC	00 F0 C0 98 CF E7 FF A7
10A9:20	D2 FF 4C 9F 10 A8 E8 CA	12D9:41	20 20 20 20 20 20 11 7F	1509:7F	00 1E 06 32 E6 CE FE E0
10B1:BD	72 15 20 D2 FF E8 D0 6A	12E1:11	11 11 11 05 12 BE 92 86	1511:FC	00 F0 E1 E2 E0 F1 F9 6E
10B9:FA	F0 E3 A2 01 A9 06 8D 82	12E9:BB	30 11 9D 9D 9D BC 00 D0	1519:7F	00 1E 0E 8E 8E 1E 3E D0
10C1:DE	10 A9 16 8D DC 10 8A 76	12F1:12	20 E7 9D 9D 11 E4 BA B3	1521:FC	00 E0 E0 F0 EE FF FF 37
10C9:48	A8 CE DE 10 AD DE 10 05	12F9:91	92 00 11 1D 1D 1D 1D 51	1529:7F	00 0E 0E 1E EE FE FE 5F
10D1:C9	FF D0 03 CE DC 10 88 B3	1301:91	91 91 91 91 91 91 91 27	1531:FC	00 E1 D1 A9 D5 EB F7 A7
10D9:D0	F0 A0 00 A9 00 20 1E 5E	1309:91	AF AF 11 9D 9D 9D 12 9B	1539:7F	00 FE FE FE FE FE FE E3
10E1:AB	A9 91 20 D2 FF A9 0D 6D	1311:BE	A4 A4 BC 11 9D 9D 9D F7	1541:FC	00 FB FE F3 C0 FF FF FB
10E9:20	D2 FF 20 68 12 68 AA D7	1319:9D	9D 92 B6 12 A7 1D 1D B9	1549:7F	00 BE FE 9E 06 FE FE 05
10F1:E8	E0 1C D0 C8 A2 09 8A BC	1321:20	92 B5 11 9D 9D 9D 9D FF	1551:FC	00 00 6E 00 00 00 00 E0
10F9:A8	18 69 11 8D 07 16 8A F1	1329:9D	9D B6 12 A7 1D 1D 20 89	1559:00	1D 2B 39 47 55 63 1A 34
1101:6D	07 16 8D 07 16 B9 E1 1D	1331:92	B5 11 9D 9D 9D 9D 9D 46	1561:28	36 44 52 60 00 0A 1E 10
1109:15	20 D2 FF C8 CC 07 16 B5	1339:12	BB 20 20 AC 92 11 9D CC	1569:5A	FA 30 20 20 20 20 20 69
1111:90	F4 A9 91 20 D2 FF A9 FC	1341:9D	9D B7 B7 11 9D 9D 9D E7	1571:00	93 01 05 07 0D 0E D3 4D
1119:0D	20 D2 FF 20 68 12 CA B5	1349:05	4C 45 46 54 9F 11 9D F2	1579:48	41 4C 4C 20 57 45 2E 7D
1121:D0	D5 A2 02 8A 4A 8D 07 35	1351:9D	9D 9D B0 C0 C0 AE 11 E3	1581:2E	2E 03 0D 03 20 9E 46 9B
1129:16	A9 1D 20 D2 FF CE 07 A1	1359:9D	9D 9D 9D 7D 20 20 7D 6D	1589:31	2D 2D 20 41 54 54 45 45
1131:16	D0 F8 8E 07 16 A9 12 90	1361:11	9D 9D 9D 9D AD C0 EA	1591:4D	50 54 20 54 4F 20 53 76
1139:38	ED 07 16 8D 07 16 A0 8A	1369:BD	00 97 20 20 4E 4F 20 5C	1599:4F	4C 56 45 20 54 48 45 C5
1141:00	B9 E2 15 20 D2 FF C8 94	1371:41	44 4A 41 43 45 4E 54 C6	15A1:20	50 55 5A 5A 4C 45 3F 0E
1149:CC	07 16 D0 F4 A9 91 20 F4	1379:20	54 49 4C 45 0D 1D 1D 68	15A9:03	0D 08 20 07 20 01 05 5B
1151:D2	FF A9 0D 20 D2 FF 20 4F	1381:1D	1D 1D 20 54 49 4C 24	15B1:2D	20 4F 52 20 2D 03 0D 52
1159:68	12 E8 E8 E0 12 D0 C4 95	1389:45	53 20 44 4F 20 4E 4F 56	15B9:03	20 9E 46 33 20 2D 20 3A
1161:A2	14 20 68 12 20 E4 FF 3F	1391:54	20 4D 41 54 43 48 0D F4	15C1:50	4C 41 59 20 41 20 4E 79
1169:C9	85 F0 0A C9 86 F0 1E EA	1399:1D	1D 1D 1D 1D 1D 43 4F 3E	15C9:4F	2D 50 52 45 53 53 55 89
1171:CA	D0 EF 4C A1 11 A9 01 95	13A1:4C	4F 52 2F 49 43 4F 4E 43	15D1:52	45 20 50 52 41 43 54 F1
1179:8D	53 15 A2 0A 4C 88 11 A7	13A9:20	49 4D 42 41 4C 41 4E 0C	15D9:49	43 45 3F 13 0D 01 05 E9
1181:A9	00 8D 53 15 A2 10 A0 53	13B1:43	45 00 00 00 00 00 00 CA	15E1:00	20 C4 20 52 20 49 20 74
1189:01	18 20 F0 FF A9 1C 20 44	13B9:00	00 00 00 07 E0 00 08 A3	15E9:58	20 45 20 4C 20 4C 20 8E
1191:D2	FF A9 BA 20 D2 FF A2 EC	13C1:10	00 13 C8 00 14 28 00 7F	15F1:41	20 27 20 53 20 20 20 27
1199:32	20 68 12 CA D0 FA 60 FA	13C9:15	A8 00 15 A8 00 14 28 8B	15F9:C4	20 49 20 4C 20 45 20 47
11A1:A2	01 8A 48 CE 07 16 A9 91	13D1:00	13 C8 00 08 10 00 07 5D	1601:4D	20 4D 20 41 00 00 00 91
11A9:1B	38 ED 07 16 A8 A9 1D 59	13D9:E0	00 00 00 00 00 00 00 70		
11B1:20	D2 FF 88 D0 FA A0 16 EA	13E1:00	00 00 00 00 00 00 00 08		
11B9:0E	07 16 CE 07 16 A9 06 3E	13E9:00	00 00 00 00 00 00 00 10		
11C1:38	ED 07 16 B0 01 88 20 78	13F1:00	00 00 10 00 00 00 00 19		
11C9:1E	AB A9 91 20 D2 FF A9 2A	13F9:00	00 00 00 00 00 00 00 20		
11D1:0D	20 D2 FF 20 68 12 68 0C	1401:00	00 10 00 00 10 00 00 6B		
11D9:AA	E8 E0 0C D0 C4 A2 01 48	1409:38	00 00 28 00 00 C6 00 5D		
11E1:8E	07 16 A9 0F 38 ED 07 A6	1411:43	83 84 00 C6 00 00 28 AA		
11E9:16	A8 A9 1D 20 D2 FF 88 1D	1419:00	00 38 00 00 10 00 00 88		
11F1:D0	FA 0E 07 16 A9 0D 38 17	1421:10	00 00 00 00 00 00 00 51		
11F9:ED	07 16 A8 8A 18 69 18 C1	1429:00	00 00 00 00 00 00 10 61		
1201:8D	08 16 A9 01 8D 09 16 B1	1431:00	70 00 28 00 00 10 00 18		
1209:B9	E2 15 20 D2 FF C8 CE 5E	1439:00	00 00 10 00 10 00 00 38 1A		
1211:08	16 D0 F4 A9 91 20 D2 CE	1441:00	00 00 28 00 00 6C 00 00 20		
1219:FF	A9 0D 20 D2 FF 20 68 8A	1449:44	00 01 C7 00 47 01 C4 14		
1221:12	E8 E0 07 D0 BA A2 02 CD	1451:AC	00 6A 47 01 C4 01 C7 76		
1229:8A	18 69 07 A8 8D 07 16 D5	1459:00	00 44 00 00 6C 00 00 BB		
1231:A9	1D 20 D2 FF 88 D0 FA 61	1461:28	00 00 38 00 00 10 00 41		
1239:8E	07 16 A9 1F 38 ED 07 80	1469:00	00 00 00 10 00 00 28 3A		
1241:16	8D 07 16 A0 00 B9 E2 71	1471:00	48 DF 0E 0E 0E 0D 0B DE 22		
1249:15	20 D2 FF C8 CC 07 16 F7	1479:DD	DC 00 02 02 08 0E 02 36		
1251:D0	F4 A9 91 20 D2 FF A9 5F	1481:02	02 38 52 06 4B 1A 4B 34		
1259:0D	20 D2 FF 20 68 12 E8 16	1489:00	00 00 18 BC 18 A7 3D		
1261:E0	1F D0 C4 4C BC 10 A9 43	1491:18	92 7E F3 E9 C1 F1 E0 B4		
1269:0F	8D 08 16 A9 FF 8D 09 4C	1499:E0	E0 FC FE FE FE FE 7E 6A		
1271:16	CE 09 16 D0 FB CE 08 F2	14A1:3E	1E 7F FE E7 CF 98 C0 D0		
1279:16	D0 F1 60 05 43 48 45 2C	14A9:F0	C0 FC FE CE E6 32 06 86		
1281:41	54 00 05 43 4F 4E 47 E6	14B1:1E	06 7F FF FB F0 F8 FC EC		
1289:52	41 54 53 21 0D 00 05 29	14B9:FC	F8 FC FE BE 1E 3E 7E 97		
1291:2A	20 47 41 4D 45 20 4F DE	14C1:7E	3E 7F FF FF F0 EF E0 2D		
1299:56	45 52 20 2A 0D 00 1D 29	14C9:E8	E7 FC FE FE 1E EE 0E 4C		
12A1:1D	1D 1D 1D 1D 1D 1D 1D C5	14D1:2E	CE 7F FF FF FF FF FF B4		
12A9:46	37 20 54 4F 20 52 45 EC	14D9:FE	FC FC FE E6 CE 9E 3E 3E		
12B1:53	54 41 52 54 00 01 03 89	14E1:7E	FE 7F FF FF FE FE FC EF		

Arthur Moore is the author of Sammy Seal (February/March 1992). He says he still enjoys his 64 and 128 after eight years of use. He lives in Orlando, Florida.

CHARACTER DESIGNER

By Daniel Lightner

Character Designer is a utility program that lets you create your own characters and set up animation sequences. CD also has an 80 x 64 pixel sketch pad that lets you create designs, characters, or pictures. You can then place these items in a sequential file for use elsewhere. You can also place character shapes on this pad to help you set up programmed character displays.

Entering the Program

Character Designer is written entirely in machine language. To enter the program, use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following.

PROGRAMS

Starting address: 0801

Ending address: 1B68

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

Running the Program

Character Designer loads and runs like a BASIC program. To move the pointer, use a joystick in port 2 or use the keyboard cursor keys.

Workscreen

You'll notice that CD's screen is divided into various sections, with copyright information in the upper right-hand corner. Clear this window and start the program by pressing the space bar.

At the top left side of the screen there's a small square sprite; this is the program's pointer. First, let's move it down the screen to near the bottom where you can see Commodore's standard uppercase graphic character set. Press the fire button if you're using a joystick; otherwise, press f7 as you cursor along the alphabet. Watch the editing window in the upper left corner of the screen. These rows of characters are where you pick up characters for editing simply by pressing the fire button or f7. Notice that this window extends upward at a point near the center.

Edit a Character

Use the above steps to find the up-arrow \bar{A} character and place it in the editing window. Be sure to release the fire button when you see the character in the window.

Move the pointer back to the area labeled as the editing window. This area is divided into three parts. On the left is the window that contains the pixel patterns for the character being edited.

The center window contains an options menu. Notice that each item in this menu is preceded by a round dot. Place the pointer on a dot when you wish to choose one of these options. Move to one of the items on the menu and press the fire button or f7. Experiment with all of the options.

Notice the window to the right as you enter the different options. This window contains six rows of the selected character and displays four more characters below separated by spaces. This display lets you see exactly what

the edited character looks like as soon as you make any changes.

Now press the D key and look at the Edit window. This is the character's data. Now press the space bar.

Next move the pointer back into the window that contains the pixel patterns and press the Clr/Home key. The window should clear. Press the fire button and watch what happens to the pixel under the pointer. If you continue to hold the fire button, the pixel will toggle back off again. Remember, if you're using the keyboard, function key f7 is the same as the fire button.

Using the Buffer

Now edit a character or create one of your own. When you have finished, move over to the window that contains the six rows of characters and press the fire button. Look in the Buffer window. It should now contain the same image as the Edit window.

If you create another character or pick one up out of the character set, you'll notice that the buffer still holds the original character. Next to the buffer is another window that contains three rows of the characters that are in the buffer. Move to this window and press the fire button. The buffer character reappears in the Edit window. Whenever you place a new character in the buffer, the previous character is overwritten. The same applies when you place a character in the Edit window. There are several places, though, where you can store characters and keep them safe.

Moving Characters

CD has two function keys that are programmed to pick up and place characters. These keys are f1 and f3. The first one picks up a character, and the second one places it elsewhere on the screen.

You can use these two keys almost anywhere on the screen. These functions are useful when designing text characters. You can, for example, design the letter A and place it anywhere you see the letter A on the screen (other than in the Sketch window and on the Enter line), and it will change all the A's in the text.

You can edit or create 95 different characters and place them almost any-

where on the screen until you're ready to save them. To save your edited characters, you must place them on the Enter line. Move the pointer in front of the word *ENTER* to the < character and press the fire button. Find the seven characters that make up the word *COMPUTE*. Now move over to the > character and press the fire button again. The letters scroll left and right through the frames. You can enter characters here simply by moving to one of the enclosed characters and pressing the fire button.

After you have filled the first seven spaces, scroll seven more onto the screen. When you save characters, CD will always save the first seven character spaces even if you haven't entered that many. Before saving, scroll the Enter line so that the last character that you wish to save is the last (far right) character in the line.

Enter some characters. If you wish to clear the Enter line, move to one of the seven spaces and press the Clr/Home key. We'll discuss more about loading and saving later.

Sketch Window

CD has a 10 x 8 character Sketch window. Here characters can be arrayed to form larger pictures, or you can use the pad as a temporary storage area. Edited characters can be placed in this window with the press of the fire button. The Clr/Home key will clear this entire window as well.

The window can be used to make sketches also. Move the pointer to the round ball in front of the word *SKETCH* and press the fire button. Did you notice that the Command line finally did something? It now indicates that you are in Sketch mode. Look in the upper left corner of the Sketch window. You can see a single pixel blinking rapidly. With the cursor keys or joystick, move the pixel around the window. Pressing the fire button will lock the pixel on, allowing you to draw with it. If you wish to erase with it, press f5 and continue. Function key f5 will toggle the On and Off settings while in Sketch mode.

When you enter the Sketch window, the setting is always toggled to On. With this feature, you can actually use characters to draw a picture. The Cr/

Home key will still function in this mode. To exit Sketch mode, press the Back Arrow key.

Animation

On the lower left side of the screen is an Animation window. This is the Animation Sequence and Speed Control window. The Animation window is a ten-page tablet with a built-in page flipper.

Previously, when you picked up characters, you were actually picking up the character data only and placing it in another area, overwriting the original character's data. When you place a character in the Animation window, it is the actual character. Place the pointer on the indicator in front of the words *PAGE AHEAD* and press the fire button. This is a useful feature for designing characters for a game or fancy title screen.

Move to any character you wish to place on the Animation window and pick it up. Move back to the place where you wish to place the character and press the fire button. It's as easy as that. Clr/Home will clear the Animation window if your pointer is within its frame.

If you continue to press the fire button, the setting will toggle to Off again. When you have finished, be sure to page ahead to be sure that your page is entered correctly. The Slower and Faster features will allow you to adjust the speed of CD's pointer as well as the Animation window.

Command Mode

Move to the Command indicator and press the fire button. You have entered the Command mode. Here, as you can see, there are four options. To enter a command, press the key that corresponds to that command. The space bar will abort Command mode. The Q key will return you to BASIC, the S key will save a sequential file, and the L key will load one. The R for reset will put CD back into its starting condition. This command will clear all the characters that you may have designed. So be careful with it.

To save or load a file, use the proper key. CD will ask for a filename. Enter the filename and press Return. CD works only on disk in drive number 8.

If you need to see the disk directory after you have exited Command mode, just press the shift key and the \$ key. The directory listing can be halted and restarted by pressing any key.

Preferences

CD offers you the ability to change the colors of the screen, border, pointer, frames, text, editing character, and pixel on and pixel off characters. This can be accomplished by placing the pointer over the type of character that you wish to alter and pressing the C key. CD scrolls through all 16 colors, starting from the color that is presently on-screen. Pressing P will color the pointer, B will color the border, S will change the screen color, and so on.

Multi-Color

CD also supports Multi-Color. To enter Multi-Color mode, press the M key. To exit, press it again. You'll notice that Multi-Color can mess up some of the items on the screen. To make them more readable, change their color to a color value less than 8. The character being edited won't show in Multi-Color unless it has a color value greater than 7.

While in Multi-Color, the editing window responds differently as well. This is because color is represented in pairs of bits instead of by each individual bit. To choose the bit pattern that you wish to use, press f5. The bit pattern is displayed on the Command line. Multi-Color characters are displayed according to the screen color, Multi-Color1, Multi-Color2, and the character color. Multi-Color1 and Multi-Color2 are adjusted by typing the 1 key or the 2 key. When this is done, the colors are displayed on the Command line as well.

Key	Action
f1	Picks up a character
f3	Puts down a character
f5	Adjusts pixel pattern
f7	Fire button alternative
C	Character color
P	Pointer color
S	Screen color
B	Border color
M	Multi-Color mode
1	Multi-Color1
2	Multi-Color2
D	Character data

Shift-\$	Directory
Clr/Home	Clears area
Cursor	Moves pointer

Command Mode

S	Save sequential file
L	Load sequential file
R	Reset CD
Q	Quit to BASIC

Character Designer

0801:0B	08	70	17	9E	32	34	30	6E
0809:37	00	00	00	20	20	20	20	96
0811:20	20	20	20	20	A0	C4	B9	06
0819:3C	08	99	F8	00	B9	FD	08	F6
0821:99	33	03	88	D0	F1	A0	09	4C
0829:B9	0C	08	99	FF	03	88	D0	A1
0831:F7	A9	DF	85	2D	A9	22	85	D5
0839:2E	4C	00	01	14	E8	03	DF	AD
0841:22	DD	19	B9	6E	09	99	E8	4C
0849:07	C8	D0	F7	EE	02	01	EE	19
0851:05	01	C6	F9	D0	ED	A2	03	23
0859:20	34	03	F0	33	C9	07	D0	95
0861:16	A2	01	20	34	03	D0	0A	A0
0869:A2	04	20	34	03	18	69	07	65
0871:10	05	A2	0A	20	34	03	85	1D
0879:A8	A5	A7	85	A9	A5	FE	85	FB
0881:F7	A5	FF	85	F8	20	6C	03	73
0889:A5	F8	85	FF	A5	F7	85	FE	72
0891:E8	20	34	03	D0	1E	A2	08	21
0899:20	34	03	A0	02	84	A8	85	2A
08A1:A6	18	A5	FC	65	A6	85	F7	58
08A9:A5	FD	65	A7	85	F8	20	6C	EF
08B1:03	4C	13	01	E8	20	34	03	FB
08B9:D0	1C	A0	03	84	A8	E8	20	36
08C1:34	03	F0	08	A2	08	20	34	F4
08C9:03	4C	5C	01	A2	0F	20	34	CF
08D1:03	E6	A7	4C	5C	01	E8	20	AF
08D9:34	03	D0	0A	E8	20	34	03	B2
08E1:18	69	04	A8	D0	D6	E8	20	37
08E9:34	03	D0	0A	A2	02	20	34	21
08F1:03	18	69	06	D0	ED	A2	08	A2
08F9:20	34	03	D0	E6	A9	00	85	F7
0901:A7	A4	FB	F0	0C	06	FA	2A	37
0909:26	A7	C6	FB	CA	D0	F2	A8	D8
0911:60	48	B1	FE	85	FA	A9	08	FE
0919:85	FB	68	A4	FE	D0	02	C6	4A
0921:FF	C6	FE	C0	E7	D0	DE	A4	B5
0929:FF	C0	07	D0	D8	A9	37	85	BA
0931:01	58	4C	28	08	A4	A8	F0	FA
0939:22	A5	F7	38	E5	A8	B0	03	7E
0941:C6	F8	38	85	F7	A5	FC	E5	8A
0949:A8	B0	02	C6	FD	85	FC	B1	3A
0951:F7	88	91	FC	98	D0	F8	C4	42
0959:A9	F0	0A	B1	F7	C6	FD	C6	76
0961:F8	C6	A9	10	EC	60	78	E6	98
0969:01	4C	16	08	60	68	08	0A	11
0971:00	9E	32	30	38	38	16	CE	12
0979:44	20	8C	19	46	52	88	06	CB
0981:40	F4	82	50	55	54	45	A9	76
0989:2B	B1	AD	C7	8D	11	03	AD	34
0991:01	1B	8D	12	03	78	A9	A0	AB
0999:8D	14	03	A9	1B	90	8F	03	AF
09A1:4A	CC	FF	D8	8D	85	48	78	25
09A9:18	13	29	FB	32	01	95	62	94
09B1:0A	0A	30	B9	00	D1	90	31	86
09B9:44	F8	09	80	32	94	33	99	39

