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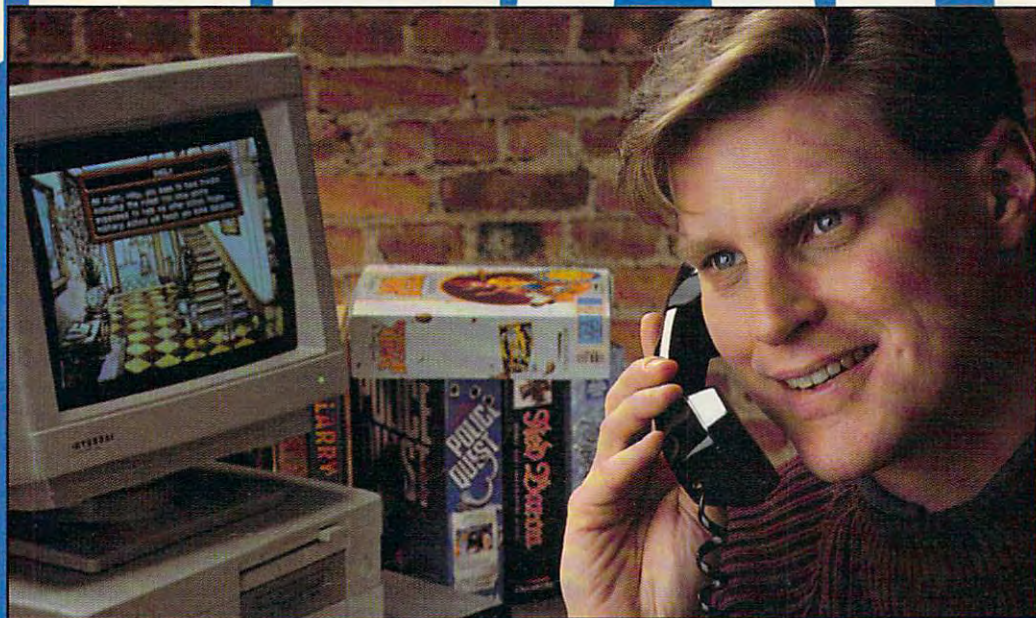
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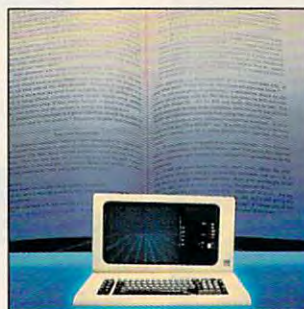
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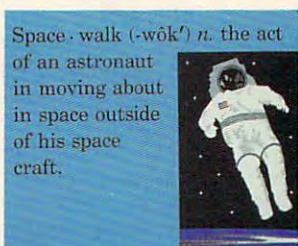
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Clifton Karnes

When Windows 3.0 hit the streets two years ago, it entered a hostile world. OS/2 loomed on the horizon like a dragon ready to devour us, and MS-DOS, stuck in version 4.0, had lost its momentum. It looked as if Digital Research with DR DOS was the only company really trying to make DOS better. Computing was boring, and the masses were grumbling. Some people even started talking about UNIX.

After two years of Windows 3.0, things are very different. OS/2 is on its way to becoming a footnote in computer history. Microsoft has just released a dramatic upgrade to Windows 3.0, version 3.1, which will further cement Windows as the operating environment of choice. And the company has produced an excellent new version of DOS, version 5.0, that fits Windows like a glove. Today, there are hundreds of exciting Windows applications, doing things most of us only dreamed about two

years ago. The masses are happy, and no one talks about UNIX much anymore.

Why has Windows been so successful? There are four main reasons.

First, there's the quality of the program itself. Windows is well designed, attractive, easy to use, flexible, and powerful. And it comes with an excellent group of support programs including Write, Paintbrush, Cardfile, Calendar, and Recorder.