PROGRAMS

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09C1:80 34 C0 FF F0 00 F0 67 0A
09C9:01 50 53 01 09 46 46 01 D9
09D1:58 20 4B 16 6A 1A 1C 51 28
09D9:59 40 04 81 80 B1 94 68 9D
09E1:6A 12 A9 4C CE 97 40 29 26
09E9:B9 DA 1B 99 00 38 E8 17 56
09F1:40 A9 28 E0 8D F8 07 90 90
09F9:EB 01 A9 34 2D E8 00 C1 89
0A01:1B 21 56 0A FF 01 45 83 68
0A09:2A A0 BD 8F 22 91 FB E8 43
0A11:E0 50 F0 0D C8 C0 0A D0 C6
0A19:F1 A3 9F 2F 64 98 35 BE A4
0A21:C9 8C 60 FC 3F 20 DE 19 6A
0A29:38 2A 85 A9 20 96 8B 81 23
0A31:AD C9 36 68 94 15 A9 05 2D
0A39:28 3A 04 11 15 C8 02 8D DE
0A41:E0 1A A9 A1 A8 39 20 E1 E7
0A49:41 51 83 7E 81 78 28 6A 53
0A51:0E 04 9F 02 00 F0 F2 A2 CD
0A59:01 97 35 42 48 1B 36 E3 9D
0A61:23 CD 78 1C 73 39 DD 7C 04
0A69:32 37 FE 34 C9 12 F0 4A 4A
0A71:4C 95 05 1F C9 1A 4C C9 BC
0A79:41 01 DD E9 1A 90 0E 96 8E
0A81:0A 20 35 10 20 4E 37 DB CE
0A89:08 20 D9 90 05 20 39 26 2F
0A91:09 02 A5 F1 81 96 0B 4C 47
0A99:62 0B D0 AF 8D 82 BA 9C 3F
0AA1:82 9C 9D 82 AB 10 AD 45 38
0AA9:03 8A 19 D6 0E 00 29 12 47
0AB1:6B F7 00 5C 4C 86 16 27 0F
0AB9:4B D1 B8 C9 05 F0 BA AB A8
0AC1:4B 0E A7 86 7F CF C9 1C 47
0AC9:F0 D1 C9 29 41 F0 84 04 71
0AD1:01 AC 26 96 0C 87 C9 3B 0D
0AD9:F0 86 F6 0F C9 20 CA 0B 47
0AE1:40 7A 11 D0 70 36 C1 29 EC
0AE9:23 68 01 C7 33 04 6F 54 23
0AF1:07 0F 20 47 A0 F8 12 20 F2
0AF9:54 13 80 B6 E4 F0 9D 20 BE
0B01:94 13 20 89 0E 20 09 14 D9
0B09:20 3B 14 67 F4 E0 05 E4 11
0B11:FF D6 68 82 12 99 4C 0E AF
0B19:C9 9D F0 0A B0 93 09 06 26
0B21:C9 24 F0 32 D4 40 E4 18 EF
0B29:30 36 8A 01 02 40 33 54 12
0B31:20 5A D6 A4 39 D2 C9 0B C6
0B39:F0 CE C1 D6 10 E4 98 46 AC
0B41:08 B1 53 1C 64 9C 82 07 95
0B49:8E DC 29 0F 38 A1 2A 80 0E
0B51:0F E5 FD 5B 2A 4A 02 F0 4D
0B59:32 CD DA 33 C9 08 F0 34 0F
0B61:C0 2E 23 10 F0 05 A9 03 BA
0B69:4C 6B 30 78 00 20 07 61 FD
0B71:60 A0 01 18 43 AC 0E 0C 2B
0B79:82 74 F3 A0 00 8C C0 68 92
0B81:25 80 91 21 C8 11 21 C8 24
0B89:9D 21 A9 1D 4C 75 0A 68 72
0B91:07 37 26 7C 3A 11 F0 1C 99
0B99:5A 0F 77 54 4E B4 F4 24 E8
0BA1:3D 06 E6 4C 7D 0B 4C 55 31
0BA9:50 E6 DE D3 1D A0 01 CF 46
0BB1:53 12 C8 4F 49 C4 18 A5 37
0BB9:69 D0 94 CC B1 93 5E 83 34
0BC1:AB 20 2C 31 C9 1F 90 2D 67
0BC9:F5 53 00 26 8F C6 80 22 CC
0BD1:91 DE 10 A9 99 4E E7 28 03
0BD9:C3 17 E7 28 34 9E 87 16 DC
0BE1:F0 4E BC 87 3B AE 0F 1A E0
0BE9:E6 08 8C 1B 60 88 00 87 65

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0BF1:21 83 18 18 36 4A 09 84 6F
0BF9:A9 06 02 CD 64 74 14 33 D3
0C01:23 EC 3E 19 04 8C 99 0B CF
0C09:2C 9F 99 0F 70 9F 99 07 7F
0C11:79 1E 00 10 F0 3C 2C F0 30
0C19:D2 E4 F5 08 8D 50 01 A0 63
0C21:10 30 72 03 74 8C 08 AC 5E
0C29:06 57 B0 E2 F0 AA 8D A4 50
0C31:4C A4 0B C2 7C 03 47 F0 95
0C39:30 34 E8 30 DA 16 31 9A C2
0C41:E3 30 38 E9 2C C0 E5 98 C5
0C49:CE 34 64 74 0D 40 18 72 C4
0C51:00 33 43 D8 C0 20 03 C2 7B
0C59:06 C6 5D 43 8D C1 02 CF 4D
0C61:AE 81 8D C2 02 47 1E 24 9C
0C69:44 38 F1 14 05 E9 06 28 35
0C71:08 20 30 0C 84 33 4C E6 CC
0C79:0B E1 13 01 C2 E9 41 A4 E6
0C81:13 90 04 C8 4C 32 0C B4 4C
0C89:C9 82 40 00 D8 00 FE 85 79
0C91:28 C7 2D 65 27 A0 28 0B C2
0C99:65 28 58 63 0A C0 27 0E 22
0CA1:EE 32 1A 64 E6 40 00 69 E8
0CA9:3C 8A E5 80 09 3C BC 00 22
0CB1:8D A5 E6 60 B9 3E E2 D0 3A
0CB9:CE 74 D1 00 96 83 A2 89 22
0CC1:01 29 4F 13 03 0E 72 F8 ED
0CC9:A9 F0 21 01 89 2D 07 EE 25
0CD1:8E EA E0 1C 95 00 C1 87 81
0CD9:90 D3 60 4B 2C 00 2E 4F FC
0CE1:D6 46 41 80 FD 09 19 F1 5F
0CE9:50 C8 08 99 43 03 2C 39 AE
0CF1:C4 22 C8 47 A9 19 E1 DD D5
0CF9:15 22 F0 0B 52 43 10 85 39
0D01:25 46 21 88 67 A0 C8 20 5B
0D09:2F 0D 4C BD 0C E0 27 01 96
0D11:8C 54 00 46 C2 51 3C 09 C7
0D19:54 F7 24 64 F0 03 30 2A 44
0D21:05 04 F9 41 63 63 E8 A7 34
0D29:A2 CA 49 28 7A 07 65 A3 51
0D31:C2 83 0A 0A 8A 41 CA 11 6F
0D39:E8 0C 12 CA E0 AA 76 F3 64
0D41:E1 DB A8 B0 0A A7 A2 01 19
0D49:A9 D8 F0 C8 18 4A 90 02 26
0D51:09 80 A8 5D E6 EF 29 9D E1
0D59:03 06 6E 84 33 85 FB 4A 7E
0D61:17 48 00 1D E0 78 C5 FB 5B
0D69:F0 15 CA E8 42 F1 A4 33 7F
0D71:DE 52 81 15 D6 CF 49 18 B1
0D79:D3 79 23 2A 05 CB 0D 16 6A
0D81:71 07 34 00 01 85 33 CA EB
0D89:A3 B0 A5 33 9D A9 62 CA AD
0D91:C0 04 D0 EA 5A A7 8D 4D AF
0D99:86 FC B9 5B 81 51 A0 25 DA
0DA1:FD D0 1F 2C 27 F4 A5 FC EA
0DA9:F3 EC 0F 18 0C E1 CD 53 33
0DB1:35 03 F5 74 B1 0D 18 BD DC
0DB9:E7 65 FC 24 81 09 1A 0E 75
0DC1:28 09 38 A9 FF F9 14 00 E3
0DC9:87 F2 79 1C 0A 6E 03 06 6B
0DD1:21 C0 C2 E3 73 CE 90 F8 34
0DD9:8F 72 00 F1 C9 AD B0 ED CB
0DE1:2F 1D 80 78 81 30 80 F5 36
0DE9:3C 61 00 22 82 00 D7 8F EF
0DF1:5D EF B0 16 F5 80 90 CC CD
0DF9:2D 8B C5 C9 5D B0 C1 97 7E
0E01:A3 70 32 9D CB 00 FC 04 87
0E09:1C 07 FD A2 2C FE A9 4F DE
0E11:E0 6E A9 DA 28 07 3E 13 09
0E19:78 32 54 18 B4 A5 FB 39 77

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0E21:F7 20 D0 0C 01 FF 52 10 D8
0E29:0B 05 FD 4C E8 0E 1D 36 80
0E31:29 91 27 A8 AD E2 55 40 99
0E39:50 DF 20 72 98 BB 80 27 7C
0E41:99 53 27 A5 28 70 30 00 A1
0E49:28 E6 C8 80 C3 D3 57 0E 7E
0E51:60 6B 3F 02 66 F0 39 C9 B3
0E59:57 B0 F4 0C FE 34 F0 60 B7
0E61:64 08 E9 F0 C8 10 E5 18 68
0E69:76 81 DC 0E 77 85 C7 2F 2E
0E71:00 22 1E 9E 80 C6 0D 9B 98
0E79:1C CD 20 9D 0F 17 2E C0 E6
0E81:48 20 5D A9 2C 61 16 40 63
0E89:AC 11 08 E7 00 01 F0 14 B9
0E91:A7 80 20 84 03 F0 26 AC C2
0E99:64 8E 85 0C 8F 86 3A 24 2C
0EA1:8A 06 40 28 1A 0A 58 01 B9
0EA9:4C F3 A9 4D 55 45 0A 30 F6
0EB1:60 03 34 3A 03 06 3C F0 82
0EB9:1C C9 44 96 5F 40 D8 1A 10
0EC1:C9 54 F0 19 C9 5C 02 97 E2
0EC9:C9 64 F0 17 C9 6C 65 53 91
0ED1:F8 B1 91 CA 01 21 4D 20 FC
0ED9:02 69 22 85 20 02 9B 0D 3B
0EE1:4C 08 0E 4C 44 0E C2 23 AF
0EE9:36 62 99 E4 01 22 36 E4 1D
0EF1:11 20 04 10 DC C9 81 70 A1
0EF9:32 C2 2B C0 F6 A5 27 C9 B7
0F01:4F F0 01 60 4C B3 0E C9 40
0F09:61 3E 27 8D CF FC 40 84 9C
0F11:FC 84 FD 84 5A 1B 80 B9 0D
0F19:24 08 30 97 04 8D 8E FE 30
0F21:69 2D 34 03 61 06 DE 01 D7
0F29:0D 85 FD 2F 12 FB F9 0C 62
0F31:10 2D 05 D4 85 FC B1 FB 10
0F39:5C A5 8D AC 00 4C 91 12 A3
0F41:C9 4E B0 14 C9 4C F0 16 A6
0F49:C9 55 11 18 4C 41 4E 53 9C
0F51:B0 81 0F 05 51 39 05 4F 23
0F59:3B 05 8D 50 21 60 A5 FE E1
0F61:29 0F C9 0F F0 06 B9 DC F1
0F69:13 40 54 05 30 A0 02 AD B1
0F71:38 07 E0 10 C7 15 42 C3 65
0F79:01 0E C0 21 0E 21 84 86 4A
0F81:03 1C 80 43 52 3C 0E 27 33
0F89:A2 05 4D C5 44 1C 45 1B 78
0F91:13 73 1C 85 FE 20 89 E0 5E
0F99:07 DC 6C 30 14 55 00 8C 85
0FA1:05 68 2C 20 0E 11 2A 95 82
0FA9:0A 94 09 10 2D 9A 8C 15 FD
0FB1:01 29 20 A1 37 83 A3 AD 2D
0FB9:81 8D 22 D0 AD C3 39 8D C9
0FC1:23 D0 63 00 8D 53 21 AD BB
0FC9:51 02 29 EF 8D 16 3C 24 96
0FD1:20 8E 0C 0E 2D 0A 08 FF D4
0FD9:62 34 40 64 C4 A1 B0 C8 5B
0FE1:C0 0E D0 EF FB 00 DF 50 EC
0FE9:8D D3 02 AD D4 A0 CF 01 A8
0FF1:F9 60 AC D0 02 46 66 01 BE
0FF9:A3 B3 AC 4B 40 6D 64 74 16
1001:15 E4 C9 FF F0 07 EC 2C C7
1009:4C 77 11 E0 01 10 AC 54 53
1011:B0 10 36 1C AC 55 21 2C 3F
1019:DF 8D B0 20 A9 A3 C0 D6 D8
1021:6D C3 F8 9C C5 B1 AE D1 F5
1029:A8 42 48 41 63 A2 C2 7B F1
1031:47 D1 40 E1 31 55 D0 68 78
1039:C8 87 69 88 E3 66 5F 1E EA
1041:D2 81 1D AB 06 C8 CC 2C A2
1049:19 F0 05 E8 E8 4C F5 11 D6

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1051:E0 06 E8 BD 57 F1 41 14 75
1059:30 2A 0A A9 CA 54 C3 1D 44
1061:E0 04 B9 9C AF 20 E6 4C 0C
1069:61 8B 88 20 C9 04 F0 0C 7C
1071:01 89 32 14 EA B0 07 56 7A
1079:21 20 E3 11 4C BF 09 30 63
1081:FC 02 A0 D0 0F 45 BB F0 B7
1089:09 C9 A4 F0 15 C9 AC F0 5E
1091:21 C7 EB E1 A1 00 F0 F8 B7
1099:AB 03 60 3C AD EC 24 C9 53
10A1:0A F0 E8 60 15 00 C9 02 64
10A9:4C A5 F3 F6 8E 01 04 85 4D
10B1:47 CD FB 91 FD 5E CD 86 0D
10B9:07 64 1D 9A 03 22 D0 09 0F
10C1:2E 70 40 14 81 ED 12 31 77
10C9:8D 8D CD 02 18 8D CE 02 84
10D1:89 DD B1 FD 65 DD 85 78 6A
10D9:88 09 08 E7 01 05 0E 78 B0
10E1:80 60 A9 94 3E 8D 01 21 24
10E9:A3 31 BC 12 A0 CC 8E 72 A8
10F1:CC C9 AF B0 E9 90 2D E2 BA
10F9:C9 BD B0 DE DE B5 22 AD 32
1101:C1 3D 02 FB AD C2 02 FC CC
1109:00 DA 01 CD 0E F0 08 AD D0
1111:CF 02 81 1A C4 21 51 A4 5F
1119:14 88 AE 03 1D F3 01 20 48
1121:9D F9 00 C6 F7 20 DC 12 09
1129:E8 E0 05 D0 ED 01 71 5A 56
1131:D8 CC 00 0E C9 D5 B0 F4 E1
1139:28 B8 C9 90 ED 4C 77 A6 16
1141:1A 70 BE D0 E3 74 23 9C 45
1149:9D DC 4C D9 0F D9 D9 03 A8
1151:3B D9 4C 4B 16 DD 46 ED 68
1159:3C 1A 02 E9 E6 25 43 B0 02
1161:8C D0 6D FB 8C E4 A7 2D DF
1169:1E 47 3F 2E F0 27 C9 7E 6D
1171:F0 C9 C9 9E F0 C5 C9 BE 92
1179:F0 C1 C9 DE F0 BD 40 F6 A1
1181:43 F0 B9 4C 08 14 7D C8 D1
1189:F9 A1 86 16 00 06 45 E1 C7
1191:13 E5 C9 A1 F0 2D 50 2A 11
1199:01 30 08 C0 48 D7 02 4C 47
11A1:FA 13 C0 16 05 08 4D 81 E3
11A9:99 E9 D9 18 AD 35 69 01 E5
11B1:B0 0E 8D D8 02 C0 1C F0 2B
11B9:07 40 1E C8 C8 4C E9 13 1E
11C1:60 C0 31 D0 F8 5B 31 06 15
11C9:D0 F1 79 31 7C 39 95 01 08
11D1:E2 2E A0 D5 11 65 56 94 C1
11D9:03 F0 F6 20 F4 4A 01 30 9D
11E1:A0 61 0B 8A 10 62 01 F0 B3
11E9:1B 60 1A FE 90 BF AD 01 C4
11F1:B9 13 34 90 B8 C9 6D B0 BD
11F9:B4 C0 93 02 44 0D 4C EB 14
1201:0F AD 00 D0 C9 47 B0 A4 96
1209:4C 49 0E 73 4D 08 29 32 AD
1211:4C 72 C6 80 74 63 BE D8 60
1219:2E FC 0A 3F 80 A9 80 D6 4B
1221:31 80 32 29 08 1D 0A C9 69
1229:33 F0 3F C9 39 F0 41 C9 81
1231:1D F0 3E C9 9D F0 3D C9 79
1239:91 F0 3C F0 FD 20 3B C9 A9
1241:06 F0 3A F0 AD 15 C0 F0 E9
1249:11 01 FD 8D 85 00 61 00 BD
1251:42 0E CD C0 24 F0 28 50 65
1259:42 51 11 25 52 AC 43 58 8B
1261:80 0F 29 8D 14 20 32 16 23
1269:4C 72 14 60 4C F2 14 4C 7B
1271:1F 70 2E 4C 20 02 79 15 DC
1279:4C F8 15 AD EA 02 C2 6F D3

1281:00 4C C1 14 CB 86 E1 1C 8A
1289:2C 71 50 00 4B 09 3C 71 92
1291:71 B0 C4 11 07 2C 71 24 34
1299:00 45 1D 07 C0 12 87 79 F9
12A1:91 00 17 75 1C A9 09 8D EF
12A9:EC 19 02 CB 1C 14 73 B0 50
12B1:C4 41 01 2C 71 CC 09 38 74
12B9:91 B6 80 60 89 07 87 24 06
12C1:AD 9E 04 A0 A8 E3 00 28 EB
12C9:E2 B0 01 90 42 79 09 18 D6
12D1:69 C0 A1 C1 C1 8D 3C 0E F5
12D9:00 B6 61 0F C0 40 AD E2 0E
12E1:A9 44 E0 03 BA 00 84 0E 25
12E9:FC F8 E5 38 0F E3 70 9C 90
12F1:07 1A ED 00 AC E0 AC 76 96
12F9:01 F1 50 50 14 3D 02 16 D9
1301:18 AD 8E 00 2A 8D E8 A9 73
1309:06 08 60 8D E9 02 88 C0 42
1311:00 92 AF 20 8E 1A 4C 00 C9
1319:1A 58 64 0E DA E2 60 C3 B6
1321:B1 88 4C AC 14 AD C0 D0 40
1329:85 D0 13 AA AE E1 02 AD 02
1331:EB 02 83 B3 0E 08 CC 3D 80
1339:81 48 C3 41 91 1D 23 10 16
1341:D0 0F 18 05 55 00 33 93 8B
1349:50 D0 F7 27 20 64 1A D0 D4
1351:85 09 EA 60 A2 F0 F0 00 9A
1359:14 30 3E B6 F0 E0 07 B0 92
1361:0A BD 74 C2 2E FD B1 FD 81
1369:4C 6C 16 B9 6C 21 91 FB 36
1371:C8 C3 04 E8 38 F0 02 8C 12
1379:27 00 01 2F 80 E8 E0 5F 0F
1381:D0 D4 60 BB 0E 40 E8 00 50
1389:26 98 E1 80 1D 48 03 0D 4A
1391:BB 01 1C 5E 1B C9 2A F0 84
1399:1D C9 3E F0 1F C9 11 F0 CA
13A1:1E CC 4D 04 EA A9 01 9C 90
13A9:CA 80 20 49 4C 09 09 20 A6
13B1:5E D1 56 28 20 D1 20 01 52
13B9:B4 B9 E2 FC 4C 40 08 50 98
13C1:C6 0D 75 1F 40 E6 16 62 5B
13C9:FC F1 58 E1 17 C0 81 5A 2D
13D1:FA FE 36 3D 45 B7 80 C8 9F
13D9:80 A7 00 C9 20 D0 F5 88 7F
13E1:88 76 52 80 20 67 18 F3 FE
13E9:01 3A 03 50 0E 02 62 A1 63
13F1:AC A1 FD 95 57 00 81 CF 7D
13F9:2A 47 B7 FF F4 32 0C 4C D2
1401:13 17 20 D9 C9 38 08 41 9A
1409:3B 17 40 75 17 05 03 8C 53
1411:EE 4C F9 8A 4C 52 16 6F F2
1419:44 76 1B 20 C1 18 20 60 75
1421:19 20 73 17 00 79 6D 51 CF
1429:A2 35 A0 03 5F BE 09 E8 25
1431:70 80 37 81 85 63 CF 9B A5
1439:80 F0 2C 90 02 30 38 48 F5
1441:01 38 2E 18 AD D7 02 69 79
1449:07 8D 80 4B C0 05 0C 07 56
1451:30 28 60 38 20 C8 CC D6 BF
1459:02 D0 ED 20 80 1A 17 57 68
1461:00 08 30 88 00 35 E6 22 DE
1469:40 38 64 B8 04 FB 98 ED 07
1471:A2 4A 40 07 38 40 C3 2A 6A
1479:A5 FB C5 FD F0 39 4C CE DF
1481:C0 F0 02 2F 18 4C FC 14 79
1489:51 17 20 E2 0E 0F A5 22 6C
1491:4F 80 B1 04 F3 01 B9 1B 2A
1499:2D 44 00 C8 C0 0B 9E 4B B0
14A1:3D 11 4C 1B 12 A5 FC C5 CE
14A9:FE D0 9F A2 00 CD 81 01 DE

14B1:37 4C C3 FF A5 BA 20 B4 0E
14B9:40 70 50 6F 85 B9 20 96 09
14C1:25 0E 99 EE 02 C8 20 A5 3B
14C9:D0 98 0D D0 F5 20 AB FF B6
14D1:AD EF C2 0D 08 AD F0 02 D0
14D9:C9 30 D0 01 60 A9 0D 60 41
14E1:72 F9 19 2C 02 F0 23 E4 A6
14E9:B9 15 0C B0 C9 01 F0 30 25
14F1:5C DE 00 C3 1C 0D C5 49 26
14F9:18 6D 25 8D 3A 40 93 80 81
1501:C9 32 F0 09 A9 64 51 23 EF
1509:CC A9 C8 C8 CE F9 72 18 05
1511:B9 D9 ED 38 E9 30 AA 96 CB
1519:2A E0 02 C4 18 69 0A 83 1B
1521:5B B6 A2 B8 F1 D3 A9 17 CF
1529:6C CB D0 BC A9 3E 85 AE 62
1531:D0 CC BD 0A 6D 00 3C 64 97
1539:45 64 40 F0 F9 C9 4F 38 04
1541:43 18 02 20 C9 7B B0 ED E0
1549:C9 20 90 E9 C9 22 F0 E5 AF
1551:C9 2C F0 E1 54 7F C8 14 ED
1559:F0 DA 1B CD 1D 19 EA 28 3E
1561:26 00 F0 CA 4C 32 5F 8B DE
1569:02 38 EE 6A 06 A0 29 C0 EC
1571:01 B0 4F 23 23 61 83 1F 29
1579:A0 01 47 38 AD 45 E9 01 06
1581:8D 60 19 4C E4 18 20 10 4A
1589:12 A9 0F C2 1D 21 1B A2 7B
1591:00 61 11 75 0B 4C 51 11 CA
1599:E0 28 E2 07 A1 E8 F0 AC 4A
15A1:59 00 93 0B 21 99 35 03 78
15A9:C8 8C 34 03 8A 8B 04 D0 6D
15B1:F1 60 A0 6B A8 B9 E7 37 EA
15B9:0A C0 A9 91 D6 85 D3 20 3B
15C1:6E E5 65 32 A2 00 BD 43 3F
15C9:21 4D E8 E0 A8 50 F5 A9 1F
15D1:9D CC 10 80 31 08 20 20 12
15D9:B9 70 32 AA 8C 34 02 30 57
15E1:01 C4 1B 80 40 0A A9 1D AB
15E9:60 19 00 AC F4 02 C8 C0 57
15F1:08 D0 CA 18 3E 3C D0 FA AE
15F9:4C 8E 0C 5F 1F FB A9 0A A5
1601:74 8A 80 0F 8E A9 D8 54 2C
1609:0A BB 60 B0 A9 1C 48 AD 3C
1611:4D 8B 0A 20 D0 AD 4C 21 01
1619:8D 21 D0 84 BB B1 30 C9 85
1621:20 F0 17 91 03 37 41 B0 BD
1629:08 90 27 C9 4D F0 1D B0 18
1631:09 C9 4C 90 0B F0 0F 4C 6D
1639:12 C2 5E 51 20 05 4E 3B EC
1641:05 4F 3B 05 21 4C 3C 57
1649:1A AD 4B 21 91 FD 20 9E CC
1651:1A 20 AC 1A 3B FD 30 43 3F
1659:B2 30 A5 31 BA 8F 31 66 8F
1661:C9 E8 82 10 36 20 C9 07 CA
1669:A8 0B 04 1A 40 E5 6C 34 75
1671:40 4E 86 28 4F 4E 85 47 AA
1679:65 FD 07 39 FC 65 FE 74 3C
1681:0F FD 6D E8 7B FC 05 6D 28
1689:E9 07 D9 17 0D FB 4D 43 4F
1691:FB A5 FC D7 FC D0 34 A5 7B
1699:FD 69 01 E0 AC 05 FE 69 00 49
16A1:36 6A 60 4B 46 69 0C 5C 90
16A9:19 60 4C 20 09 E5 52 24 AE
16B1:F0 F7 17 B9 18 AD 65 29 3E
16B9:F0 09 04 8D 18 C0 04 00 C5
16C1:8D 15 D0 A9 01 A2 93 A0 09
16C9:21 20 BD CA DD A2 08 2A A6
16D1:8C BA 46 C0 40 2A 39 18 FC
16D9:C9 0D F0 57 A2 80 7B 80 50

PROGRAMS

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16E1:55 9A D3 A0 D2 30 81 40 7E
16E9:D1 51 C0 00 DA 28 4E 41 C0
16F1:8D 53 00 07 0D B0 02 F0 4A
16F9:2B ED 40 AA A3 20 CD BD E0
1701:A9 20 D0 B6 64 F4 F0 0F 79
1709:10 44 38 8E 7E 80 34 4C EA
1711:1B 64 29 0D 08 45 4C 15 DE
1719:1B 20 6F 1B A9 00 C3 85 D6
1721:80 02 20 C3 FF 00 47 20 FE
1729:BA 1A 20 85 1B 4C DB 08 61
1731:B6 B8 43 F0 8E 20 E4 FF 1F
1739:C9 00 D0 F9 60 A5 CB C9 01
1741:40 D0 FA 60 A9 93 20 D2 D7
1749:FF AD CD 83 77 02 FD AD 42
1751:CE 02 85 FE A9 3F 85 FB 59
1759:A9 06 85 FC 20 C6 12 60 FE
1761:8E EC 28 AE 72 E0 06 F0 16
1769:25 80 06 50 AE 22 03 E8 FC
1771:02 EC C9 02 B0 07 E0 51 E9
1779:B7 03 4C C9 1B 60 43 C8 14
1781:D3 CA 02 AE CB 02 6C 11 C7
1789:03 A2 00 8E D3 02 8E D4 63
1791:02 4C AE 1B 80 7D E5 C3 E4
1799:43 A3 58 C8 F0 28 88 43 66
17A1:A0 C0 30 42 F0 11 85 0B 5C
17A9:8F 8E 38 2E 3C 76 BA 3C 9A
17B1:E4 64 23 63 E3 67 E3 28 B2
17B9:C3 00 4E 36 18 8A 93 8D 96
17C1:8B 8D 83 38 2E 40 66 E3 30
17C9:A3 38 88 1F 1F EB 21 F8 BE
17D1:F8 AE 83 82 63 43 A0 90 BA
17D9:18 10 0A 8E C8 10 7E 7E DF
17E1:7E E8 0A 00 18 18 00 00 EB
17E9:00 EA 83 3A 06 32 02 FF E3
17F1:E4 65 A0 E3 D1 B2 43 93 B1
17F9:0B C0 F0 70 05 58 78 98 16
1801:02 E8 60 00 C8 44 73 B2 69
1809:E1 09 0C 75 1F 22 27 17 2C
1811:50 51 52 53 54 55 56 57 39
1819:58 59 7E FC 64 C3 06 0C B5
1821:09 AF 1E 44 4E 2E 5A 5B 05
1829:5C 5D 5E 5F 60 61 62 63 51
1831:FC F8 C9 86 15 10 17 C7 9E
1839:1C 27 64 65 66 67 68 69 2F
1841:6A 6B 6C 6D F5 F1 93 0D 91
1849:0F FD 42 25 80 71 52 E1 6B
1851:6E 6F 70 71 72 73 74 75 79
1859:76 77 C7 4F 36 0C 05 06 82
1861:FC FE 06 1A 27 78 79 7A BA
1869:7B 7C 7D 7E 7F 80 81 F7 07
1871:F1 93 0E 8F ED 81 1C 4F 37
1879:20 4E 4E 50 3D 82 83 84 9B
1881:85 86 87 88 89 8A 8B 19 36
1889:3F E9 F0 0F 14 01 2B 1E FB
1891:60 44 02 EC 8C 8D 8E 8F 59
1899:90 91 92 93 94 95 E3 8F 54
18A1:00 A2 01 40 C7 12 05 16 45
18A9:98 25 13 05 D1 15 0C 14 31
18B1:01 D0 1F 20 B0 03 9C 9D EA
18B9:9E 9F 70 3E 55 78 B0 05 06
18C1:EC 08 0B 50 78 24 04 EC 1A
18C9:78 CA 20 09 01 12 01 03 D2
18D1:41 A7 05 04 09 14 4C 02 A0
18D9:07 20 17 09 0E 04 A6 05 D7
18E1:A1 0C D5 0B 05 14 03 08 D1
18E9:F6 69 C3 E3 A0 8E 85 3A 2B
18F1:84 32 06 32 80 E0 29 3C EA
18F9:20 3E 20 05 E0 EB 29 E3 34
1901:61 C3 E3 A0 0E 9D 39 3E F2
1909:33 3C 1E EE 4A 39 A8 42 61
1911:4A 6B 20 43 3B E3 0C 80 7D
1919:06 01 E5 0F 27 1D 3A 3E 9C
1921:27 2B 13 0C 0F 17 9E 5C 43
1929:00 E2 09 00 87 C4 3B CE C9
1931:49 89 C7 05 80 10 01 07 01
1939:05 4C 08 05 01 04 C2 A7 97
1941:3C 7A 9E 40 A0 4F 4F 7A 63
1949:9A F1 78 88 41 3D 2B A7 D9
1951:8E A7 0B 20 01 0E 09 4F B9
1959:64 14 09 0F 63 0B 10 D7 14
1961:85 C4 3E 41 D6 40 11 20 5D
1969:4F 40 77 31 1E D7 46 3F 71
1971:71 C5 D6 49 73 52 E1 61 47
1979:07 03 04 05 06 07 08 09 26
1981:0A 0B 0C 0D 0E 0F 10 11 AB
1989:12 13 14 15 16 17 18 19 B3
1991:1A 1B 1C A0 06 7F 52 E1 D9
1999:41 1D 65 20 21 22 23 24 5E
19A1:25 26 27 28 29 2A 2B 2C CB
19A9:2D 2E 2F 30 31 32 33 34 D3
19B1:35 36 37 38 39 4E 83 27 A7
19B9:01 68 18 48 ED 3C ED 47 91
19C1:F8 C4 D4 49 41 35 0A 4D 11
19C9:01 0D 01 0E CE 22 E0 E1 63
19D1:EL 15 07 02 15 06 06 05 0D
19D9:12 20 41 45 35 F1 86 0E 26
19E1:8F 87 3A 0E E6 4B 19 C8 45
19E9:08 42 42 46 4D 55 4C 54 0A
19F1:49 2D 05 30 7E B0 31 1C EC
19F9:3A 87 00 7A 52 32 FF 60 8E
1A01:20 43 4F 4D 4D 41 4E 44 25
1A09:CA 87 50 45 89 16 38 40 38
1A11:0F 80 E2 61 05 A0 FF 90 9A
1A19:05 1C 9F 9C 1E 1F 9E 81 C0
1A21:95 96 97 98 99 9A 9B 80 31
1A29:AF E7 10 08 92 01 7F BF 09
1A31:DF EF F7 FB FD FE 14 F1 16
1A39:81 57 2C 53 2C 52 46 49 3F
1A41:4C 86 13 4E 41 4D D8 3F B4
1A49:FF 20 84 7D 01 20 9A 14 BF
1A51:52 89 53 2D 53 41 56 45 DF
1A59:20 4C 2D 4C 4F 41 44 20 43
1A61:52 2D 52 45 53 16 F6 27 B0
1A69:20 51 2D 51 55 FD FF 44 A3
1A71:A0 0F 41 79 DA 00 00 06 56
1A79:04 02 0E 07 00 01 02 02 6C
1A81:6D 6D E6 02 6D 6C 6C 42 FC
1A89:25 20 50 41 54 54 45 52 47
1A91:4E 20 FF FF C3 99 9F 9F 58
1A99:99 C3 FF 18 78 68 80 A8 1C
1AA1:A0 28 45 44 49 54 4F 52 A9
1AA9:87 0F 7E 21 53 4B 45 54 ED
1AB1:43 48 20 4D 4F 44 45 FF 88
1AB9:24 40 7E 4E 1D 87 44 41 95
1AC1:5D 48 64 78 64 07 D8 15 52
1AC9:0B C5 54 13 3C 06 1B 12 F2
1AD1:45 CC 1C 12 13 8D 07 48 A5
1AD9:09 34 12 1B 0C 05 D0 1C C5
1AE1:12 07 8D 44 1C 38 20 B1 8A
1AE9:11 5D A8 D5 0E C3 B0 21 72
1AF1:A0 20 0F 20 F1 10 66 C8 97
1AF9:6D 3C 14 12 17 1E 17 E0 D7
1B01:B7 21 91 F1 B0 E1 71 12 AE
1B09:D1 50 84 78 5C C4 81 D1 1F
1B11:EL 71 51 1C 40 20 6C 2D 09
1B19:65 78 84 20 40 64 E5 08 1A
1B21:34 02 E0 00 D1 50 10 19 17
1B29:D0 CE 86 41 31 39 32 73
1B31:39 B1 03 0F 0D 77 14 05 35
1B39:40 07 10 15 02 2E 99 0C AC
1B41:09 0E 14 7B 11 0C 14 04 9E
1B49:46 B0 21 20 20 20 01 0C 84
1B51:0C 50 1B 09 07 08 14 13 29
1B59:20 12 05 13 05 12 16 05 97
1B61:04 20 40 00 00 00 00 00 A9

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SMART FORMAT

By Rustin Ambrose

Smart Format for the 1541 drive is a utility program that executes a full NEW format of a disk in one-third the usual time. Anyone who must format a number of disks at one session will appreciate this timesaving feature.

With another welcome feature, Smart Format eliminates head bumping—that banging noise in your drive that normally occurs at the start of a conventional format. Smart Format was designed to work only with the 1541 drive.

Entering the Program

Smart Format is written entirely in BASIC. To help avoid typing errors, use The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before exiting Proofreader.

To use Smart Format, simply load and run it as you would any BASIC program. The program uses DATA statements to send custom machine language routines to the drive.

Why It's Faster

Formatting a disk is usually done with the NEW command, which is written OPEN15, 8, 15, "NO: DISK NAME, ID": CLOSE15. This type of formatting usually takes about 85 seconds. More than half of this time is spent calculating the optimal size of the disk's inter-sector gaps.

The inter-sector gaps are strings of about 4–18 bytes that are added to the end of each sector during formatting. The gap areas are never used by the drive but rather act as padding between sectors of a track. The optimal gap size depends partly on the rotational speed of the drive.

Commodore's Disk Operating System (DOS) repeats a complex algorithm on each track to calculate the best gap size. The time-consuming

part of the algorithm compensates for small changes in drive speed that can occur from track to track. Testing shows, however, that drive speeds don't vary enough during the short time of the NEW command to make a significant difference in the gap calculations. As a result, there's no good reason to repeat the algorithm on every track on a disk.

Smart Format uses the DOS algorithm only on track 1. The gap length for track 1 is then used to calculate the gaps for all other tracks.

Smart Format also improves the efficiency of the routine that clears a track prior to formatting. The combined effect of these changes reduces execution time to about 28 seconds. User group librarians or anyone else who must format a number of disks during one computing session will appreciate this faster procedure.

Eliminating the Bump

When you format a disk using the conventional command, you probably hear a banging noise coming from the drive. This banging sound at the start of formatting is caused by the drive read/write head stepping outward an excessive number of times. The regular format routines do this to guarantee that formatting begins on track 1, the outermost track. The bump can contribute to alignment problems and should be avoided whenever possible. Smart Format uses the drive's internal track counter to move the read/write head precisely to track 1 without the bump.

If the drive hasn't been used since power-up, the internal track counter will need to be initialized. Should Smart Format detect this situation, it will ask the user to insert any formatted disk. The track counter is then updated by reading the track number from the formatted disk using the INITIALIZE command.

Other Details

Smart Format does all of the standard error checking. This includes a full verification of every formatted track. If an error is detected, the program will attempt to correct it up to ten times before giving up. Smart Format's final display shows the number of retries required (usually zero).

The final display also indicates four inter-sector gap lengths (in bytes) used during the format. Each gap value applies to an entire zone of the disk. The track number ranges of the four zones are 1-17, 18-24, 25-30, and 31-35. Drives that rotate at slower speeds will produce larger gap values.

Smart Format makes no permanent changes in the DOS, and all drive commands will function normally. The BASIC program must be used to execute the custom drive routines.

SMART FORMAT

```

JA 100 REM SMART FORMAT BY RUS
      TIN AMBROSE
CE 110 REM COPYRIGHT 1992 - CO
      MPUTE PUBLICATIONS INTL
      LTD - ALL RIGHTS RESER
      VED
RJ 120 REM A$ MUST BE FIRST VA
      RIABLE USED IN PROGRAM
FF 130 A$="":C0$=CHR$(0):CR$=C
      HR$(13):VA=PEEK(45)+256
      *PEEK(46)
CX 140 POKE(VA+2),255:POKE(VA+
      3),0:POKE(VA+4),192
QC 150 PRINT"SETTING UP. . ."
FA 160 FORAD=49176TO49375:READ
      X:POKEAD,X:NEXTAD
HS 170 POKES3280,0:POKE53281,0
AP 180 PRINT"{CLR}{8}{DOWN}";C
      HR$(14)
RQ 190 PRINT"*****SMART
      {SHIFT-SPACE}FORMAT V1.
      0*****"
FJ 200 PRINTCR$$(11)"1541 FA
      ST FORMAT"CR$$(12)"WI
      THOUT 'BUMP'"
CA 210 PRINTCR$$(11)"BY RUST
      IN AMBROSE"
EQ 220 PRINT"{3 DOWN}ENTER:
      {2 SPACES}DISKETTE NAME
      ,ID"
JR 230 PRINT"(NAME CAN HAVE MA
      X OF 16 CHARS,"
BM 240 PRINT" I.D. MUST BE 2 C
      HARS LONG)";CR$
PH 250 DN$="":ID$="":INPUTDN$,
      ID$:IF(DN$="")OR(ID$="")
      )THENEND
KH 260 LN=LEN(DN$):IFLN>16THEN
      PRINTCR$"--NAME TOO LON
      G.":GOTO220
BH 270 IFLEN(ID$)<>2THENPRINTC
      R$"--I.D. NOT 2 CHARACT
      ERS LONG.":GOTO220
RJ 280 CS$="N0:"+DN$+CHR$(44)+
      ID$+CHR$(13):CL=LEN(CS$
      ):POKE49175,CL
FP 290 FORI1=1TOCL:POKE49151+I
      1,ASC(MID$(CS$,I1,1))+C0$
      ):NEXTI1
ED 300 :
```

```

QF 310 CLOSE15:OPEN15,8,15
SQ 320 PRINT#15,"M-R"CHR$(34);
      C0$:GET#15,T$:IFASC(T$+
      C0$)THEN380
HJ 330 PRINTCR$***INTERNAL TRA
      CK COUNTER OF DRIVE NEE
      DS"
FS 340 PRINT"{2 SPACES}TO BE I
      NITIALIZED."
EG 350 PRINT"{2 SPACES}PLEASE
      {SPACE}INSERT ANY FORMA
      TTED DISKETTE."
BS 360 PRINT"{2 SPACES}THE DIS
      KETTE WILL NOT BE AFFEC
      TED**":GOSUB630
BX 370 PRINT#15,"I0":GOSUB700:
      GOTO320
XG 380 PRINTCR$***PLACE DISKET
      TE TO BE FORMATTED INTO
      "
FK 390 PRINT"{2 SPACES}DRIVE**
      ":GOSUB630
CP 400 PRINT#15,"M-R"CHR$(30);
      C0$:GET#15,WP$:IFASC(WP
      $+C0$)AND16THEN430
KJ 410 PRINTCR$"--WRITE PROTEC
      T IS ON."
AG 420 PRINT"--REPLACE DISKETT
      E.":GOSUB630:GOTO400
XF 430 PRINTCR$***PLEASE CHECK
      THAT DISKETTE IN"
DE 440 PRINT"{2 SPACES}DRIVE S
      HOULD BE FORMATTED."
KS 450 PRINT"{2 SPACES}ALL DAT
      A WILL BE DESTROYED!*"
JC 460 PRINTCR$$(7)"[HIT SPA
      CE BAR TO FORMAT":GOSUB
      640
CC 470 PRINT#15,"M-R"CHR$(34);
      C0$:GET#15,T$:IFASC(T$+
      C0$)=0THEN330
XB 480 PRINT#15,"M-R"CHR$(30);
      C0$:GET#15,WP$:IF(ASC(W
      P$+C0$)AND16)=0THEN410
EC 490 PRINTCR$"--FORMATTING '
      "DN$","ID$". . ."
EP 500 PRINT#15,"M-W"CHR$(28);
      C0$:CHR$(1);C0$
QM 510 OPEN2,8,2,"#1":PRINT#15
      ,"B-P";2;0:PRINT#2,AS;:
      CLOSE2
FX 520 PRINT#15,"M-E"CHR$(28);
      CHR$(4):GOSUB700
JQ 530 PRINTCR$DONE!
      {3 SPACES}[I.S. GAPS: "
      ;
FR 540 PRINT#15,"M-R"CHR$(5)CH
      R$(6)CHR$(4)
XF 550 FORI1=0TO3:GET#15,G$:G(
      I1)=ASC(G$+C0$):NEXTI1
AE 560 FORI1=3TO0STEP-1:PRINTG
      (I1);:NEXTI1:PRINT"]"
BA 570 PRINTSPC(10)"[# OF RE-T
      RIBS:";
DJ 580 PRINT#15,"M-R"CHR$(32)C
      HR$(6):GET#15,ER$:ER=AS
      C(ER$+C0$)
HB 590 PRINT10-ER"]"
```

```

RH 600 CLOSE15:PRINTCR$***FORM
      AT ANOTHER?***:GOSUB630
      :GOTO220
GH 610 :
MH 620 :
SA 630 PRINTCR$SPC(7)"[HIT SPA
      CE BAR TO CONTINUE]"
SF 640 PRINTSPC(11)"OR 'E' TO
      {SPACE}EXIT]"
DB 650 POKE198,0
SK 660 GETI$:IFI$="E"THENCLOSE
      15:END
QF 670 IFI$<>" THEN660
JA 680 RETURN
GR 690 :
CS 700 INPUT#15,E1$,E2$,E3$,E4
      $:IFE1$="00"THENRETURN
DH 710 PRINTCR$"DRIVE ERROR #"
      E1$:""
KB 720 PRINT""E2$"" TRACK#"E3
      $" SECTOR#"E4$:CLOSE15:
      END
PS 730 :
KP 740 DATA1,4,10,0,174,23,4,1
      34,163,189,255,3,157,25
      5,1,202
BD 750 DATA208,247,160,70,162,
      193,169,132,32,93,4,32,
      48,6,160,13
AB 760 DATA162,238,169,61,32,9
      3,4,32,48,6,160,54,162,
      252,169,174
JH 770 DATA32,93,4,169,76,141,
      0,6,169,123,141,1,6,169
      ,4,32
HG 780 DATA210,200,76,64,238,1
      40,105,4,142,106,4,141,
      3,6,162,0
AH 790 DATA189,255,255,157,48,
      6,232,200,204,3,6,208,2
      43,169,96,157
AS 800 DATA48,6,96,165,81,16,1
      9,169,6,141,33,6,169,15
      ,141,34
KG 810 DATA6,169,10,141,32,6,1
      69,1,133,81,160,0,209,5
      0,240,13
JM 820 DATA201,2,208,6,174,38,
      6,142,4,6,76,251,250,20
      1,1,240
AX 830 DATA52,165,68,74,74,74,
      74,74,170,189,24,4,24,1
      09,4,6
RC 840 DATA157,5,6,141,38,6,32
      ,48,6,173,12,28,41,31,9
      ,192
RD 850 DATA141,12,28,169,255,1
      41,3,28,169,85,141,1,28
      ,162,2,32
EE 860 DATA36,254,76,177,252,7
      6,0,251

```

Rustin Ambrose's initial goal with Smart Format was to protect his drives from the excessive head bumping that can occur during formatting. He lives in West Allis, Wisconsin.

DLINER

By Daniel Lightner

Here's a little program that you can have fun with by devising a variety of useful applications. DLiner is a utility that can convert any area of memory into lines of BASIC data statements. These lines can then be saved and used just like any BASIC program data.

DLiner is written in machine language. To enter it, you'll need MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. When MLX prompts for the starting and ending addresses, respond with the following.

Starting address: CCA2

Ending address: CFFE

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

To use DLiner, load it with the .8,1 extension, type NEW, and press Return. You can then go ahead and load another program. When you're ready to convert an area of memory to data statements, simply type SYS 52386, SA, EA. SA is the starting address of the area you want to convert, and EA is that area's ending address.