The second thing that's really fueled Windows' takeoff is the fact that it runs DOS apps so well. In 386-enhanced mode, you can multitask DOS applications and customize the way they run. Microsoft recognized that downward compatibility with DOS was essential, and 3.0 garners four stars for getting along with DOS so well.

For those of us who use DOS apps regularly (and I imagine that includes most Windows users), 3.1 is a boon. Not only does it let you select your own DOS icons (which appear on your desktop when you minimize the DOS apps), but windowed DOS apps now support the mouse. Windows 3.1 earns *five* stars for getting along with DOS.

The third element is 386 hardware. Windows' magic act with DOS apps only plays on computers powered by an 80386 or better CPU. When Windows 3.0 was released, 386s had just become an option for most of us. A full-boat system was still about \$3,000, but that was within reach—a figure most serious PC users and most companies could handle.

Now, two years later, 386 prices have dropped *dramatically*, and loaded systems sell for about half of what they did at Windows' debut. The 386 is fast becoming the de facto standard.

The fourth major factor in

Windows' success (and perhaps the most important in the long run) is that a large number of Windows applications were immediately available after 3.0's release. In the past two years, developers have fallen over each other creating Windows applications and have made this by far the most active area in applications development today.

There's no doubt about Windows' success, but the question is, Should you switch to Windows?

In most cases the answer is yes. And the reason is simple. The most exciting apps being released today are Windows programs. And Windows programs are usually much more powerful than their DOS counterparts. But the icing on the cake is, as I mentioned earlier, that you can stay at the leading edge with Windows programs, but you don't have to give up your DOS favorites.

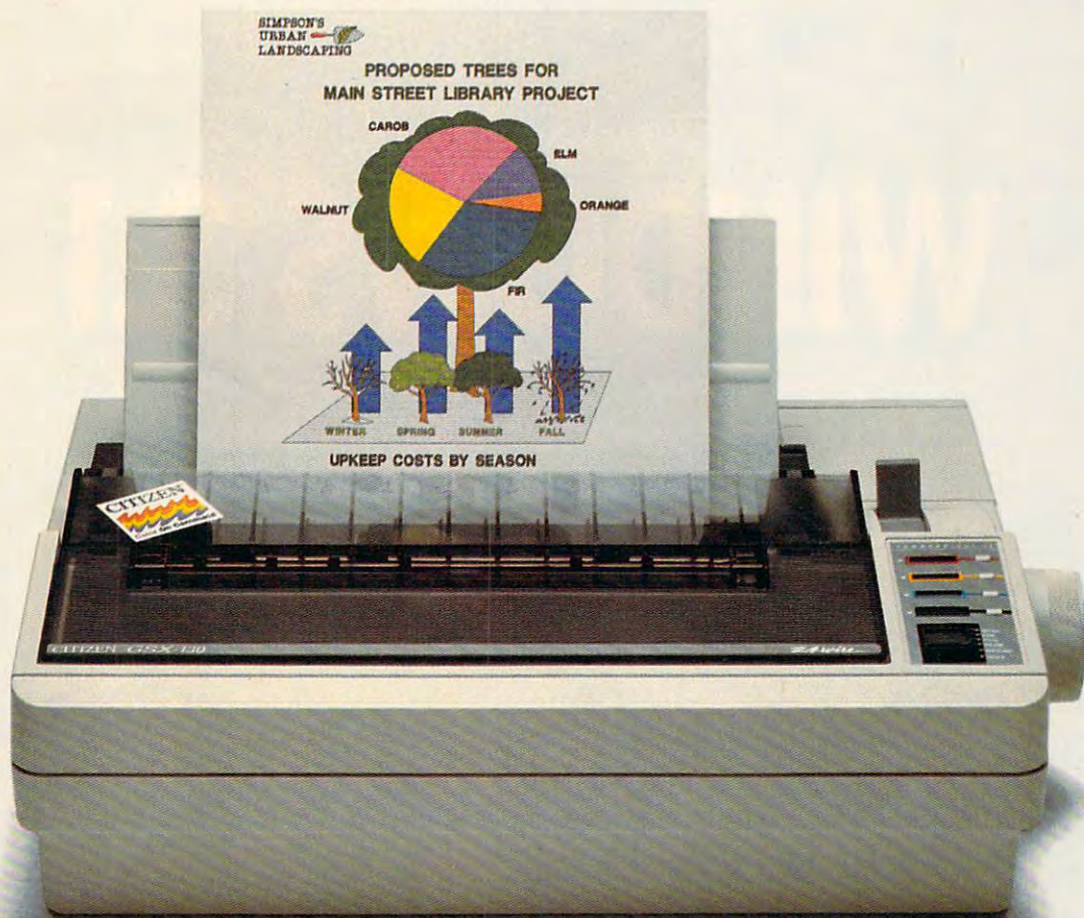
For example, DOS XyWrite is still one of my favorite word processors, and I'm writing this column with XyWrite now. If I have to print something that needs to look spiffy, however, I use Word for Windows. And if the document is complicated, I use PageMaker for Windows.