To convert the information that appears on a screen, for example, type SYS 52386, 1024, 2023 and press Return. DLiner then creates 1000 data statements, starting with line 9000. Adding a few lines of code to read and poke these same data statements back into memory will re-create the screen.

DLiner can also be used to convert machine language code. If you write a machine language program, you can convert it to data statements and either run the statements with a BASIC loader or combine them to run with other subroutines.

DLINER

```

CCA2:D8 20 7D CF A0 00 A2 00 A7
CCAA:A9 00 C8 C0 FF D0 FB A0 1A
CCB2:00 E8 E0 FF D0 F4 A2 00 42
CCBA:69 01 C9 0A D0 EC AD 06 BE
CCC2:02 C9 2C D0 11 A0 00 B9 27
CCCA:07 02 C9 2C F0 0B 99 35 80
CCD2:03 C8 C0 06 D0 F1 4C 66 E5
CCDA:FE 8C 34 03 88 8C C4 02 CF
CCE2:20 4D CD AD A7 02 8D C2 97
CCEA:02 AD A8 02 8D C3 02 AC 52
CCF2:C4 02 C8 B9 07 02 C9 2C 24

```

```

CCFA:D0 DC A2 00 C8 B9 07 02 C5
CD02:C9 00 F0 07 9D 35 03 E8 C1
CD0A:C8 D0 F2 98 38 ED C4 02 2B
CD12:A8 88 88 8C 34 03 20 4D 39
CD1A:CD AD A7 02 8D A9 02 AD E1
CD22:A8 02 8D AA 02 AD C2 02 3D
CD2A:8D A7 02 AD C3 02 8D A8 7B
CD32:02 AD AA 02 CD A8 02 90 55
CD3A:9D F0 03 4C D4 CD AD A9 E8
CD42:02 CD A7 02 90 90 F0 8E 9E
CD4A:4C D4 CD A0 00 B9 35 03 59
CD52:A2 00 DD 95 CF F0 06 E8 8B
CD5A:E0 0A D0 F6 60 C8 CC 34 66
CD62:03 D0 EA AD 34 03 C9 05 32
CD6A:90 1C A0 00 B9 35 03 D9 EB
CD72:9F CF B0 03 4C 88 CD D9 12
CD7A:9F CF F0 01 60 C8 C0 05 B4
CD82:F0 03 4C 6E CD 60 EA A9 37
CD8A:00 8D A7 02 8D A8 02 A0 52
CD92:00 AE 34 03 CA BD 8B CF C4
CD9A:8D AA 02 BD 90 CF 8D AB 4E
CDA2:02 B9 35 03 8C AC 02 38 D7
CDAE:E9 30 A8 18 C0 00 F0 17 DC
CDB2:18 AD A7 02 6D AA 02 8D 82
CDBA:A7 02 AD A8 02 6D AB 02 0A
CDC2:8D A8 02 88 4C AD CD AC 79
CDCA:AC 02 CA C8 CC 34 03 D0 31
CDD2:C4 60 18 AD A9 02 69 01 EF
CDDA:8D A9 02 AD AA 02 69 00 F2
CDE2:8D AA 02 AD A7 02 85 FB 57
CDEA:AD A8 02 85 FC A9 00 8D 3C
CDF2:AB 02 A9 28 8D AE 02 A9 71
CDFA:23 8D AF 02 A9 01 8D AC BA
CE02:02 A9 08 8D AD 02 A9 03 B0
CE0A:8D B0 02 A9 08 8D B1 02 51
CE12:A0 00 AD B0 02 85 FD AD 90
CE1A:B1 02 85 FE AD AE 02 91 6F
CE22:FD AD AF 02 C8 91 FD A0 69
CE2A:00 18 AD AE 02 69 01 8D B3
CE32:AE 02 AD AF 02 69 00 8D 9B
CE3A:AF 02 20 CC CE 20 CC CE 60
CE42:A9 83 91 FD 20 CC CE B1 2B
CE4A:FB AA A9 00 20 77 CE A0 E2
CE52:00 A9 2C 91 FD 18 A5 FB 90
CE5A:69 01 85 FB A5 FC 69 00 51
CE62:85 FC 4C DA CE EE AB 02 C4
CE6A:AD AB 02 C9 10 D0 D5 20 36
CE72:26 CF 4C 14 CE 8D 2F CB B8
CE7A:8E 2E CB A2 09 8E 20 CB 1D
CE82:A0 B0 AD 2E CB DD AB CF 2C
CE8A:AD 2F CB FD A9 CF 90 FD E0
CE92:8D 2F CB AD 2E CB FD AB 5C
CE9A:CF 8D 2E CB C8 D0 E3 98 EF
CEA2:CA F0 10 C9 B0 F0 03 8D 5D
CEAA:20 CB 2C 20 CB 30 04 A9 A3
CEB2:00 F0 05 29 7F 20 BE CE 88
CEBA:CA 10 C5 60 8C B4 02 A0 5C
CEC2:00 91 FD 20 CC CE AC B4 36
CECA:02 60 18 A5 FD 69 01 85 FB
CED2:FD A5 FE 69 00 85 FE 60 C3
CEDA:A5 FB CD A9 02 F0 03 4C C4
CEE2:67 CE A5 FC CD AA 02 F0 7A
CEEA:03 4E 67 CE 20 26 CF A9 D9
CEF2:00 91 FD C8 91 FD C8 91 E8
CEFA:FD 18 A5 FD 69 02 85 2D BD
CF02:A5 FE 69 00 85 2E A5 2D BE
CF0A:85 2F 85 31 A5 2E 85 30 1D
CF12:85 32 A0 00 B9 A4 CF 99 AE
CF1A:77 02 C8 C0 05 D0 F5 84 F6
CF22:C6 4C 66 FE A9 00 8D AB 09

```

```

CF2A:02 A9 00 91 FD 20 CC CE 27
CF32:A5 FD 8D B0 02 A5 FE 8D 13
CF3A:B1 02 AD AC 02 85 FD AD 83
CF42:AD 02 85 FE AD B0 02 91 9F
CF4A:FD AD B1 02 C8 91 FD A0 D3
CF52:00 AD B0 02 85 FD 8D AC 7F
CF5A:02 AD B1 02 8D AD 02 85 69
CF62:FE A9 00 91 FD C8 91 FD 39
CF6A:A0 00 20 CC CE 20 CC CE 8A
CF72:A5 FD 8D B0 02 A5 FE 8D 53
CF7A:B1 02 60 A0 00 B9 B3 CF A7
CF82:20 D2 FF C8 C0 4C D0 F5 42
CF8A:60 01 0A 64 E8 10 00 00 A9
CF92:00 03 27 30 31 32 33 34 C7
CF9A:35 36 37 38 39 36 35 35 0F
CFA2:33 35 4C 49 53 54 0D 01 4E
CFAA:00 0A 00 64 00 E8 03 10 CC
CFB2:27 0D 54 48 45 20 44 4C B7
CFBA:49 4E 45 52 0D 43 4F 50 C4
CFC2:59 52 49 47 48 54 20 31 46
CFCA:39 39 32 20 43 4F 4D 50 DF
CFD2:55 54 45 0D 50 55 42 4C 54
CFDA:49 43 41 54 49 4F 4E 53 D4
CFE2:20 49 4E 54 4C 20 4C 54 C3
CFEA:44 0D 41 4C 4C 20 52 49 AD
CFF2:47 48 54 53 20 52 45 53 30
CFFA:45 52 56 45 44 00 00 00 13

```

Daniel Lightner is a frequent contributor. He lives in Sidney, Montana.

XLOGIC

By Richard Penn

Merge and renumbering utilities all have their place, but a good debugger is a tool that no programmer should be without. Although it's not absolutely necessary for short programs, using one can save you a great deal of time when you're writing lengthy code.

XLogic is a BASIC debugging tool that's simple enough to be used by novices, yet powerful enough to meet the needs of even the most demanding programmer. It has no gimmicks, only the bare essentials—the bare essentials to locate and blow any bug off the silicon landscape, that is.

First, it enhances the LIST command to display in color the paths of all GOTO statements, IF/THEN statements, and other branches. This lets you follow a program's logic at a glance, even if you're viewing someone else's program for the first time. A description doesn't do justice to its power. After using it, you'll feel half-blind looking at a conventional listing.

If you need a closer look at program flow, the trace routine shows each line and highlights every statement as it executes. Up to four variables (including array variables) can be displayed inside

the trace window. The window can be placed at the top or at the bottom of your screen so that it won't overwrite something important. Finally, the speed of the trace can be varied, and the code can be single-stepped. You can also dump all the variables and functions, color-coded by type, into memory.

Typing It In

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

Starting address: C000

Ending address: CBF7

When you've finished typing, be sure to save a copy of the program before exiting MLX.

Four Commands

To use XLogic, just follow these simple steps. Load the program with a command of the following form: LOAD "XLOGIC",8,1. Of course, you should replace XLOGIC with whatever name you used when you saved the XLogic data. Type NEW. Activate the program with SYS 49152.

XLogic's features are easily accessed with four new commands that work only in direct mode. You're limited to one XLogic command per line, which can be abbreviated by typing the left arrow (←) and the first letter (or as many characters after these initial two as you like).

Both ←LIST and ←TRACE activate debugging modes, as opposed to most commands that perform an immediate function. You can program normally in either mode. Apart from the enhanced features, you won't even know one of these features is on unless you list or run a program.

Only one mode can be used at a time, so activating a new mode will replace the current one. Run/Stop-Restore won't disable a mode. To turn off either mode, use the ←OFF command.

The command ←VAR is always available and is unaffected by ←OFF. XLogic itself will remain active until you shut off the computer.

The command ←LIST turns on

branch mapping. A branch is any point where a BASIC program jumps to another line and is done with the GOTO, GOSUB, IF/THEN, ON/GOTO, or ON/GOSUB commands.

Most cross-reference utilities print a line-number list, which is not very useful. XLogic highlights branches in color within the listing so that you can see where each branch goes and continue programming normally at the same time. In this mode, the LIST command changes the screen color to black and lists everything in light blue, but it prints all branches and the lines they reference in matching colors.

For example, let's look at this simple program.

```

10 PRINT "XLOGIC"
20 PRINT
30 FOR T = 1 TO 10 : NEXT : GOTO 10

```

With ←LIST, GOTO 10, all of line 10 would be listed in white. The rest of the program would be light blue.

The key to reading a colored listing is the line number, which is always light blue unless some other line branches to it. Whenever you see a line number (and the rest of the line, since lines match their line-number color) that isn't light blue, you know that there's at least one command somewhere in the program that jumps to this line. It's then a simple matter of matching up all the branch commands of the same color with the line that's that color. If all this sounds confusing, don't worry; it will become obvious when you see it on the screen.

The 64 has 16 colors, so there's a limit to how many branches can be mapped. Since light blue is the neutral color and characters are invisible if they're the same color as the screen, that leaves 14 free. However, ←LIST also uses reverse video, so a total of 28 different branches can be displayed. If there are more than 28 branches, the surplus branches are all highlighted in light blue reverse video. So although they're still shown, you can't tell different jumps apart. This isn't a serious problem, because ←LIST only cross-references the lines you list.

If you type LIST alone, the entire program is cross-referenced. But if you type a command such as LIST 100—

PROGRAMS

200, only the lines 100-200 are cross-referenced.

Since ←LIST cross-references branches on a first-come-first-served basis, don't be surprised if the colors change when you're listing different groups of lines. Although the colors may be different, the program listing is still accurate.

There are two error messages that you can get with ←LIST. The first is an UNDEFINED BRANCH error message with the offending line printed beneath. This happens when there's a branch command with a syntax error somewhere in the program, such as GOTO with a missing line number. Simply cursor up to the line, correct it, and list again.

It's rare that anyone will see the second error, which occurs when there are too many branches. This shouldn't be confused with the 28-branch color limit. Although ←LIST is able to display only 28 different branches, it can handle over 1300 internally. Few programs for the 64 need this many branches, but ←LIST will inform you if you ever exceed this limit! Should that occur, simply list smaller groups of lines.

The command ←TRACE turns on the execution trace. This mode displays a trace window whenever you run a program. Use it to see exactly what a program is doing as it runs and to find out when and why variables are changing.

Also, if you get a syntax error but can't tell what's wrong with the line in question, ←TRACE will show you exactly where the program stopped.

The command ←TRACE prompts you for several settings. If you change your mind during this procedure, press Run/Stop-Restore to cancel. First, it asks you if you want the trace window to be at the top or at the bottom of the screen. This lets you put it where it won't overwrite anything important. Next, you're prompted to select the execution speed. You have the choice of running the program at the fastest possible speed (normal), slower (delay), or slowest, (single step) through the code.

When single-stepping, hit any key on the keyboard (hold it down for continuous execution) to execute the next command. If you single-step a program that waits for a keypress with the

GET command, remember to hold down the key the program expects when the trace reaches the GET. (It's better to avoid single-stepping programs with many GET commands.)

Regardless of which speed you select, keep in mind that a traced program runs slower than normal, so hold down all keys including Run/Stop until they catch.

You also have the option of displaying up to four variables during the trace. To enter the variables, type them in the order that you want them to appear and separate them with a slash (/). An entry such as A/B/C/BOX(A,B,C) is legal and still counts as only four variables, since BOX(A,B,C) prints only one value.

If you accidentally enter an illegal variable and run the program, the trace will stop and display an error beside the variable it doesn't understand. If this happens, use the ←TRACE command again to enter the correct variables. Also, strings must be less than 36 characters in length, or they won't fit inside the window.

To try out the various trace options, enter and run this short program.

```
10 A=1: B=2: C=3: D=4: E=5: F=6: G=7: H=8:
   GOTO 10
```

The command ←TRACE uses light blue to display the current line and variables and highlights commands in white as they're executed. If these colors conflict with your program's screen color, change it temporarily while you debug your program. Also note that the LIST command won't work properly with ←TRACE on.

The command ←VAR dumps all non-array variables and functions in memory, color-coded by variable type, to the screen. Functions are followed by the notation FN.

The command ←OFF disables all XLogic commands except for ←VAR.

Debugging BASIC with ML

XLogic is a BASIC debugging tool. If your program uses any machine language routines, there might be a memory conflict.

Note that XLogic resides from 49152 to 52208, downloads and modifies BASIC ROM, and changes several vec-

tors. It also uses all of the RAM underneath Kernal ROM and part of the cassette buffer as work areas. ML is safe to use with XLogic, provided that it isn't located in any of these potential trouble spots.

XLOGIC

```
C000:4C B8 CA 08 8D 34 03 8E 81
C008:35 03 8C 36 03 AD 4B 03 42
C010:D0 46 A2 FF B5 00 9D F1 BA
C018:CB CA E0 02 D0 F6 A9 01 25
C020:8D 4B 03 A5 5F 85 FD A5 A8
C028:60 85 FE A5 15 8D 40 03 D7
C030:C9 FF D0 08 A9 FE 8D 3F D4
C038:03 4C 41 C0 A5 14 8D 3F 5A
C040:03 20 A2 C1 A2 FF BD F1 3E
C048:CB 95 00 CA E0 02 D0 F6 69
C050:A9 00 85 FD A9 F0 85 FE 52
C058:A9 00 8D 3A 03 8D 21 D0 65
C060:A9 0E 8D 86 02 A9 00 85 90
C068:FB A9 E0 85 FC A0 00 C8 F9
C070:20 DE C0 C9 FF D0 05 A9 65
C078:0E 4C BF C0 88 20 DE C0 5B
C080:CD 35 03 D0 09 C8 20 DE 2E
C088:C0 CD 34 03 F0 0E A2 03 9C
C090:E6 FB D0 02 E6 FC CA D0 50
C098:F7 4C 6D C0 C8 20 DE C0 28
C0A0:C9 00 D0 0C A9 0E 8D 86 09
C0A8:02 A9 12 85 C7 4C C2 C0 E5
C0B0:C9 0F 90 07 38 E9 0E A2 85
C0B8:12 86 C7 AA BD 03 CB 8D A7
C0C0:86 02 AD 86 02 8D 4D 03 08
C0C8:A5 C7 8D 4C 03 AD 34 03 BF
C0D0:AE 35 03 AC 36 03 28 85 B5
C0D8:62 86 63 4C D1 BD 78 A2 77
C0E0:34 86 01 B1 FB A2 36 86 B6
C0E8:01 58 60 08 8D 37 03 8E 6B
C0F0:38 03 8C 39 03 A6 D4 D0 A1
C0F8:61 AE 3A 03 E0 01 9D 25 9F
C100:C9 3A D0 13 A9 00 8D 3A E4
C108:03 AD 4C 03 85 C7 AD 4D 26
C110:03 8D 86 02 4C 5A C1 E0 99
C118:02 D0 3F C9 2C D0 03 20 20
C120:67 C1 4C 5A C1 4C 57 C4 A9
C128:29 C9 8D F0 25 C9 A7 D0 E3
C130:12 C8 B1 5F C9 20 F0 F9 C5
C138:C9 30 90 1E C9 3A B0 1A 53
C140:4C 52 C1 C9 91 D0 13 A9 F2
C148:02 8D 3A 03 20 67 C1 4C 16
C150:5A C1 A9 01 8D 3A 03 20 32
C158:67 C1 AD 37 03 AE 38 03 6F
C160:AC C9 03 28 4C 1A A7 A9 2F
C168:00 85 C7 A0 00 78 A2 34 AB
C170:86 01 B1 FD A2 36 86 01 89
C178:58 C9 00 D0 0C A9 0E 8D 58
C180:86 02 A9 12 85 C7 4C 9B 9D
C188:C1 C9 0F 90 07 38 E9 0E 45
C190:A2 12 86 C7 AA BD 03 CB 55
C198:8D 86 02 E6 FD D0 02 E6 51
C1A0:FE 60 A9 FF 8D 00 E0 8D AC
C1A8:01 E0 A9 01 8D 3B 03 A9 33
C1B0:00 8D 3C 03 8D 4A 03 A9 94
C1B8:00 85 FB A9 F0 85 FC EE 3E
C1C0:3F 03 D0 03 EE 40 03 A0 0E
C1C8:00 B1 FD 8D 41 03 C8 B1 AA
C1D0:FD 8D 42 03 C8 C8 B1 FD F9
```

C1D8:CD 40 03 90 0C 88 B1 FD A0
C1E0:CD 3F 03 90 03 4C 64 C2 59
C1F8:C8 C8 B1 FD C9 22 D0 08 99
C1F0:AD 4A 03 49 01 8D 4A 03 A8
C1F8:AD 4A 03 D0 40 4C 3B C4 C1
C200:89 D0 06 20 65 C2 4C 3D 4D
C208:C2 C9 8D D0 06 20 65 C2 5E
C210:4C 3D C2 C9 A7 D0 1D 8C 47
C218:43 03 C8 B1 FD C9 20 F0 7C
C220:F9 C9 30 90 0A C9 3A B0 C0
C228:06 20 73 C2 4C 3D C2 AC DC
C230:43 03 B1 FD C9 91 D0 05 69
C238:A9 01 8D 3C 03 B1 FD F0 14
C240:03 4C E9 C1 A9 00 20 65 A6
C248:C4 8D 3C 03 AD 41 03 85 49
C250:FD AD 42 03 85 FE A0 00 22
C258:B1 FD D0 05 C8 B1 FD F0 9A
C260:03 4C C7 C1 60 C8 B1 FD 17
C268:C9 20 F0 F9 AD 3C 03 C9 C6
C270:01 F0 3D A2 00 B1 FD C9 11
C278:30 90 32 C9 3A B0 2E 9D AB
C280:84 03 C8 E8 B1 FD C9 3A 04
C288:F0 0B C9 00 F0 07 C9 20 D9
C290:F0 03 4C 77 C2 A9 2C 9D 03
C298:84 03 E8 A9 30 9D 84 03 DC
C2A0:E8 A9 00 9D 84 03 20 F7 E6
C2A8:C3 20 FF C2 60 4C 0C C4 55
C2B0:A2 00 B1 FD C9 30 90 41 0F
C2B8:C9 3A B0 3D 9D 84 03 C8 69
C2C0:E8 B1 FD C9 2C F0 0F C9 90
C2C8:3A F0 0B C9 00 F0 07 C9 41
C2D0:20 F0 03 4C B2 C2 A9 2C E7
C2D8:9D 84 03 E8 A9 30 9D 84 0B
C2E0:03 E8 A9 00 9D 84 03 20 7C
C2E8:A7 C3 20 FF C2 B1 FD C9 D9
C2F0:2C F0 00 A9 00 8D 3C 03 36
C2F8:60 4C 0C A4 4C 65 C2 8C 99
C300:48 03 A9 00 85 9B A9 E0 70
C308:85 9C 78 A2 35 86 01 A0 19
C310:00 B1 9B CD 44 03 D0 1F 43
C318:C8 B1 9B CD 45 03 D0 16 AE
C320:C8 B1 9B A0 00 91 FB A2 D6
C328:36 86 01 58 E6 FB D0 02 DC
C330:E6 FC AC 48 03 60 88 B1 E0
C338:9B C9 FF D0 56 C8 B1 9B E1
C340:C9 FF D0 4F A2 36 86 01 B7
C348:58 A0 00 AD 44 03 91 9B EB
C350:C8 AD 45 03 91 9B C8 AD BA
C358:3B 03 91 9B C8 A9 FF 91 A8
C360:9B C8 91 9B A0 00 AD 3B 6F
C368:03 91 FB E6 FB D0 02 E6 D1
C370:FC A5 FC C9 00 F0 60 AD 4E
C378:3B 03 D0 04 AC 48 03 60 A5
C380:EE 3B 03 AD 3B 03 C9 1D 20
C388:90 05 A9 00 8D 3B 03 AC DA
C390:48 03 6C A2 03 E6 9B D0 EE
C398:02 E6 9C CA D0 F7 A5 9C 69
C3A0:C9 F0 B0 33 4C 0F C3 E0 99
C3A8:08 B0 61 E0 07 D0 12 AD E7
C3B0:84 03 C9 37 B0 56 C9 36 90
C3B8:D0 07 AD 85 03 C9 34 B0 D0
C3C0:4B 8C 49 03 A5 7A 8D 46 E2
C3C8:03 A5 7B 8D 47 03 A9 84 A1
C3D0:85 7A A9 03 85 7B 20 EB 65
C3D8:B7 A5 14 8D 44 03 A5 15 8F
C3E0:8D 45 03 AD 46 03 85 7A 7F
C3E8:AD 47 03 85 7B AC 49 03 F5
C3F0:88 C8 B1 FD C9 20 F0 F9 AF
C3F8:60 A2 00 BD 12 CB 20 D2 08
C400:FF E8 C9 00 D0 F5 A2 FA 9B

C408:9A 4C 74 A4 A2 00 BD 25 80
C410:CB 20 D2 FF E8 C9 00 D0 21
C418:F5 A9 37 85 01 A9 1A 8D B6
C420:06 03 A9 A7 8D 07 03 A2 4E
C428:FA 9A A0 02 B1 FD 85 14 AE
C430:C8 B1 FD 85 15 20 13 A6 98
C438:4C BD A6 B1 FD C9 CB D0 C6
C440:0E C8 B1 FD C9 20 F0 F9 C3
C448:C9 A4 F0 08 4C 0C C4 C9 64
C450:89 4C 01 C2 4C 03 C2 C9 BB
C458:CB F0 07 C9 89 F0 03 4C E3
C460:29 C1 4C 52 C1 AD 3C 03 DD
C468:D0 A2 A9 00 8D 4A 03 60 34
C470:08 48 A5 3A C9 FF F0 18 B0
C478:A9 37 85 01 A9 1A 8D 06 3C
C480:03 A9 A7 8D 07 03 A9 E4 40
C488:8D 08 03 A9 A7 8D 09 03 5E
C490:68 28 4C E4 A7 08 48 8A A8
C498:48 98 48 A5 3A C9 FF D0 99
C4A0:03 4C F7 C6 A2 FF B5 00 AA
C4A8:9D F1 CB CA E0 02 D0 F6 4B
C4B0:AD 86 02 8D 4E 03 A9 13 B0
C4B8:20 D2 FF AD 50 03 C9 00 04
C4C0:F0 0C C9 01 F0 11 C9 02 70
C4C8:F0 31 C9 03 F0 3D A5 DA 23
C4D0:09 80 85 DA 4C 3F C5 A5 ED
C4D8:EF 09 80 85 EF A9 11 A2 EF
C4E0:16 20 D2 FF CA D0 FA A2 0A
C4E8:00 A9 2D 9D 48 07 A9 0E 1C
C4F0:9D 48 DB E8 E0 28 90 F1 20
C4F8:4C 3F C5 A2 00 B5 D9 09 EE
C500:80 95 D9 E8 E0 08 90 F5 39
C508:4C 3F C5 A2 11 B5 D9 09 88
C510:80 95 D9 E8 E0 19 90 F5 8D
C518:A9 11 A2 11 20 D2 FF CA 39
C520:D0 FA A2 00 A9 2D 9D 80 E4
C528:06 A9 0E 9D 80 DA E8 E0 DE
C530:28 90 F1 A2 00 A9 20 9D E0
C538:C0 07 E8 E0 28 90 F8 A9 30
C540:60 8D 14 A7 A5 39 85 14 8D
C548:A5 3A 85 15 A9 C1 8D 18 BE
C550:03 A9 EF 8D 28 03 20 13 3F
C558:46 38 A5 7A E5 5F 8D 4F B8
C560:03 A9 17 8D 26 03 A9 C7 EB
C568:8D 27 03 A9 0E 8D 86 02 35
C570:A5 14 D0 33 A5 15 D0 2F 73
C578:A0 00 B1 2B 85 FB C8 B1 9C
C580:2B 85 FC A0 00 B1 FB 85 F0
C588:FD C8 B1 FB 85 FE A0 00 A4
C590:98 91 FB C8 91 FB 20 BD 53
C598:A6 A0 00 A5 FD 91 FB C8 F0
C5A0:A5 FE 91 FB 4C AA C5 20 69
C5A8:BD A6 AD 50 03 C9 02 F0 AB
C5B0:07 C9 03 F0 22 4C 52 C6 4F
C5B8:A9 20 A6 D3 9D 00 04 E8 11
C5C0:EE 78 90 F8 A9 13 20 D2 29
C5C8:FF A9 11 20 D2 FF 20 D2 8C
C5D0:FF 20 D2 FF 4C F2 C5 A9 22
C5D8:20 A6 D3 9D A8 06 E8 E0 82
C5E0:78 90 F8 A9 13 20 D2 FF 45
C5E8:A9 11 A2 14 20 D2 FF CA 3A
C5F0:D0 FA A9 5B 85 FB A9 03 01
C5F8:85 FC A9 0E 8D 86 02 A0 C7
C600:00 B1 FB 0F C9 24 D0 41
C608:04 A2 01 86 D4 20 D2 FF 95
C610:C8 4C 01 C6 A9 20 20 D2 82
C618:FF A5 FB C5 7A A5 FC 85 D0
C620:7B 98 48 A5 D1 85 FD A5 3B
C628:D2 85 FE 20 A0 AA A4 D3 2F
C630:88 A9 20 91 D1 C8 C0 28 E4

C638:90 F9 A9 8D 20 D2 FF 68 4F
C640:A8 C8 B1 FB F0 0C E6 FB CB
C648:D0 02 E6 FC 88 D0 F7 4C 2F
C650:FF C5 A9 CA 8D 26 03 A9 E5
C658:F1 8D 27 03 A9 4C 8D 14 05
C660:A7 A9 ED 8D 28 03 A9 47 AA
C668:8D 18 03 AD 50 03 C9 02 22
C670:D0 12 20 24 EA A0 00 A9 B4
C678:2D 91 D1 A9 0E 91 F3 C8 3D
C680:C0 28 90 F3 AD 50 03 C9 48
C688:00 F0 07 C9 01 F0 23 4C 2E
C690:BE C6 A9 20 A6 D3 9D 00 26
C698:04 E8 E0 50 90 F8 A2 00 31
C6A0:A9 2D 9D 50 04 A9 0E 9D 87
C6A8:50 D8 E8 E0 28 90 F1 4C 73
C6B0:BE C6 A9 20 A6 D3 9D 70 B6
C6B8:07 E8 E0 78 90 F8 AD 51 BC
C6C0:03 C9 01 F0 07 C9 02 F0 C5
C6C8:10 4C E5 C6 A0 1E A2 FF 5D
C6D0:CA D0 FD 88 D0 F8 4C E5 29
C6D8:C6 20 9F FF A5 CB C9 40 F5
C6E0:F0 F7 4C CC C6 A2 FF BD B9
C6E8:F1 CB 95 00 CA E0 02 D0 C3
C6F0:F6 AD 4E 03 8D 86 02 68 52
C6F8:A8 68 AA 68 28 20 2C A8 93
C700:60 08 48 A9 0E 8D 86 02 1B
C708:CC 4F 03 B0 05 A9 01 8D 9B
C710:86 02 68 28 4C 1A A7 08 15
C718:48 C9 0D D0 07 68 A9 00 1A
C720:28 4C CA F1 68 28 4C CA 96
C728:F1 08 48 78 A9 31 8D 14 84
C730:03 A9 EA 8D 15 03 58 A9 F0
C738:CA 8D 26 03 A9 F1 8D 27 DC
C740:03 A9 4C 8D 14 A7 A9 ED 9E
C748:8D 28 03 A9 47 8D 18 03 47
C750:AD 06 03 C9 01 F0 23 AD F4
C758:52 03 D0 22 A9 00 8D 4B C1
C760:03 A9 0E 8D 86 02 A9 EB F1
C768:8D 06 03 A9 03 8D 07 03 88
C770:A9 70 8D 08 03 A9 C4 8D F8
C778:09 03 A9 36 85 01 68 28 0F
C780:4C 83 A4 06 48 8A 48 98 C1
C788:48 AD 00 02 C9 5F F0 03 78
C790:4C 55 CA AD 01 02 C9 54 C7
C798:F0 03 4C EC C8 20 5E CA 08
C7A0:A2 00 BD 3C CB 20 D2 FF 91
C7A8:E8 C9 00 D0 F5 A5 C5 C9 C7
C7B0:1C F0 09 C9 16 D0 F6 A9 D3
C7B8:00 4C BE C7 A9 01 8D 50 6C
C7C0:03 A2 00 BD 52 CB 20 D2 2B
C7C8:FF E8 C9 00 D0 F5 A5 C5 3B
C7D0:C9 27 F0 0D C9 12 F0 0E 84
C7D8:C9 0D D0 F2 A9 02 4C E8 B0
C7E0:C7 A9 00 4C E8 C7 A9 01 3E
C7E8:8D 51 03 A2 00 BD 79 CB D3
C7F0:20 D2 FF E8 C9 00 D0 F5 B9
C7F8:A5 C5 C9 40 D0 FA A5 C5 8D
C800:C9 27 D0 03 4C BB C8 C9 37
C808:19 D0 F3 AD 50 03 C9 00 D5
C810:F0 05 A9 03 4C 19 C8 A9 C2
C818:02 8D 50 03 A2 00 BD 94 6D
C820:CB 20 D2 FF E8 C9 00 D0 39
C828:F5 A9 00 85 C6 A0 00 8C BC
C830:53 03 A9 A4 20 D2 FF C6 BE
C838:D3 20 E4 FF F0 FB AC 53 7C
C840:03 C9 0D D0 0E AD 5B 03 55
C848:C9 41 90 ED C0 00 F0 E9 D1
C850:4C 8D C8 C9 14 D0 19 AC E3
C858:53 03 F0 DD C6 D3 A9 20 49
C860:20 D2 FF 20 D2 FF C6 D3 B0

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C868:C6 D3 CE 53 03 4C 32 C8 D7
C870:C0 26 F0 C5 C9 20 F0 08 1F
C878:C9 24 90 BD C9 5B B0 B9 BC
C880:AC 53 03 99 5B 03 20 D2 31
C888:FF C8 4C 2F C8 A9 20 20 16
C890:D2 FF A9 0D 20 D2 FF A2 80
C898:00 A0 FF C8 CC 53 03 F0 89
C8A0:11 B9 5B 03 C9 2F D0 F3 65
C8A8:A9 00 99 5B 03 E8 E0 04 79
C8B0:90 E9 A9 00 99 5B 03 C8 43
C8B8:99 5B 03 A9 00 85 C6 A2 2F
C8C0:00 BD B9 CB 20 D2 FF E8 EA
C8C8:C9 00 D0 F5 A9 20 8D AE 50
C8D0:A7 A9 95 8D AF A7 A9 C4 60
C8D8:8D B0 A7 A9 01 8D 06 03 3A
C8E0:A9 C7 8D 07 03 A9 36 85 0C
C8E8:01 4C 55 CA C9 4C D0 2B B1
C8F0:20 5E CA A9 4C 8D CD BD 10
C8F8:A9 03 8D CE BD A9 C0 8D 62
C900:CF BD A9 00 8D 52 03 A9 85
C908:36 85 01 A2 00 BD CD CB C0
C910:20 D2 FF E8 C9 00 D0 F5 DC
C918:4C 55 CA C9 56 F0 03 4C E5
C920:41 CA 20 B2 CA AD 86 02 52
C928:8D 54 03 A9 0D 20 D2 FF 21
C930:A5 2D 85 FB A5 2E 85 FC A0
C938:A5 2D C5 2F D0 06 A5 2E AD
C940:C5 30 F0 15 A0 00 B1 FB 96
C948:8D 55 03 C8 B1 FB 8D 56 D3
C950:03 20 EA FA 20 E1 FF D0 24
C958:03 4C 33 CA AD 55 03 C9 26
C960:80 90 11 AD 56 03 C9 80 28
C968:90 05 A9 03 4C 82 C9 A9 94
C970:07 4C 82 C9 AD 56 03 C9 1E
C978:80 90 05 A9 01 4C 82 C9 B3
C980:A9 0E 8D 86 02 AD 55 03 FA
C988:C9 80 90 03 38 E9 80 20 ED
C990:D2 FF 8D 57 03 AD 56 03 33
C998:C9 80 90 0A 38 E9 80 D0 1F
C9A0:05 A9 20 4C A9 C9 20 D2 71
C9A8:FF 8D 58 03 AD 55 03 C9 6A
C9B0:80 90 23 AD 56 03 C9 80 BA
C9B8:90 05 A9 25 4C E3 C9 A9 8C
C9C0:20 20 D2 FF A9 46 20 D2 40
C9C8:FF A9 4E 20 D2 FF A9 D0 89
C9D0:20 D2 FF 4C 14 CA AD 56 6B
C9D8:03 C9 80 90 09 A9 01 85 EF
C9E0:D4 A9 24 20 D2 FF 8D 59 DA
C9E8:03 A9 00 8D 5A 03 A9 20 93
C9F0:20 D2 FF A9 3D 20 D2 FF F3
C9F8:A9 20 20 D2 FF A5 7A 48 6E
CA00:A5 7B 48 A9 57 85 7A A9 5A
CA08:03 85 7B 20 A0 AA 68 85 F7
CA10:7B 68 85 7A 18 A5 FB 69 8E
CA18:07 85 FB A5 FC 69 00 85 7F
CA20:FC A5 FB C5 2F B0 03 4C 08
CA28:44 C9 A5 FC C5 30 B0 03 2A
CA30:4C 44 C9 A9 00 20 D2 FF F6
CA38:AD 54 03 8D 86 02 4C 55 1D
CA40:CA C9 4F D0 10 20 5E CA 2D
CA48:A2 00 BD DF CB 20 D2 FF 69
CA50:E8 C9 00 D0 F5 68 A8 68 E4
CA58:AA 68 28 4C 7C A5 A9 37 2C
CA60:85 01 A9 85 8D CD BD A9 4F
CA68:62 8D CE BD A9 86 8D CF 9A
CA70:BD A9 20 8D AE A7 A9 2C BF
CA78:8D AF A7 A9 8B 8D B0 A7 D4
CA80:A9 CA 8D 26 03 A9 F1 8D E1
CA88:27 03 A9 4C 8D 14 A7 A9 22
CA90:ED 8D 28 03 A9 1A 8D 06 8C

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CA98:03 A9 A7 8D 07 03 A9 E4 64
CAA0:8D 08 03 A9 A7 8D 09 03 82
CAA8:A9 01 8D 52 03 A9 00 8D 76
CAB0:5B 03 A9 00 8D 00 02 60 BA
CAB8:A9 37 85 01 A9 00 8D 0E 28
CAC0:DC 85 5F A9 A0 85 60 A9 32
CAC8:FF 85 5A 85 5B 85 58 85 8A
CAD0:59 20 BF A3 AD FF FF 8D 48
CAD8:FF FF A9 01 8D 0E DC A9 BB
CAE0:95 8D 04 DC A9 42 8D 05 69
CAE8:DC A9 01 8D 52 03 A9 29 6B
CAF0:8D 02 03 A9 C7 8D 03 03 46
CAF8:A9 83 8D 04 03 A9 C7 8D 12
CB00:05 03 60 0E 01 02 03 04 E1
CB08:05 06 07 08 09 0A 0B 0C 97
CB10:0D 0F 54 4F 4F 20 4D 41 48
CB18:4E 59 20 42 52 41 4E 43 CC
CB20:48 45 53 0D 00 55 4E 44 9F
CB28:45 46 49 4E 45 44 20 42 BF
CB30:52 41 4E 43 48 20 45 52 DE
CB38:52 4F 52 0D 00 0D 12 54 94
CB40:92 4F 50 20 4F 52 20 12 17
CB48:42 92 4F 54 54 4F 4D 3F 8E
CB50:0D 00 0D 12 4E 92 4F 52 DE
CB58:4D 41 4C 2C 20 12 44 92 97
CB60:45 4C 41 59 2C 20 4F 52 3E
CB68:20 12 53 92 49 4E 47 4C 86
CB70:45 20 53 54 45 50 3F 0D 59
CB78:00 0D 44 49 53 50 4C 41 26
CB80:59 20 56 41 52 49 41 42 28
CB88:4C 45 53 20 28 59 2F 4E 57
CB90:29 3F 0D 00 0D 45 4E 54 9C
CB98:45 52 20 55 50 20 54 4F BB
CBA0:20 34 20 56 41 52 49 41 E5
CBA8:42 4C 45 53 20 28 41 2F A5
CBB0:42 2F 43 2F 44 29 3A 0D D8
CBB8:00 0D 0D 58 54 52 41 43 6C
CBC0:05 20 41 43 54 49 56 41 15
CBC8:54 45 44 0D 00 0D 58 4C 66
CBD0:49 53 54 20 41 43 54 49 77
CBD8:56 41 54 45 44 0D 00 0D 2E
CBE0:58 4C 4F 47 49 43 20 44 F1
CBE8:49 53 41 42 4C 45 44 0D 53
CBF0:00 00 00 00 00 00 00 00 88

```

Richard Penn is a prolific Commodore programmer. He lives in Montreal, Quebec, Canada. □

POLYGONS

By Rowland Medler

There have been many programs published for computing the parameters of triangles, even those that aren't right triangles, but few if any have been published for polygons with more than three sides. In case you don't remember your high school geometry, a polygon is any closed plane surrounded by three or more usually straight sides.

Polygons works with any multisided figure that has four or more sides of equal length. If you know one dimension of the polygon, this program will compute all

the other possible parameters.

Typing It In

Polygons is written entirely in BASIC for the 64 or 128 in 64 mode. To help avoid typing errors, enter the program with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you exit Proofreader.

Calculating

Simply load and run Polygons and then answer the prompts. Suppose you have an octagon, for example, and you know that each of the eight sides is 5 inches long. Enter this information, and Polygons will compute the diagonal (13.06 inches), the width (12.07 inches), the area (120.71 square inches), and the internal angle (135 degrees). If you know any one of these parameters, Polygons can calculate the others. Of course, diagonals and widths aren't meaningful for polygons with an odd number of sides.

The mathematics is straightforward though probably not of everyday familiarity. If you do architectural design or have a use for plane geometry of this level, the program should save you many hours of calculation.

POLYGONS

```

AP 0 REM COPYRIGHT 1992 - COMP
UTE PUBLICATIONS INTL LTD
- ALL RIGHTS RESERVED
QB 5 PRINTCHR$(5)"[CLR]
[11 SPACES]*** POLYGONS *
**
FQ 10 PRINTCHR$(158)
FK 20 PRINT"[14 SPACES]NEEEEEEE
EEM"
JA 30 PRINT"[11 SPACES]A N
[10 SPACES]M"
FK 50 PRINT"[12 SPACES]YA=INT
[SPACE]ANGLE T "
KC 52 PRINT"AB=DIAGONAL Y< ** W
IDTH**>T"
JF 55 PRINT"[12 SPACES]Y
[2 SPACES](A R E A) T"
KC 57 PRINT"[13 SPACES]M
[10 SPACES]N B"
SD 60 PRINT"[14 SPACES]M
[2 SPACES]SIDE[2 SPACES]
N "
KP 70 PRINT"[15 SPACES]EEEEEEEE
E "
JX 75 PRINTCHR$(5)
BD 100 INPUT"NUMBER OF SIDES="
;SI
BG 110 IFSI<4THENPRINT"THIS PR

```



```

OGRAM REQUIRES 4 OR MORE SIDES." :END
FK 120 PRINT "I ALREADY KNOW: (ONE ONLY)"
SE 130 PRINT "{16 SPACES}1) SIDE"
SH 140 PRINT "{16 SPACES}2) WIDTH"
SR 150 PRINT "{16 SPACES}3) DIAGONAL"
AC 160 PRINT "{16 SPACES}4) AREAS"
QP 170 INPUT "CATEGORY NUMBER=" ;CA
JH 180 IF CA=(1) THEN 220 :GOTO 190
KQ 190 IF CA=(2) THEN 330 :GOTO 200
DX 200 IF CA=(3) THEN 410 :GOTO 210
FS 210 IF CA=(4) THEN 510
DG 220 C=360/SI
RP 230 A=(180-C)/2
GS 240 INPUT "SIDE DIMENSION =" ;SD
RH 250 R=(SD/SIN(C/(180/I))) * SIN(A/(180/I))
CE 260 IF (SI)/2 <> INT((SI)/2) THEN
  NPRINT "DIAGONAL AND WIDTH {SPACE} ARE NOT MEANINGLEFUL FOR {2 SPACES} ODD";
HJ 270 IF (SI)/2 <> INT((SI)/2) THEN
  NPRINT "NUMBERS OF SIDES BECAUSE THEY DO NOT PAIR";
DS 280 IF (SI)/2 <> INT((SI)/2) THEN
  NPRINT "THROUGH THE CENTER." :GOTO 310
JA 290 PRINT "DIAGONAL {7 SPACES}=" ;:PRINT 2*(R)
AC 300 PRINT "WIDTH {10 SPACES}=" ;:PRINT 2*(SIN(A/(180/I))) * (R)
AE 310 PRINT "AREA {11 SPACES}=" ;:PRINT (SI)*(SD)*(SIN(A/(180/I))) * (R)/2
BD 320 PRINT "INTERNAL ANGLE =" ;180-(360/SI) :GOTO 620
BB 330 INPUT "WIDTH {10 SPACES}=" ;WD
AX 340 IF (SI)/2 <> INT((SI)/2) THEN
  PRINT "YOU CAN'T SAY WIDTH OF ODD SIDED FIGURE." :END
HX 350 H=WD/2
DR 360 C=360/SI/2
JH 370 PRINT "SIDE {11 SPACES}=" ;:PRINT 2*(H*(TAN(C/(180/I))))
DG 380 PRINT "DIAGONAL {7 SPACES}=" ;:PRINT H/COS(C/(180/I))*2
QM 390 PRINT "AREA {11 SPACES}=" ;:PRINT (H*(TAN(C/(180/I)))) * H*SI
QJ 400 PRINT "INTERNAL ANGLE =" ;180-(360/SI) :GOTO 620

```

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FQ 410 INPUT "DIAGONAL {7 SPACES}=" ;DI
CS 420 B=360/SI/2
GG 430 A=90-B
GM 440 IF (SI)/2 <> INT((SI)/2) THEN
  PRINT "YOU CAN'T DEFINE {SPACE} WIDTH OR DIAGONAL OF ODD";
AH 450 IF (SI)/2 <> INT((SI)/2) THEN
  PRINT "{2 SPACES} SIDED FIGURE." :END
EC 460 PRINT "WIDTH {10 SPACES}=" ;:PRINT (DI)*SIN(A/(180/I))
FK 470 PRINT "SIDE {11 SPACES}=" ;:PRINT ((DI/2)*COS(A/(180/I))) * 2
BA 480 AR=((DI)*SIN(A/(180/I))) * ((DI/2)*COS(A/(180/I))) * SI/2
QJ 490 PRINT "AREA {11 SPACES}=" ;:PRINT (AR)
HS 500 PRINT "INTERNAL ANGLE =" ;180-(360/SI) :GOTO 620
BQ 510 INPUT "AREA {11 SPACES}=" ;AR
QH 520 AT=AR/SI/2
SH 530 B=360/SI/2
FR 540 A=90-B
SA 550 PRINT "SIDE {11 SPACES}=" ;2*(SQR(2*AT*TAN(B/(180/I))))
FP 560 IF (SI)/2 = INT((SI)/2) THEN 590
CQ 570 IF (SI)/2 <> INT((SI)/2) THEN
  ENPRINT "ODD NUMBER SIDES HAS NO WIDTH OR";
PE 580 PRINT "DIAGONAL {2 SPACES} DEFINED." :GOTO 610
PK 590 PRINT "DIAGONAL {7 SPACES}=" ;2*(SQR(2*AT*TAN(B/(180/I))))/SIN(B/(180/I))
JQ 600 PRINT "WIDTH {10 SPACES}=" ;(SQR(2*AT*TAN(B/(180/I)))) * TAN(A/(180/I)) * 2
RE 610 PRINT "INTERNAL ANGLE =" ;180-(360/SI)
BM 620 INPUT "ANOTHER PROBLEM (A), HARDCOPY (H) OR {4 SPACES} QUIT (Q)";E$
PD 625 IF E$ <> "A" AND E$ <> "H" AND E$ <> "Q" THEN PRINT "* ONLY {SPACE} 'A' OR 'H' OR 'Q' *":GOTO 620
EQ 630 IF E$="A" THEN GOTO 600
JP 640 IF E$="H" THEN GOSUB 60035
BK 650 IF E$="Q" THEN PRINT CHR$(30);PRINT "{CLR} * THANKS. I'D BE GLAD TO HELP AGAIN *":END
HC 60035 A$="" :OPEN 4,4:Z=1023:FOR Y=0 TO 24:FOR X=0 TO 39:Z=Z+1
FS 60040 CH=PEEK(Z):IF CH>128 THEN CH=CH-128
PE 60050 IF CH<32 OR CH>95 THEN CH=CH+64:GOTO 60070

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RK 60060 IF CH>63 AND CH<96 THEN CH=CH+32
SH 60070 A$=A$+CHR$(CH):NEXT:P:PRINT#4,A$:A$="" :NEXT:CLOSE 4

```

Rowland Medler devised this program when an architect requested the length of an eight-sided auditorium whose area was 10,000 square feet. Medler is 74 years old and lives in Gainesville, Florida. □

TYPING AIDS

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

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

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

ONLY ON DISK

Here is the bonus program you'll find on this month's Gazette Disk.