This issue celebrates Windows' birthday with a special feature on Windows' brand-new release, 3.1. You'll find out why 3.1 is the upgrade of the year, but don't stop there. You'll also find reviews of about 20 Windows products scattered throughout the magazine in Test Lab, columns, departments, and reviews. If you're thinking about catching the Windows wave, these articles will help you decide. If you're new to Windows, this issue will give you a jump start. And if you're a pro, you'll find a hands-on look at what's new with Windows 3.1. □

When Microsoft released Windows 3.0 two years ago, the computing world was ready for a change—the timing was nearly perfect.



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WINDOWS 3.1

Windows 3.1 is here, and it's hot. It's fast, crashes less often, has a topnotch File Manager, runs DOS programs better than 3.0, comes with its own font technology (TrueType), makes compound documents possible with OLE, and much, much more. In short, it addresses almost every criticism of 3.0 and goes far beyond with new and exciting innovations. Here's a whirlwind tour.

Fast, Faster, Fastest

First off, don't be misled by the 3.1 version number. This release was originally conceived as a minor upgrade to 3.0, but in the past year, it's grown into what should really be called Windows 4.0.

The changes begin with Setup. It's enhanced and has a special Express option that's faster and well worth using. If 3.1's Setup detects another version of Windows installed on your system, it will update it, leaving your groups and configuration as they are.

After you've got Windows up and running, the first thing you'll notice is

that it's faster—a lot faster. There are several reasons for 3.1's dramatic speed increase. First, the code has obviously been fine-tuned for speed optimization. More visible, though, are new video drivers—especially a Super VGA driver that's much faster than the third-party 16-color drivers I've seen.

And hidden in the entrails of the system is Fast Disk, an improved 32-bit hard disk driver that revs up disks driven by Western Digital and compatible controllers. (To see if Fast Disk is installed on your system, check Control Panel, or look in the [386Enh] section of SYSTEM.INI for the lines *device=*int13* and *device=*wdctrl*. These are the Fast Disk drivers.)

Windows 3.1 also comes with enhanced versions of HIMEM.SYS, EMM386.EXE, and SMARTDRV.EXE. (Yes, you read that right. SMARTDrive 4.0 is now an EXE file.) The new SMARTDrive is both faster and smarter and is covered in detail below.

In addition to its increase in speed, 3.1 is

much more robust than 3.0. You can all but kiss those UAEs (Unrecoverable Application Errors) goodbye. As an example, Windows used to crash on my system at work at least once or twice a day. Now crashes are extremely rare—especially with DOS programs, which used to be my biggest source of problems with 3.0.

Fancy File Manager

An improved Setup, increase in speed, and more robust design are exciting, but they're not things you can touch and play with. The new File Manager is, and it's 3.1's hottest new application. In fact, the new File Manager alone is worth the upgrade price.