Weather Plus 128

By George E. Black
Adrian, MO

Use your 80-column 128 to record temperatures, humidity, wind direction, and other weather data to make accurate short-range weather forecasts.

Order the September Gazette Disk. The price is \$9.95 plus \$2.00 shipping and handling. Write to Gazette Disk, COMPUTE Publications, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

HOW TO TYPE IN GAZETTE PROGRAMS

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

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

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

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

Special Characters

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

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

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

If a key is enclosed in special brack-

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

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

The Quote Mode

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

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

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

When You Read:	Press:	See:	When You Read:	Press:	See:	When You Read:	Press:	See:
{CLR}	SHIFT CLR/HOME		{PUR}	CTRL 5		←	←	
{HOME}	CLR/HOME		{GRN}	CTRL 6		↑	SHIFT ↑	
{UP}	SHIFT ↑ CRSR ↓		{BLU}	CTRL 7				
{DOWN}	↑ CRSR ↓		{YEL}	CTRL 8				
{LEFT}	SHIFT ← CRSR →		{F1}	f1				
{RIGHT}	← CRSR →		{F2}	SHIFT f1				
{RVS}	CTRL 9		{F3}	f3				
{OFF}	CTRL 0		{F4}	SHIFT f3				
{BLK}	CTRL 1		{F5}	f5				
{WHT}	CTRL 2		{F6}	SHIFT f5				
{RED}	CTRL 3		{F7}	f7				
{CYN}	CTRL 4		{F8}	SHIFT f7				
						For Commodore 64 Only		
						⌘ 1	COMMODORE 1	
						⌘ 2	COMMODORE 2	
						⌘ 3	COMMODORE 3	
						⌘ 4	COMMODORE 4	
						⌘ 5	COMMODORE 5	
						⌘ 6	COMMODORE 6	
						⌘ 7	COMMODORE 7	
						⌘ 8	COMMODORE 8	

WORDPERFECT FOR WINDOWS

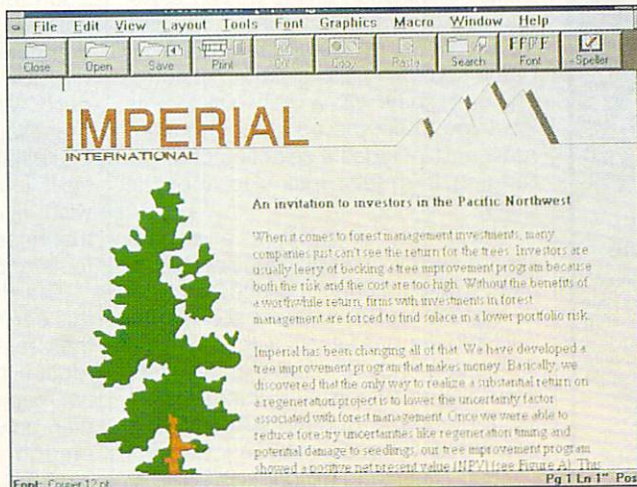
We waited and we waited—a year past the originally announced release date. It seemed to the loyal majority that WordPerfect for Windows (WPWin) would never come. Well, it's finally here. Now the question is: Was it worth the wait?

WordPerfect promised that its new GUI word processor would be completely compatible with the immensely popular WordPerfect for DOS (WPDOS). It's always refreshing when a software maker lives up to its claims. WPWin lets you work with the same file formats and editing procedures that WPDOS users have come to know and trust. Documents created in the DOS version print exactly the same in WPWin.

Making the transition even less painful is an option offered during installation (and any time thereafter) to choose either a Windows or a WPDOS keyboard layout. In other words, if you're used to pressing Home—down arrow to move to the bottom of a document or Shift-F6 to center a paragraph, you won't have to change the way you work. Users who are new to WordPerfect and prefer the standard Windows Common User Access (CUA) keyboard may simply opt for it during installation—or any other time. In fact (WordPerfect power users take note), WPWin maintains the powerful multiple keyboard and keyboard-mapping features of the DOS version. If you do many different kinds of writing, you can use WordPerfect for Windows to create a keyboard, complete with macros and special characters for each type.

Compatibility between the old and the new is maintained to the point that both versions can use not only the same keyboard files but also spelling and thesaurus files, style sheets, and even the advanced printer drivers found in WPDOS. About the only thing you cannot bring

include choosing from file lists during merges rather than having to remember filenames, extensive control over how the program is displayed on your monitor, and the option of running both the spelling checker and thesaurus any time during a Windows session—even when



WordPerfect for Windows lets you preview most common file formats—including those from other word processors.

with you from DOS is your more sophisticated macros. Simple ones can be converted with an included conversion utility, but you'll probably have to rewrite most macros.

But what does running in Windows do to improve WordPerfect? Well, with the graphic interface you have WYSIWYG—the ability to see font and formatting changes as you make them. Graphics can be placed and resized with your mouse. Tabs, columns, and tables can be adjusted by dragging markers or clicking on icons on a slick new ruler. You can work on nine documents at a time and create links between spreadsheets and graphics files with Windows' Dynamic Data Exchange (DDE).

Other advantages in-

clude WPWin is not open. But the hottest new feature is the Button Bar.

The Button Bar, which can be placed almost anywhere in the document window, is a completely programmable group of icons. Any command or macro can be assigned to it. And, in keeping with WordPerfect's multiple keyboards, you can create as many Button Bars as you need.

Yet another slick feature is WPWin's file-handling ability. Not only do the Open and Save As dialog boxes give you extensive control (moving, renaming, deleting, and viewing) over computer files, but the program is also shipped with File Manage—a stand-alone program much more adept at handling files than Windows' rickety file-manage-

ment utility with the same name.

As with everything in life, all this versatility comes with tradeoffs—in this case, a rather high price. You also sacrifice speed. Compared to character-based programs, Windows word processors are notoriously slow. Of the three most popular—Ami Pro, Word for Windows, and WordPerfect for Windows—WPWin seems to be the slowest. If you're used to the lightning-fast DOS version, prepare to mellow out, no matter how fast your computer.

If you don't have a relatively fast computer (at least a 286) with 2MB of RAM, prepare to upgrade before running this product. This is the minimum system requirement. This review was done on a 386 with 8MB of RAM and a fast graphics card, however, and there were times when WPWin's sluggishness was annoying.

Aside from the speed considerations, finally getting to use WordPerfect for Windows was well worth the wait. Once you try it, you can delete yet another lackluster DOS application from your hard drive.

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ROLAND SCC-1

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REVIEWS

That card found large numbers of followers, not only among professional musicians but also among computer-using audiophiles looking for the best in PC sound. Software entertainment companies such as Sierra and Electronic Arts supported the LAPC-1 with stunning sound effects and theme music that rivaled television and approached the quality of motion picture soundtracks.

Don't look now, but Roland has released the high-end, ear-stunning SCC-1, also known as the GS sound card. Like the LAPC-1, the SCC-1 is an 8-bit AT-compatible card; unlike the LAPC-1, the SCC-1 is a half-size card, which makes installation a little easier, especially in crowded PC cases. You can have your SCC-1 installed and running demo sounds in less than ten minutes. The card ships with a utility disk that allows you to set the address and interrupts and includes a selection of music ranging from jazz fusion to acoustic guitar.

The SCC-1 combines a sound-source card with a MIDI (Musical Instrument Digital Interface) processing unit for access to 128 different sounds (all built into the card itself, with variations on those sounds for more than 300 separate sound effects and instruments). From pianos to gunshots, the SCC-1 creates all of the sounds within the GS Format. That standard codifies some of the MIDI standard and irons out some of the inconsistencies that occur between different products that claim to be MIDI compatible.

In essence, if a sound device carries the GS-Format label, then it can play data created with any other GS-Format device in the same form. If a piece of data created with one GS device calls upon an instrument or effect not available in another GS device, then the target device will supply a sound that matches the data as closely as possible.

All of this talk about formats and data devices means that the SCC-1 is widely compatible with software—such as entertainment, multimedia, and education packages—that supports the MT-32. It also means that the card is compatible with MIDI, which makes it a good all-around device for computer users who need access to both.

The GS Format used by the SCC-1 combines the program-change number employed by MIDI devices (numbers 1 through 128) with MIDI's bank of select numbers to create the various sounds. Roland claims that the SCC-1 is able to change between 16,384

tones, but there's no device on the market that supports that many sounds. The GS sounds are arranged in a Tone Map, which can be shared by any number of GS-compatible sound devices. Composing with this technique is what gives the GS Format such compatibility from one device to the next.

When it comes to sound quality, the SCC-1 matches the best equipment you're likely to have on your home stereo—unless you're a hopeless audiophile with one of those \$10,000 turntables I once saw at an electronics show. But for most of us, the powerful bass and well-defined treble are incredibly rich, especially when they come from a PC. This card can't be compared with the Sound Blaster or the Thunder Board or any of the other sound cards that have made a mark in computer entertainment and multimedia. The SCC-1 is a professional-level card. While other sound cards are great for day-to-day work and for educational software, the SCC-1 is essential if you're composing music or otherwise involved in creating applications that need a specific range of sound effects and MIDI capability.

The flexibility and performance of this card make it a solid investment for the professional PC user whose tasks require music/sound composition. It's not meant for the occasional MIDI tinkerer; however, if you're interested in exploring the world of PC music, this card will probably last longer than the PC you put it in. And that's a sound investment, no matter what your musical needs.

PETER SCISCO

Roland SCC-1—\$499

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THE ROCKETEER

So you won a couple of air races the conventional way—in a plane. Then you turned around and beat the planes flying solo with your spiffy new rocket pack. You're feeling pretty pumped up. But wouldn't you know it? A group of Nazi soldiers has staked out your hangar to steal the plans for the rocket pack! Within moments, they've locked up your mechanic, kidnapped your girlfriend, and blasted off for parts unknown. Darn the luck! Time for action—again.

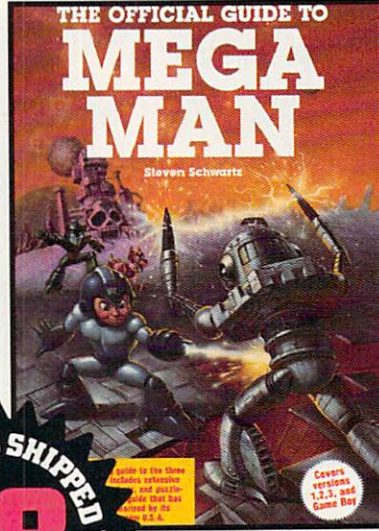
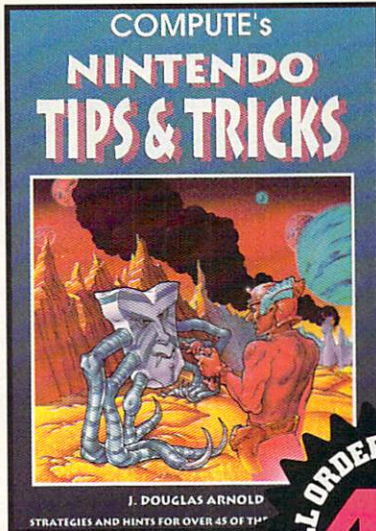
There's no rest for the Rocketeer in the game of the same name, a Disney Software product modeled after the Dis-

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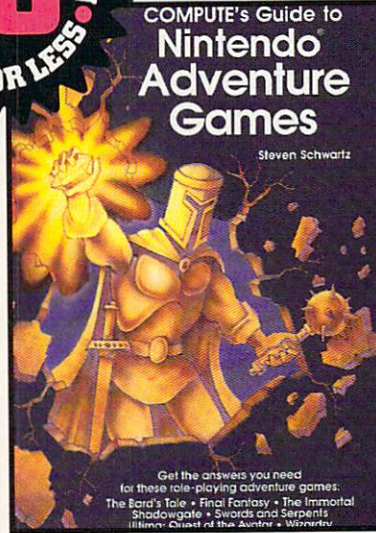
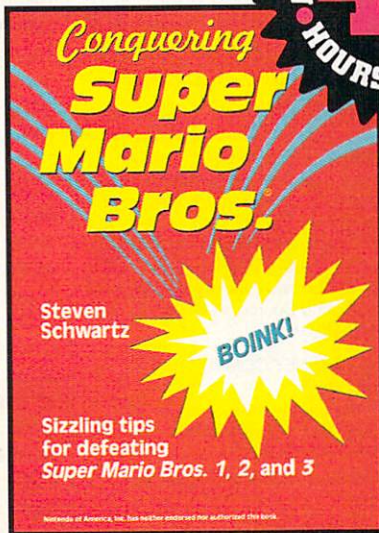
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ney movie. In an elaborate series of arcade games linked by story interludes that resemble panels from a comic book, you assume the role of the Rocketeer. The action ranges from fast-paced and friendly—racing at Bigelow's Air Circus—to fast-paced and potentially fatal—sending Nazis screaming to their deaths while you dodge bombs above the clouds in a gunfight to the finish.

Though *The Rocketeer* includes elements of both adventure and arcade games, it's primarily an arcade game. That's hardly a drawback: This 256-color arcade game's backdrops are more realistic-looking than those of most adventure games. A 1930s California airfield is rendered with remarkable vividness, while the hangar interior in which the Rocketeer has a frantic shootout with the Nazi soldiers exhibits impressive clutter. The game's sound adds to the excitement. Though the comic-book dialogue of Rocketeer Cliff Secord and his companions is wooden and predictable, the adventure is heightened by the convincing sound effects. When I played the Rocketeer, the game automatically routed the dialogue and sound effects through *The Sound Source* included with my *Combo-Pak*, while the music emanated from my Covox Sound Master II. It was a winning combination.

Too bad I can't say the same for my game-playing skills and *The Rocketeer*. Though I thoroughly enjoyed playing the game, after many hours I still wasn't able to reach the fourth and final episode. Even so, I thought the level of difficulty was appropriate. It took me a great deal of practice and



Explore sports history and trivia with *Sports Adventure*, a hypermedia system loaded with words, pictures, and sounds.

learning from my mistakes to advance through *The Rocketeer*. My only complaint is one that's been echoed by computer gamers since the Roman Empire: You should be able to save your games!

While you can skip early episodes once you've conquered them, conquering the first episode alone took hours. To escape it, the Rocketeer must win three races, two by plane and one by rocket pack. After watching one more fiery crash and starting over for the 38th time, you'll be ready to smash your *Sound Source* when Cliff's mechanic says, "All right, hotshot, you're in. Now where do you want to begin?"

The Rocketeer works with a joystick, keyboard, mouse, or some combination of the three. I don't have a joystick, but I found both my mouse and keyboard adequate for playing the game. I used neither consistently, however: I found the keyboard much more effective than the mouse during the initial episode, but the mouse played better during episodes 2 and 3.

I'm not sure I'd recommend the game to someone without a joystick or a mouse, but I recommend it unreservedly to anyone who

has either. It's a multipart arcade game that's visually appealing, sounds great, and presents one tough, entertaining challenge after another. What more could you ask? Well, maybe a save-game feature . . .

EDDIE HUFFMAN

IBM PC and compatibles (80286 or faster running at 10 MHz); 640K RAM; EGA or VGA; hard drive recommended; supports Ad Lib, PS/1 Audio Card, Roland MT-32/LAPC-1, Sound Blaster (386 required, MCV not supported), Tandy Sound, and *The Sound Source*—\$49.95; *Combo-Pak*—\$69.95

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SPORTS ADVENTURE

For a taste of the future from the comfort of your own home, explore the interactive world of *Sports Adventure*, where the magic of CD-ROM comes alive on your hard drive. It's the second installment in a promising series from *Knowledge Adventure*, whose self-titled debut put a fascinating new twist on our notions of multimedia.

Sights, sounds, and detailed information about almost every aspect of profes-

sional sports are only a mouse click away. From historic events to little-known trivia, the program allows users to pursue myriad paths of interest freely. People, places, dates, and events are dynamically linked and instantly accessible. Let curiosity be your guide.

The term multimedia is actually a misnomer here, implying the use of multiple input devices. Instead, the program is completely self-contained—a hypermedia system utilizing more than 6MB of specially compressed data. For now, the software engine offers only preset connections within a closed architecture. The publisher hints that additional modules will soon be available, as well as the capability for users to create their own data links.

A large picture window, bordered by a baroque gold frame, occupies most of the main screen. Every picture tells a story, revealed in a scrolling sidebar display. Category buttons at the top allow users to jump right into their favorite sport: baseball, basketball, football, hockey, tennis, golf, or boxing, or the Olympics. Below this, a revolving wire-frame globe lets you zoom in on countries or cities. You can even pinpoint dates, from 1869 (the invention of baseball) to 1996 (Olympic hopefuls), on the horizontal time line.

Much like the human thought process, navigation within the system can be both logical and randomly motivated. For example, click on the basketball category, and you might get information on UCLA coach John Wooden, the only person to be inducted twice into the Basketball Hall of Fame. Clicking on Wood-

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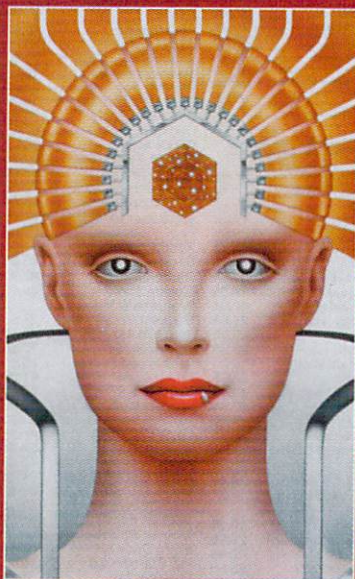
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PH005

REVIEWS

en's picture takes you to Kareem Abdul-Jabbar and a screen where you'll read about his numerous school records. Clicking on the words *sky hook* will take you to the index heading Strange Techniques.

Sometimes the program moves in mysterious ways, branching off into random directions with seemingly no correlation. Clicking on a picture of Tommy Aaron, for example, might send you to Jake LaMotta, Jose Canseco, or Chris Evert. Luckily, a handy U-turn button lets you back up if you get off track.

A help screen lets you rummage through the card catalog for a particular topic. Because of the immense number of entries, however, this is a slow, tedious task. Want to look up Wayne Gretzky? First, wade through dozens of screens—one at a time. Be sure of your selection, because the U-turn function doesn't apply to the card files. A word search or bookmark option would improve this area immeasurably.

Text descriptions are ample and intelligent, sparked by a welcome sense of humor. No source of reference is given, so facts must be taken at face value. For most applications, this shouldn't present a problem. All text can be sent to the printer for offline reading.

Only a small percentage of the topics contain sound files, which are limited to brief digitized sound bites illustrating the selected sport. Examples include the telltale thwack of a baseball, the swoosh of a golf swing, or the roar of an Indy 500 car.

Despite the almost deceptive packaging, picture quality is limited to 16-color EGA. The producers claim future upgrades will support VGA or Super VGA. Although far from photographic in quality, the photos are fast-loading and attractive, culled from such sources as *Sports Illustrated* and the Baseball Hall of Fame.

Sports Adventure offers a gold mine of entertaining information. Anyone with a desire for knowledge should partake of the wealth.

SCOTT A. MAY

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SONY MULTISCAN HG VGA MONITOR

If you want—or need—a monitor big enough to make people do a double take, this 20-inch model is the one for you. The box it comes in is the size of a small washing machine, and the monitor will take up all of the space on top of a standard AT case—though I wouldn't set it there.

Moving the monitor to change cards might put a crimp in your chassis. I suggest that you make room for the monitor in its own region of your desk or on a separate table—preferably one with wheels.

The 20-inch Sony Multiscan HG is a monitor designed for use in a classroom or conference room, or in an office where a user has vision problems. I set the monitor on a table across the room from where I work and had no trouble writing and editing even in Windows set for 800 x 600 resolution.

The Sony is an attention-getter. The entire unit has a Brobdingnagian appearance, as if it had suffered from hyperpituitary problems in its youth. For about a week after it arrived, people were stopping outside my office and asking, "What is that thing?" I'd invite them in to take a look. Everyone who saw the picture was impressed by its sharpness and brilliant color.

The controls are beautifully integrated into the front panel. A single button switches control through various adjustments: brightness, horizontal size, horizontal center, vertical size, vertical center, horizontal focus, and vertical focus. A single pair of buttons marked + and - adjusts these parameters. A separate pair of buttons adjusts contrast. The power switch is also mounted on the front panel.

Even though you can read the monitor from a distance, there's no reason to put it into isolation. It meets the stringent Swedish standards for low ELF and VLF electromagnetic emissions.

Sony has filled out its high-grade monitor line with similar monitors in 14- and 17-inch screens. In addition to its value for shocking coworkers, I found that the 20-inch model also proved its worth at providing enviable sharpness and color, whether up close or across the room.