When you first run File Manager, you'll notice its new look. Each drive window sports a directory tree on its left side and a window displaying the files in the selected directory on the right.

You can open and display multiple drive trees and directories, so copying and moving files be-

BY CLIFTON KARNES



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with 3.0 was to use the WIN : command so I could bypass the startup. But with 3.1, the startup's pretty cool, and I actually like to see it.

Just Say Oh-Lay

OLE (Object Linking and Embedding) is a major enhancement to Windows that lets you actually create compound documents by embedding one application inside another. To get an idea of the power of OLE, let's go over the three ways you can transfer data between Windows apps. In the discussion below, the client is the program that receives the data, and the server is the one that provides it.

The first way to transfer information is with the Clipboard. Using the Clipboard, the client gets a copy of the server's data in a form the client can use. There's no link between programs—this is the data-transfer equivalent of a one-night stand.

With DDE (Dynamic Data Exchange), the client gets the data in a form it can use, and it sets up a permanent link with the server, so if the data is changed, the client's information can be updated. With DDE, the client and server are going steady.

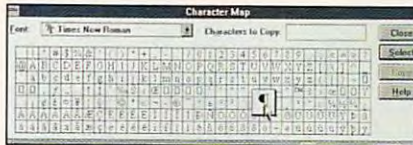
OLE is akin to DDE, but it goes a step beyond. With OLE, not only does the client get the data in a form it can

use and set up a link with the server, but it gets a copy of the data in the server's native format, too. There's a real commitment here. This is data marriage.

If you're using OLE, you just double-click on the embedded spreadsheet figures in a word processing document, and your spreadsheet loads inside your word processor, so to speak, ready for editing.



Kiss load= and run= goodbye with Startup.



Character Map displays all characters available for each font.

Be True to Your Type

In the past two years, TrueType has become the Jackie O. of the computer press. It's an outline font technology, like PostScript, that was developed by Apple, licensed by Microsoft, and incorporated into Windows 3.1.

If you don't already have a collection of fonts, then TrueType is great news for you. With 3.1, you'll get a basic collection of 13 high-quality outline fonts. If you do already have a font manager, such as ATM or Facelift, and an investment in fonts, then you may never use TrueType.

If you've never used a font manager, you may ask, What good is one? Well, as people who've been using ATM or Facelift already know, a font manager gives you true, accurate WYSIWYG screen output, and outline fonts let you print almost any size text from each typeface. Windows 3.1 comes with Times (called Times New Roman) and Helvetica (called Ariel) as well as Courier and Symbol, all in normal, bold, italic, and bold italic styles.

TrueType is installed by default, but if you choose not to use it, you can turn it off (and save some memory). Open Control Panel and double-click on Fonts. Click on the TrueType button and make sure Enable TrueType Fonts is not checked.



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Barry Simon of PC Magazine concurred with, “...I find it difficult to imagine using my computer without Carousel. This package has become an essential tool and one that I strongly recommend.”

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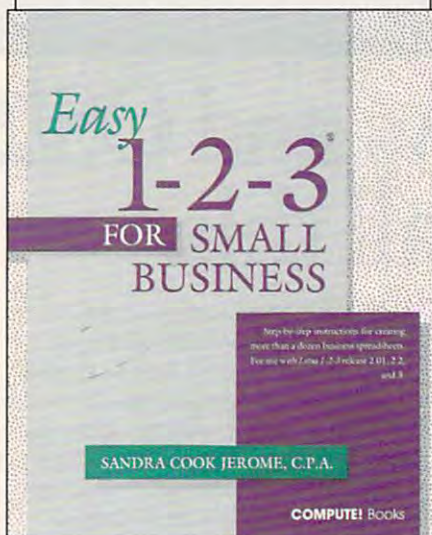
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SMARTDrive 4.0

It's true that SMARTDrive used to be the brunt of a lot of jokes, the punch line always playing on the fact that it really wasn't smart at all.