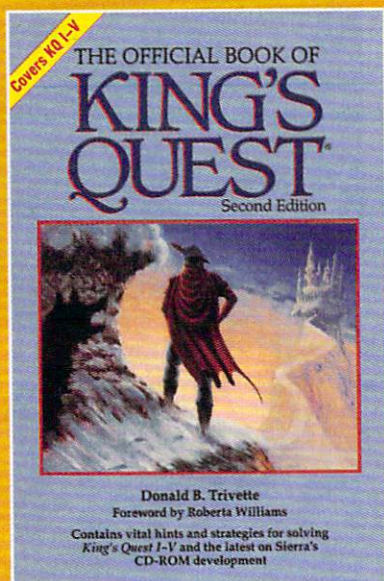
ROBERT BIXBY

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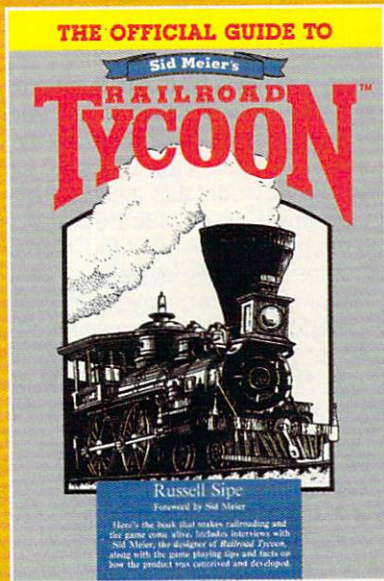
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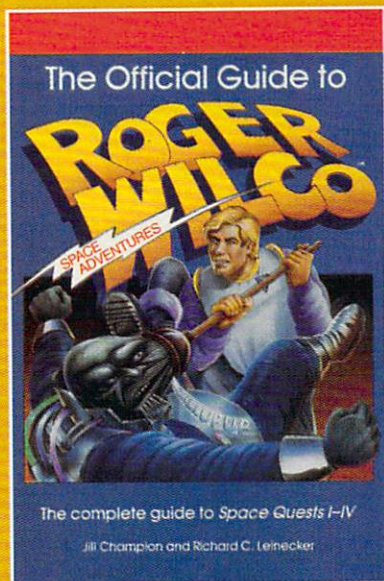
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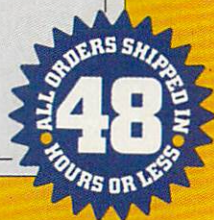
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REVIEWS

MICRO-SCOPE 4.28

If you've ever wondered whether the various systems and components that comprise your personal computer are functioning as they should, you'll be interested in a new product called Micro-Scope. The name is a good thumbnail description of the product, a software tool for looking inside your system and altering settings and parameters.

Micro-Scope is different from other system-diagnostic software products in that it's totally independent of the operating system; the program disks (both 5¼- and 3½-inch disks are supplied) are fully bootable themselves, so the program communicates directly with the hardware without the intervention of the operating system.

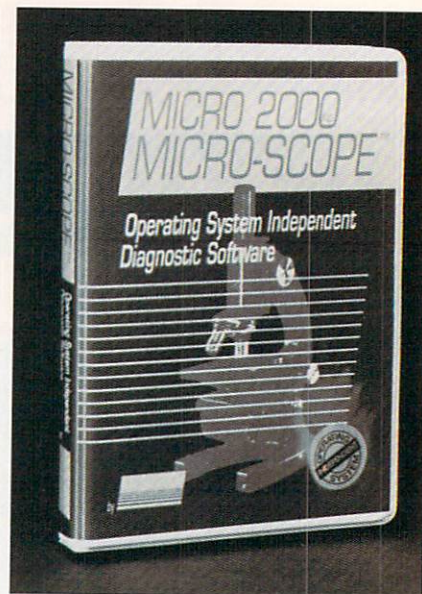
The program is also unique in its ability to perform low-level formatting on all types of hard drives, including IDE drives. This capability makes Micro-Scope a true industrial-strength software utility that can be used to rectify some serious hard drive problems that otherwise would be uncorrectable. Bear in mind, however, that such power in the wrong user's hands can also wreak havoc, so some of the more advanced formatting and sector-editing functions should not be used by anyone who doesn't have a thorough understanding of how hard drives work.

In addition to the software disks and an excellent spiral-bound user's manual, three loop-back connectors are also supplied in the package. These units attach to the serial and parallel ports and are used during some of the I/O tests.

More than 100 diagnostic tests are available, all easily accessible from pull-down menus. Batch-mode testing can be performed by preselecting the desired tests from the various menus. The main menu selections are Configuration, Setup, Diagnostics, and Tools, in addition to a Quit option.

Micro-Scope provides a wealth of information on interrupts, memory usage, active IRQs, adapters with ROMs, and more. It permits running the CMOS setup directly from the program and even "forcing" a system type other than the default settings. But, while the program provides lots of information about the system's hardware configuration—including CPU type—I was highly surprised that it doesn't give any information on the CPU clock speed or on other performance parameters like computing and disk speed.

The hardware-configuration detection portion of the program incorrectly reported an 80MB hard drive on a 386



Micro-Scope is a valuable tool, although costly and imperfect.

notebook which, in reality, is equipped with a 60MB drive. Micro-Scope also reported other information about the hard drive of this machine which differed from that entered in CMOS:

Drive Specs in CMOS

Type 46
823 cylinders
4 heads
38 sectors/track
Landing zone = 0
Write precomp. = 0
Drive size = 62MB

Drive Specs Reported by Micro-Scope

Type 46
822 cylinders
4 heads
38 sectors/track
Landing zone = 822
Write precomp. = 822
Drive size = 80MB

It's important to note that both Norton Utilities 6.0 and DiagSoft's Power Meter (each of which sells for hundreds of dollars less than Micro-Scope) accurately reported the correct drive capacity and other system-configuration information—including CPU speed.

As noted earlier, Micro-Scope's real ace in the hole is its ability to low-level format IDE hard drives and to read, write, edit, and random-seek all data on a floppy or hard disk—even on the usually untouchable track 0—regardless of the operating system.

I put Micro-Scope to the test with a Seagate 1102-A 90MB IDE hard drive that had seen better days; the drive had some severe problems that pointed to a faulty servo. The drive was reliable for about the first 50MB, but data errors were frequent and massive starting at cylinder 646. Using the program, I was able to low-level format the

drive down to 55MB, effectively locking out the bad cylinders and sectors which were causing the problems. While the drive couldn't be totally revived, at least now it's a reliable 55MB drive instead of a flaky 90MB unit.

If you do lots of PC servicing or have several IDE hard drives that need low-level formatting or sector editing, then Micro-Scope is a valuable tool. Its \$499 price tag, however, puts it out of the reach of most home users. After all, for \$499 you could buy a new IDE hard drive and a copy of Norton Utilities 6.0 or DiagSoft's Power Meter (or both) and have some change left over, to boot (excuse the pun).

TOM BENFORD

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Circle Reader Service Number 366

STAR LASER PRINTER 4

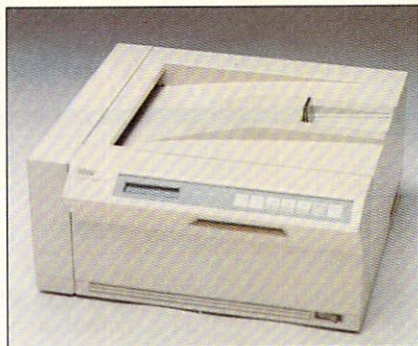
Star Micronics offers the Laser Printer 4 as an economical alternative for users who are looking for a solid-performing laser printer but don't need PostScript capabilities. The Laser Printer 4 is, in fact, the basic machine to which Star adds additional RAM and the PostScript emulation options which transform it into the StarScript model.

Its physical dimensions of 16.4 inches wide by 15.2 inches deep by 7.3 inches high are identical to those of the StarScript, but at only 24.5 pounds, it weighs in 2 pounds lighter than its sister model.

The standard RAM configuration for the Laser Printer 4 is 1MB, twice the amount usually found on comparable lasers from other manufacturers. The inclusion of a full megabyte of RAM as standard equipment makes the Laser Printer 4 capable of handling desktop publishing and most graphic applications as well as able to download soft fonts. There are three memory expansion boards available (in 1MB, 2MB, and 4MB configurations) that can boost the Laser Printer 4's total RAM to a maximum of 5MB—more than enough to handle virtually any graphics requirements.

The Laser Printer 4 supports HP LaserJet IIP and Epson FX-850 emulations as standard bill of fare, with IBM Proprinter XL24 emulation available via an optional cartridge. Starpage, an optional PostScript-compatible board, is also available should you ever wish to upgrade the Laser Printer 4 to PostScript capabilities.

Fourteen fonts (seven in portrait and



Star's Laser Printer 4 is a lightweight, economical machine.

seven in landscape orientation) are the internal complement, and these fonts include the standard workhorse Courier and Lineprinter typefaces in 10- and 12-pitch sizes for the former and 16.66-pitch for the latter. Additionally, the Laser Printer 4 can use HP-compatible font cartridges in its single cartridge slot, and HP LaserJet IIP- and Type 1-compatible fonts can also be downloaded for use with the printer.

As with other laser printers, the amount of RAM available dictates the number of downloadable fonts that can be present in memory simultaneously, so starting off with a base configuration of 1MB in the Laser Printer 4 gives you good downloading capabilities right out of the box. Of course, additional RAM is always a good idea if you intend to do lots of DTP or design work in which you'll be using lots of soft fonts.

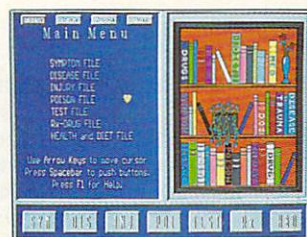
Output resolution is 300 dots per inch, with an output speed of four pages per minute. Input paper handling is accomplished via a multipurpose tray that can hold up to 50 sheets at a time. An optional lower paper cassette can hold up to 250 sheets, and this lower paper cassette is HP compatible (as is the disposable EP-L toner cartridge assembly). Printed output can be delivered either facedown (up to 50-sheet capacity in this mode) or faceup (20 sheets maximum in this mode). Paper stocks of 16–28 pounds can be used with the Laser Printer 4 in letter, legal, A4, Executive, and B5 sizes. Four envelope sizes can also be accommodated (Monarch, #10, DL, and C5), and odd-size sheets (from 3.8 up to 8.5 inches wide and from 5.8 up to 14 inches long) can be fed manually into the Laser Printer 4.

RS-232C and Centronics parallel interfaces are built into the Laser Printer 4, which will cover the needs of most IBM-compatible users. For those users who would also like to connect a Macintosh to the Laser Printer 4 or use it on an AppleTalk network, Star also offers an AppleTalk interface; this option, how-

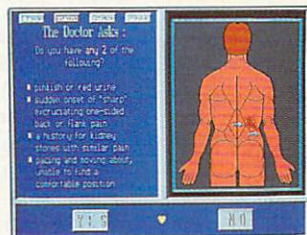
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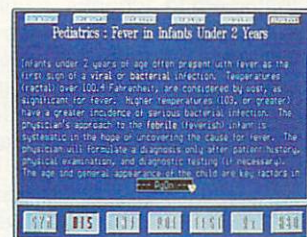
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ever, requires the Starpage board and at least 1MB of additional RAM to activate.

Laser printer users looking for an inexpensive alternative to PostScript-capable machines should find Star's Laser Printer 4 to their liking. It's a lightweight machine capable of handling a wide range of functions.

TOM BENFORD

Star Laser Printer 4—\$1,395

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Circle Reader Service Number 367

MIDWEST MICRO ULTRA 386SX-20

If you were judging the Ultra 386SX-20 laptop on looks alone, it would be a good computer. It's very attractive—I especially like the exterior casing, which is finished in a charcoal gray graphite coating. Though pleasing to the eye, the semirough finish is designed to resist the fingerprints that seem to accumulate on other laptops.

Fortunately, besides its good looks, the Ultra laptop is also a good value with plenty of worthwhile features. The machine I reviewed came equipped with an 80MB hard drive, 4MB of RAM, an external 2400 baud fax/modem, and a handy travel bag.

I put the computer to work doing what it was designed to do—perform on the road. Before my journey, I installed DOS 5.0, Microsoft Windows, two programming languages, a communications program, and a fax program. I packed up the computer, along with a colleague's Microsoft Ballpoint mouse, and headed for the airport.

While on the road, I used the computer for programming, writing, and telecommunicating. It performed flawlessly in every aspect. The external fax/modem works well with the many on-line services that I deal with. I used it to stay in touch with the office, as well as to stay on top of COMPUTE/NET. The modem comes with an AC adapter, but you can also plug in a nine-volt battery for true portability. Under heavy use, the modem battery lasted about a week.

The Ultra has plenty of external ports to keep you connected with the outside world. It comes with two COM ports, a printer port, an external floppy drive port, and connections for an external keyboard and VGA monitor. Best of all, the ports are standard. You don't have to fuss with strange adapters every time you try to connect something.

Expanding this laptop is no problem. Sturdy sliding panels on the bottom of the unit provide quick and easy access to the expansion slots and the battery compartment. There are slots for additional memory and a math coprocessor.

The computer has an extremely clear VGA display. Even after hours of use, I suffered no eyestrain. The controls for contrast and brightness are located on the side of the display. The keyboard has a very comfortable layout. The keys are a little stiffer than I like, but adequate for a laptop computer. One thing I found particularly bothersome, however, was the space bar. It registers only a very firm press in the center of the key. Since I'm a touch typist, I occasionally missed the center.

I found the 80MB hard drive more than adequate in both speed and size. The internal 1.44MB 3½-inch drive, located on the right side of the case, performed with equal results. Both shut down after limited use to conserve precious battery power. Under moderate use, you can operate under battery power for about three hours.

When power is fleeting, you are given a flashing LED and an audible tone. After a few minutes of warning, the system shuts down. The power supply/charger that comes with the unit is small, light, and easy to pack. It has a green LED on top that lights up when in use. When you're operating on AC power, the battery pack is trickle charged, so you'll always be ready.

There are several extra-nice features found on the Ultra. You get ten LED status lights to keep you informed of what's going on. The casing above the keyboard has three rows of ventilation slots that help keep things cool inside. All of the rear ports are concealed by a single hinged door with a magnetic fastener. Unlike the Ultra, most laptops have separate doors for the various ports.

I think the Ultra is a good value. The price beats that of many of the comparable models on the market. It's solidly built and easy to upgrade. I'm thinking about purchasing one myself, so it goes without saying that I'd also recommend one to anyone looking for a powerful, portable laptop computer.

(Editor's note: At press time, Midwest Micro indicated the Ultra 386SX-20 had been discontinued and replaced by a 386SX-25 machine with several changes,

including a faster coprocessor and improved keyboard and screen. The Ultra 386SX-20 may still be available at retail stores.)

TROY TUCKER

Midwest Micro Ultra 386SX-20—\$1,549 with 60MB hard drive and 1MB RAM, \$1,938 with 80MB hard drive and 4MB RAM

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THREE WINDOWS UTILITIES

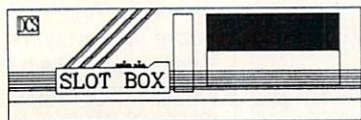
Ever notice how, after just a few weeks of running Windows, that once-elegant wallpaper cries out for a change? And those icons! Who designed them anyway? Functional they may be, but do they qualify as art? If you want to make some much-needed cosmetic adjustments to your desktop, take a gander at these Windows accessories.

The simplest route to beautifying your display is Icons 300+ from Vitesse. Just install, make a few adjustments via the Change Icon button found under Properties in the Program Manager's File menu, and presto! Same old applications meet brand-new color icons. Your choices range from corporate logos to butterflies to some rather fierce surgical tools, and the quality of these runs the gamut. Most users will find a number of icons ideal for their purposes but certainly won't use all of the ones available here.

Borland bundles a sampler of screen savers, fresh wallpaper, and still more icons in its delightful Screen-

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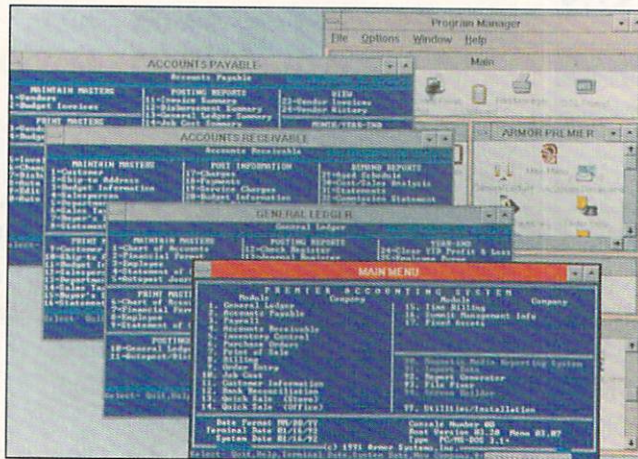
Hard Drives

ery. The three screen savers offer up predictable melting screens and kaleidoscope effects. The wallpaper, on the other hand, sizzles with sumptuous color and detail. With plenty of backdrops to choose from, you'll find yourself flipping from the Escheresque Plaza to the striking Oriental Dragon and on to the lush Jungle. The 25 icons seem a bit more colorful than those of Icons 300+ and somewhat less amateurish, though their potential utility is limited by their number. An offer for a free second disk of wallpaper, screen savers, and icons comes with the package.

Not willing to settle for prefab icons? Design your own with Software Workshop's Icon Creator. With conventional Windows grace, this specialized graphics editor gives you the power to remake the image of your Windows world. You can choose from a number of brush sizes and paint in up to 16 distinct colors. Drawing tools include traditional polygons and fill features, and you also have the ability to capture portions of Windows screens for use as icons. When you know what you need in an icon, go get it with Icon Creator. Since you'll receive a cursor editor as a bonus, why not go all out and replace that boring pointy arrowhead with something more you?

Whatever additions you make to your standard Windows graphics, you'll enjoy the change. With products like these around, variety could become the common denominator for proud GUI owners everywhere. Barring that, at least you'll agree that there's no longer any need to maintain the status quo of the humdrum.

DAVID SEARS



Armor Premier offers sophisticated accounting software that can be expanded incrementally as your business grows.

IBM PC and compatibles (80286 or faster), Windows 3.0 Icon Creator—\$49.95

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Well, you've finally done it. You've started your own business, and you need accounting software to keep track of all the money you're making. Or your business is getting bigger, and you're looking to make a software change. Or maybe your current accounting software doesn't do everything you thought it would, and now

you're looking for something better.

Here's one to consider. Armor Premier Accounting Software (formerly called Excalibur+) is one of the major players in accounting software, with 12 years of experience in the vertical market and more than 200,000 modules installed in a 40,000-user base.

Armor is considered by many in the accounting community to be one of the half-dozen best high-end commercial software packages available today. It has 18 modules to meet the specific needs of more than 200 types of businesses, including hardware stores, auto-parts stores, tire dealers, and many others with complicated inventory systems.

Armor's advantages are numerous. The system is flexible and will provide virtually everything you need to handle the most complex accounting requirements. Armor's Inventory Control module can handle unlimited items and vendor costs for up to 32,767 warehouses, with automatic functions and full integration with other modules. Its Point of Sale module is state-of-the-art for

its number of features and versatility. And Armor is capable of growing with a small or large business, meeting the accounting requirements of either.

Armor recommends that you buy the general ledger package when you get started in any business and then expand the system module by module as your business needs change. Doing so will save you the expense of converting from a less sophisticated system all at once.

A typical service business may need five modules, while a manufacturing business may need eight to do the job—at a cost of \$695 per module. Since Armor is very sophisticated, extra time and expertise are required to set up the system correctly. You may even need an accountant and a systems analyst to help you, and you should expect to pay them by the hour for their expertise.

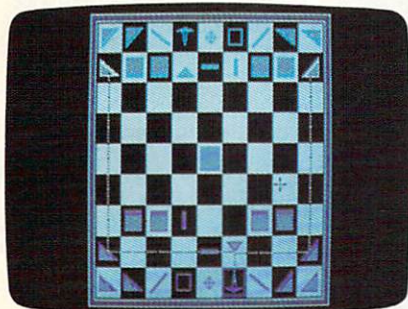
To use the system to its best advantage, Armor also requires trained operators. Factory-direct technical training is offered by local Armor resellers for \$395. Businesses that take the time and money to purchase the appropriate modules, set up the system correctly, and procure trained operators will find that Armor more than fulfills their accounting system needs and desires.

Several Armor modules can also be used as stand-alones to perform such specific business functions as time and billing, inventory control, and point of sale. Some businesses use only one Armor module to fulfill a specific task and another less expensive package to handle other accounting functions. However, more complex businesses with

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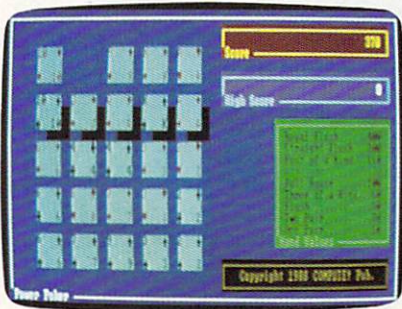
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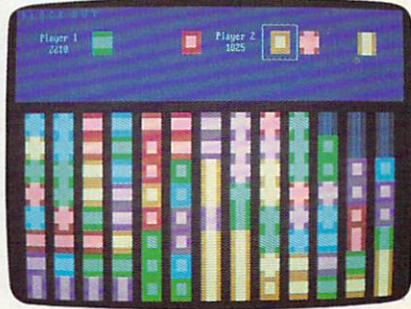
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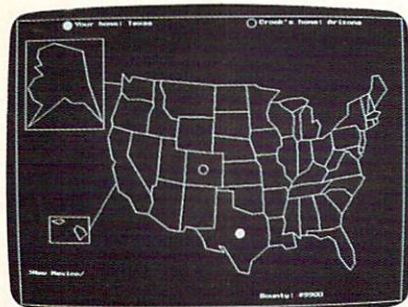
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PET MOUSE

Here's the lazy secretary's First Axiom of Computing: It's a great deal easier to manipulate software with a mouse than without one. After getting used to a system with a mouse, I suddenly had to do without. I was crippled. During my first mouse era, my keyboard use had shrunk to (gasp!) only letters and numbers. I'd forgotten the cursor-movement key combinations in my word processor.

With mice on my mind, I went browsing in my favorite computer shop, and there it hung, an answer to my prayer: Pet Mouse from International Microcomputer Software. I picked up the mouse to check for unusual markings. One caught my eye right away. This mouse came with MenuDirect menuing and hard disk-management software. The mouse was nicely compact and fit my hand well. It was so light that I looked forward to hours of Windows working with no wrist cramp. I noticed three buttons across the top and a small drawing of a mouse (probably a relative) under the left button. Flipping it over to tickle the



Novices can start computing immediately with the PC Positive 2100-2 and then upgrade instantly as they advance.

trackball, I realized that taking the cover off to clean it wouldn't be a problem.