The SMARTDrive shipping with 3.1 is a different animal, however.

First, it's now an EXE file, and you load it in your AUTOEXEC.BAT. SMARTDrive will automatically load itself into high memory, unless you tell it not to (pretty smart). And now it caches writes, which gives it a big performance boost. If you're nervous about caching writes, you can turn this feature off or just cache writes on selected drives.

And you can now control SMARTDrive interactively, which means you can turn it on or off and adjust its parameters while it's running.

Most people will simply specify the same two parameters for SMARTDRV.EXE that they did for SMARTDRV.SYS. For example, if the line in your CONFIG.SYS file says DEVICE=SMARTDRV.SYS 1024 512, you translate that line to SMARTDRV.EXE 1024 512 in your AUTOEXEC.BAT. SMARTDrive will automatically configure itself to cache writes for optimum speed.

If you want to find out how SMARTDrive is doing, type SMARTDRV /S at the DOS prompt (in or out of Windows), and you'll get a status screen that tells you the number of cache hits and the number of cache misses. The higher the ratio of hits to misses, the better SMARTDrive is performing.

If you're a Stacker user, it's worth noting that this new version of SMARTDrive is Stacker-aware and works fine with stacked drives.

New Accessories

As if all this weren't enough, Windows 3.1 adds several new utilities and enhances others. Among the most useful new apps is Character Map, which displays a grid of all the characters available for each font in your system.

When you double-click on Character Map (found on the Accessories group), you'll see a character grid with your font names listed alphabetically in a drop-down list box.

Click on any character, and you'll get an enlarged view of it. There are also buttons to copy the selected character to the Clipboard and to append groups of characters. Once in the Clipboard, you can paste the character or characters directly into your document.

There are several enhancements to Control Panel's Desktop utility. First, there's an animated screen blanker that offers full password protection.

PROGRAMMING 3.1

There's a lot for programmers to get excited about with 3.1. First, real mode is gone. While real mode provided a transition from Windows 2.0 to 3.0, it's always been a pain for programmers.

Although this version of Windows unassumingly carries a "point one" designation, in terms of new API (Application Program Interface) calls, it represents the biggest improvement in Windows history. Version 3.0 boasted 578 API functions, but 3.1 lists nearly 800 (the enhanced versions of Windows for multimedia and pens list nearly 1000 calls each).

Included in this large API group is a call for a standard File Open dialog box. The new dialog box includes a directory list of files and a tree display, as well as drop-down list boxes for drives and file extension types.

Perhaps 3.1's most challenging new feature for programmers is OLE (Object Linking and Embedding). With OLE, users can embed data in both the client's and the server's native formats. There are nearly 70 new API calls for OLE.

HOW OLE WORKS

OLE is one of Windows 3.1's more powerful new features. Here's a step-by-step tutorial on embedding a Paintbrush object in a Write document.

1. Run Paintbrush and load WEAVE.BMP, the object we're going to embed.
2. Select the picture, and choose Edit, Copy.
3. Run Write, and select Edit, Paste.
4. The WEAVE picture will appear in your Write document. You've created an embedded object.
5. Close Paintbrush.
6. Now double-click on the WEAVE object, and Paintbrush will run with WEAVE.BMP loaded.
7. To link an object, follow all the steps above, except number 3, and choose Edit, Paste Link.

Note that when you embed an object, you create a static copy of the object. If the original changes, your copy won't change. When you link an object, you create a dynamic copy of the object. When the original changes, so does the copy.

With the Packager application that comes with Windows 3.1, you can embed objects but display them as icons.

There are a limited number of animations available, but they're all usable.

In addition, Desktop now sports several new, well-designed wallpaper bitmaps. Be sure to check out Marble and Slash.

Last but not least, there's a new OLE utility that links icons to objects you insert in documents.