The Pet Mouse is slightly wider and fits my hand better than a Microsoft mouse. As far as performance is concerned, I couldn't find any problems. I found it responsive and accurate, even with the rigorous demands of Tetris. The buttons are a bit firmer than those of other mice I've used, and the click is more audible, but I found that double-clicking wasn't a problem at all.

I'm a sucker for pets, so of course I took this little guy home. It said right on the box that there's a double lifetime guarantee, so what did I have to lose? The manufacturer guarantees the Pet Mouse for as long as you own it and further assures that the Pet Mouse supports all mouse-driven PC software, since it's compatible with both Microsoft and Mouse Systems. What more could you ask?

You could buy a bigger, heavier, fancier mouse that costs more. But why would

you want to do that?

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PC POSITIVE 2100-2

The first hurdle that mass-market computer makers face is putting together a computer that does virtually everything for the newcomer at the flick of a switch.

The second hurdle is the fact that a new user becomes an expert so quickly. Sometimes it's only a year before the work that needs doing has outgrown the tool.

Positive clears these hurdles handily with its line of computers. When you get the computer home, unpack it, and attach the monitor, keyboard, and power cables, a flick of the front-panel power switch boots up the machine

and takes you right into Windows, where you have instant access to all the tools most people will ever need.

Windows opens with all the program groups tiled. Just by double-clicking on the appropriate icon, you can access Microsoft Works, WinFAX, and a productivity suite including Quick Troubleshooter, Learning Windows, and Working Smarter. These are in addition to the standard collection of Windows utilities and accessories.

PC Positive computers are easy to customize. The drives slide right out, and the memory chips are SIMMs (they snap in). But the most intriguing aspect of these computers is that you can upgrade the CPU. That's right—you can. The CPU (located inside a sheet-metal cage) can be removed and replaced with no more difficulty than changing floppies. You can upgrade your machine from a 386 to a 486 in five seconds or less. The expansion bus is a standard 16-bit AT-style bus. As long as that remains standard, the PC Positive won't become obsolete.

If you opt to install the CD-ROM, you'll also receive Software Toolworks World Atlas, Software Toolworks Illustrated Encyclopedia, Software Toolworks CD Game Pack II (ten games including chess, checkers, backgammon, cribbage, and gin), and Mammals. These are all DOS-based programs, although the encyclopedia and Mammals are multimedia to a limited degree, providing sound and still pictures.

There are three basic ranges of PC Positive computers. The 1100-2 (\$1,300) features 4MB RAM, a 105MB hard disk, 5¼- and 3½-inch drives, and a 9600-/2400-bps fax/modem. The

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REVIEWS

PC 2100-2 (\$1,800) features 8MB RAM, a 170MB hard disk, and a 9600-/2400-bps fax/modem. All of the configurations feature Super VGA (1024 x 768 resolution monitor and 512K card), 101-key keyboard, Logitech serial mouse, and six available expansion slots. The PC 3000-2 (\$1,900) features 4MB RAM, a 105MB hard disk, an installed sound card, and a CD-ROM drive for MPC operation.

When you've selected your basic computer configuration, you then choose the processor that will drive it. Prices are subject to change, but to give an idea of the relative prices, as this is being written, the processors cost \$199 for a 386SX-25, \$249 for a 386SX-25 with a 32K cache, \$599 for a 386DX-40, \$499 for a 486SX-25, \$999 for a 486DX-33, and \$1,499 for a 486DX-50. If you decide to upgrade, Positive has a trade-in policy. Adding an internal CD-ROM drive to the system adds only \$450 to the price.

PC Positives are marketed through warehouse clubs. If a machine that matches your needs is in stock, you can pick it up and walk out with it, or you can order a computer through the club, and it will be delivered to you.

I had some trouble with the computer initially and used the opportunity to check out Positive's technical support. While on the telephone with technical support, I tried several techniques for dealing with the problem, including going through the setup and reformatting the hard drive. Technical support seemed well qualified and helpful, but unfortunately, we were unable to trace the problem. At that point, had I been a consumer, I would've returned the unit for a replacement. Being a tinkerer, however, I decided to dig into the guts of the computer, discovered the problem, and fixed it. Once it was put back in place, the computer performed flawlessly. The hesitation to get the consumer into the computer box is in keeping with the company's overall approach. It would prefer to perform or arrange for technicians to perform any installation or repair inside the computer itself.

All of the software (except that on the CD-ROMs) is preloaded on the hard disk. The setup instructions advise the new user to back up the entire hard disk immediately to prevent data loss. But as a seasoned user, I don't want just the DOS and Windows manuals provided. I want the disks, too.

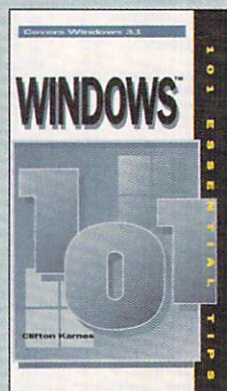
From my first introduction to the PC Positive, I saw that it had two definite advantages in the mass market: immedi-

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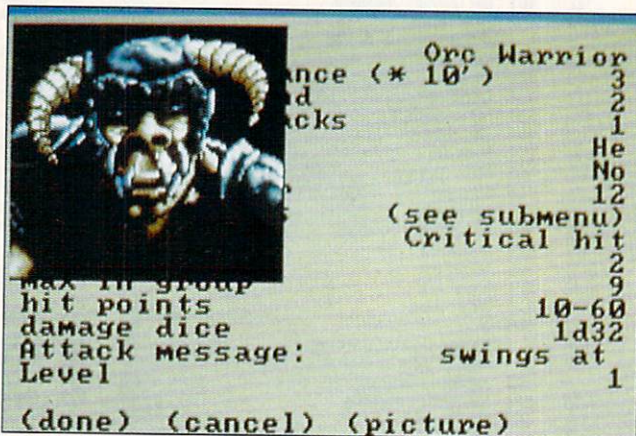
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THE BARD'S TALE CONSTRUCTION SET

Boy, what I wouldn't have done to get this game several years ago when Bard's Tale was so popular and everyone had to wait a long, long time for a good game to come out! Several years back, Bard's Tale was the state of the art, the game that everyone interested in role-playing adventure games was playing. The new version of Bard's Tale is an updated version of the old classic, Bard's Tale I, with the twist that you can create your own dungeons.

With The Bard's Tale Construction Set, you can draw your own map and create your own spells, monsters, and artifacts, as well as features called specials. You can customize the dungeons and make them as hard or as easy as you like. When you're through creating and editing your new world, the game you create is a stand-alone game—a fully functional scenario of the original Bard's Tale that can be given to your friends to play. Finally, there is a role-playing adventure game on the computer that lets you play the dungeon master for your friends.

Editing artifacts allows you to determine the classes that can use an item, the name of the item, the type



Create your own dungeons, maps, and monsters with The Bard's Tale Construction Set, a new version of an old classic.

of weapon, the damage the weapon causes, the special damage or effects, the chance of hitting the enemy with the weapon (from 0 to 100 percent), the spell that can be cast by the item, the number of castings allowed (from 0 to an infinite number), and the descriptions of the use ("swings for") and effects ("slices the monster for . . .") of the weapon. Monsters can be edited for type, level, hit points, and damage, among other things.

Spells can also be designed from the ground up, providing for the duration, the place the spell is cast for effect, the class that can use the spell, the spell level, the spell power used, the range, and the number of targets (one monster, one group of monsters, or all monsters). The map editor provides for a cursor selection of 30 types of specials per 22 x 22 grid map, including teleportation to other maps, so that adventures can be as large or as small as desired.

Creating your own specials allows you to ask a riddle, give a treasure, gain experience, give quests to the group, create traps, and determine treasure and power

in the form of draining or restoring hit points, spell power, or health. The charm of the game is that as many of the specials as needed can be created. The riddles and mazes can be as hard or as easy as you like.

The new Bard's Tale version supports full VGA graphics, major sound boards, and a point-and-click interface. Unfortunately, sound effects are produced by the internal speaker, while the music is played through the sound boards. A separate paint program, such as DeluxePaint, must be used to produce up to 45 monster and character pictures per game. The documentation is brief and sometimes confusing, and the mazes require considerable work, planning, and play testing before they can be explored. Once they're finished, though, you have a complete game that can be shared with fellow adventurers and monsters alike.

The Bard's Tale Construction Set is a very easy-to-use and well-thought-out dungeon generator from the people who brought you the original record-busting Bard's Tale series. Interplay has employed its considerable

expertise in role-playing games and produced a real winner of a game.

ALFRED C. GIOVETTI

IBM PC and compatibles; CGA, EGA, MCGA, or VGA; color monitor; hard drive and high-density floppy drive recommended; supports Microsoft mouse; supports Ad Lib, Sound Blaster, Pro-Audio Spectrum, Roland, and Tandy sound—\$49.95

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FREEDOM MENU SYSTEM

Need an easy-to-use program interface and better computer security? Three Point Software fills the bill with Freedom Menu System.

Geared toward small business use, Freedom simplifies PC operation by hiding DOS complexities behind a slick, menu-driven interface. This feature-laden program installs automatically, optionally creating menu items for many popular programs in the process. Once installed, it requires only 2K of RAM and supports EMS 3.2+. For increased security, Freedom provides three levels of password protection and an activity log for file-usage tracking.

If not the most advanced security package, Freedom Menu System does simplify life with DOS. With its ease of installation and handy features, it's an interface improvement to consider.

RICHARD RAPP

IBM PC and compatibles; installs as a 2K RAM TSR; hard drive recommended; supports mouse—\$79.95

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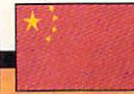
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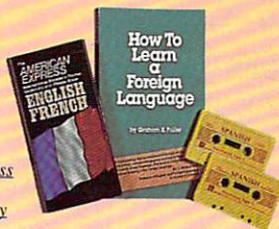
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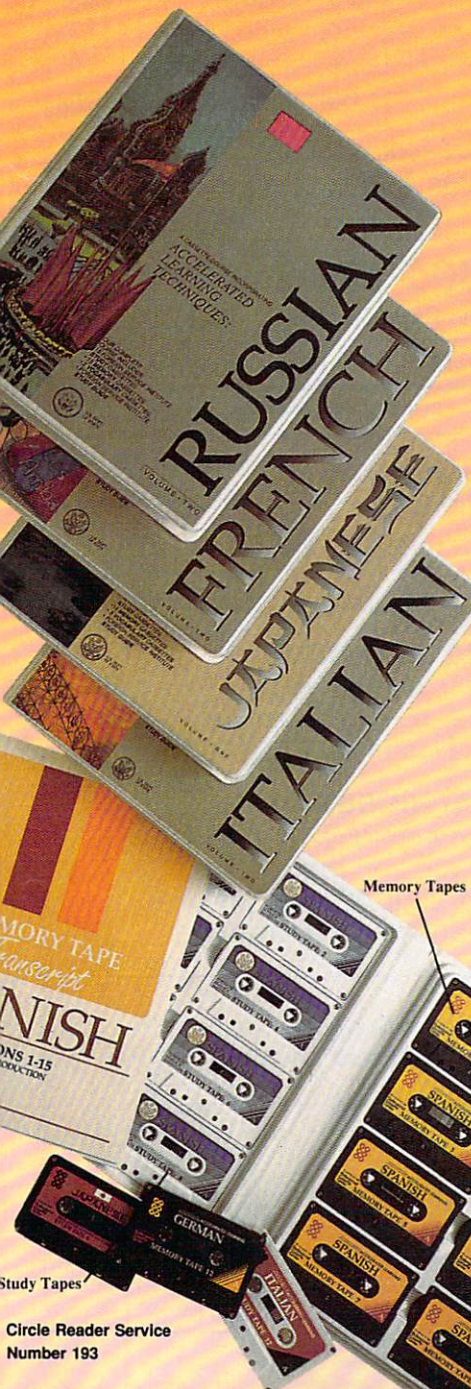
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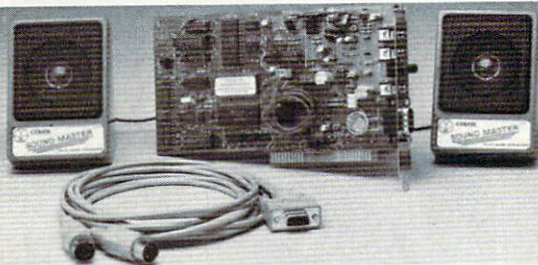


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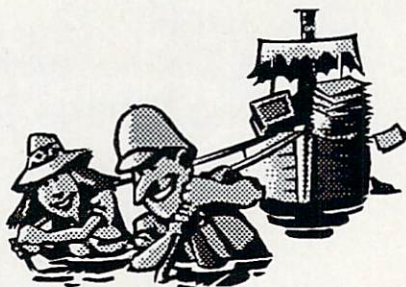
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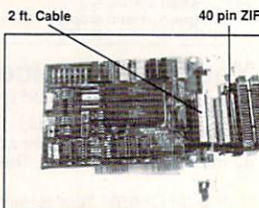
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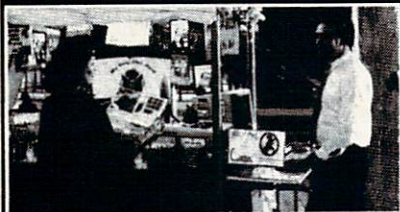
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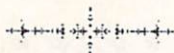
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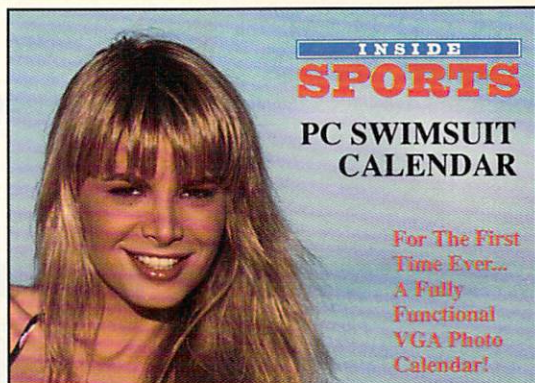
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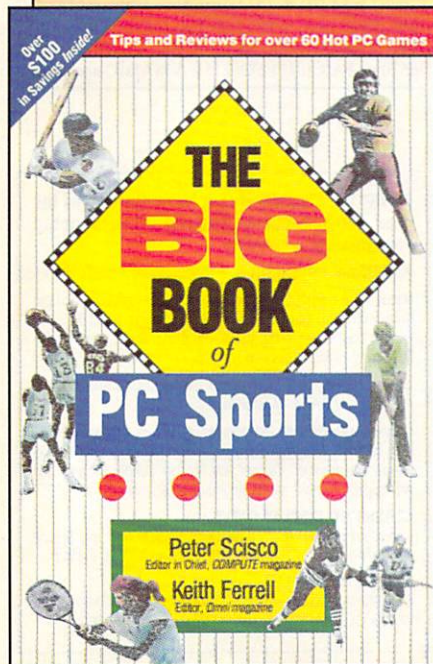
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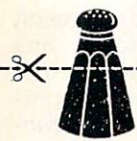
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NEWS BITS

Jill Champion

Novell issues a statement on DR DOS compatibility, oenophiles get their own hot line, and much more.

No More Homework Excuses

The times are certainly changing on college campuses. Only a decade ago, students were lucky to find a PC on campus outside the computer science lab. Contrast that with what's happening at Cedarville College, an independent school in Ohio with an enrollment of around 2000 students. Cedarville announced last May that it has entered into a partnership with IBM that will eventually place IBM PS/2 computers in nearly every dorm room, giving students access to a network that will link up the entire campus—and negate all those excuses for late homework.

IBM is donating a significant portion of the equipment, and the network will use IBM's LANkit technology. The network will connect students' rooms with the computer center, classrooms, campus library, faculty and staff offices, and other student rooms. Every network computer will have access to advanced word-processing, spreadsheet, database, graphics, and research software. Network computers will be replaced every four years, so students will continue to use current technology. Imagine the advantage of being able to communicate with the prof via 24-hour E-mail. It's a sweet deal for Cedarville and IBM, but it's even sweeter for Cedarville's students, who will take what they've learned straight from campus to the networked business world.

3-D Scanning for the Masses

There's good news for engineers, animators, designers, and others who work with CAD and multimedia to create 3-D computer models: Georgia Tech's Multimedia Laboratory has developed a scanner that automatically generates the detailed mathematical computer

descriptions necessary for creating complex 3-D objects. Called a 3-D Optical Digitizer, this scanner should practically eliminate the tedious work of pen digitizers. Using the digitizer, an artist can import a very complex shape into a computer graphic program in just a few minutes and at a very low cost, compared to existing optical scanners.

Michael Sinclair, Georgia Tech's Multimedia Lab codirector, says the new scanning device is part of a trend toward lower cost and more widespread availability of multimedia computing. An added plus: Georgia Tech's digitizer can handle large objects, including the full human figure. Most scanners can only digitize small objects.

Don't Forget to Write

Believe it or not, there's more to the U.S. Postal Service than late mail delivery, too many days off, and deciding which Elvis picture belongs on your stamps. Researchers at the U.S. Postal Service-funded Center of Excellence for Document Analysis and Recognition (CEDAR) at the State University of New York at Buffalo are currently teaching computers to *really* recognize human handwriting. Called stroke extraction, the process involves analyzing the movements made by a person's hand when creating letters. The computer breaks words down into strokes and determines the order of the strokes based on rules of handwriting, such as making a smooth transition from one letter to the next in cursive handwriting. It then relates the pen-stroke characteristics to letters of the alphabet and generates a list of words it thinks might be correct. Although CEDAR's current focus is on making sense of handwritten addresses, even-

tually the technology will be applicable wherever handwriting needs to be read.

On the Grapevine

Don't expect to be served a glass of wine over the phone lines, but you *can* order some distinctive California wines by the bottle via Wine OnLine, a new online service based in—you guessed it—California wine country. Before ordering your choice, however, you might want to peruse the wine database to find out about the 262 small- to medium-sized California wineries. You'll be able to learn everything you need to know about them, such as the viticultural area, wines produced, wine maker, production, and history. Even a few experts are lined up to answer your wine-related questions and give tips.

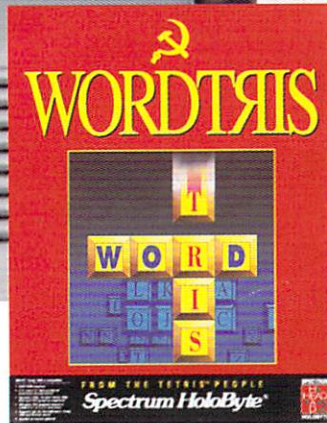
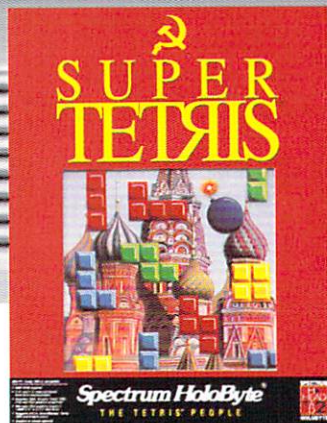
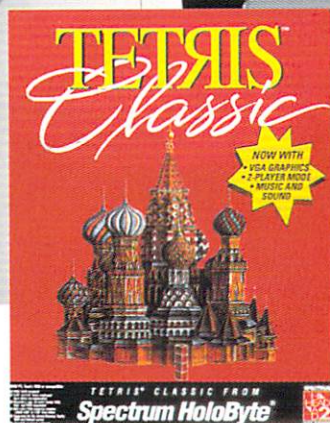
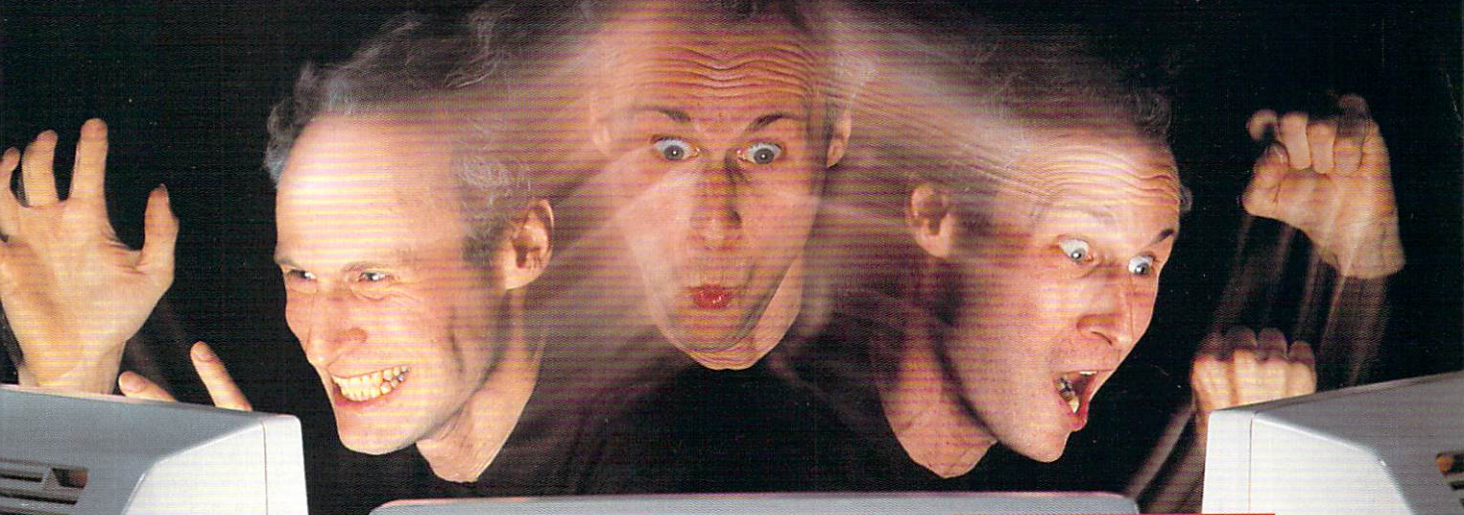
If you're really into the wine thing, you might want to try one of a collection of recipes provided by wineries and restaurants around California (and occasionally, around the world). Aspiring connoisseurs should dial (800) 972-3680 to reach Wine OnLine. The cost is \$0.30 per minute with a \$5.00 monthly minimum.

Which DOS?

Concerned about press reports of compatibility problems between several major software applications and the recently released Microsoft Windows 3.1, Novell has come forward to report that its DR DOS 6.0 is 100-percent compatible with Windows 3.1.

"Moreover," says the company, "DR DOS 6.0 is a better foundation for Windows than [Microsoft's own] MS-DOS. For example, the DR DOS disk cache is far superior to MS-DOS's SmartDrive, enabling both Windows and its applications to run faster." □

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