That's the quick tour. Here's the bottom line: Get 3.1 as soon as you can. You won't be sorry. □

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Spreadsheets are the fuel powering the computer revolution. And in this capacity, they've often legitimized a platform, its operating system, or both. Strange as this may sound, it's supported by history.

When VisiCalc hit the scene in 1979, it turned the Apple II from a toy into a powerful business machine. Apple II sales skyrocketed, and it became *the* personal computer for the computer revolution's first generation. People often walked into a computer store asking for VisiCalc and a machine that could run it.

Next came Lotus 1-2-3. It was a tremendous improvement on VisiCalc and the epitome of user-friendly software in 1983. To run it, however, you needed an IBM PC. This created a huge demand for the early crop of PCs. Soon there were millions of PCs in homes and offices everywhere, and a large number of them were running 1-2-3.

When Excel appeared for the Mac in 1985, it was the most powerful spreadsheet available on any platform at any price. It forced business people to take the Mac seriously as a business tool.

And when Excel 3.0 for the PC hit the software shelves last year, everyone started thinking of Windows 3.0 as more than just a pretty face. Windows soon became *the* operating environment for PC power users, and Excel played a major role in establishing it as such.

The VisiCalc-Lotus-Excel story doesn't end there, however. VisiCalc is out of the picture, but Lotus has fired back at Microsoft's Excel with a trio of topnotch spreadsheets: Lotus 1-2-3 2.3 and Lotus 1-2-3 3.1+ for DOS and, more recently, Lotus 1-2-3 for Windows. These products, especially 1-2-3 3.1+ and 1-2-3 for Windows, are giving Excel a run for its money in the ever-hotter spreadsheet feature wars.

Excel and 1-2-3 for Windows are far from the only choices for

CA-SUPERCALC 5.1
IBM PC and compatibles, 512K RAM,
hard drive; supports networks and
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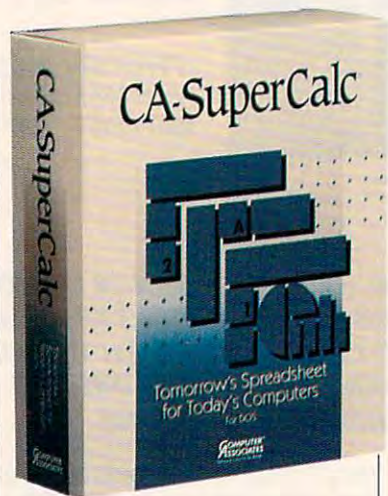
the Windows environment. There's also Wingz. It was a dramatic innovation when it first appeared, and it can still hold its own against most competition.

Not to be outdone, Borland champions the DOS arena. It has continually improved its flagship spreadsheet, Quattro Pro, which many say is the obvious choice for DOS. But SuperCalc aficionados stand staunchly by their spreadsheet of choice because it's faster and easier to use.

Why all this excitement about spreadsheets? Because of their versatility. You can do almost anything with a spreadsheet. It's an excellent tool for handling your checkbook and household finances. It can also be used as a general-purpose database for everything from recipes to addresses. In the business world, anything dealing with numbers, from accounts receivable to next quarter's sales projections, can be handled easily with a spreadsheet. In the educational and scientific communities, a spreadsheet is one of the primary tools for manipulating statistical data, from standard deviation to regression analysis.

Clearly, just about anyone can make use of a spreadsheet, but how do you choose the right one? First, you need to look at your platform. If you're a Windows user, you'll want a Windows spreadsheet. Windows users who are coming from a DOS version of 1-2-3 will want to give special attention to Lotus 1-2-3 for Windows. Others should take a close look at Excel.

For DOS, your choices are Quat-



tro Pro 3.0 or SE, 1-2-3 2.3 or 3.1+, and Computer Associates' SuperCalc 5.1. SuperCalc is fast, Quattro Pro is extremely feature-rich, and Lotus is the compatibility king, boasting more add-in support than any other software product in history.

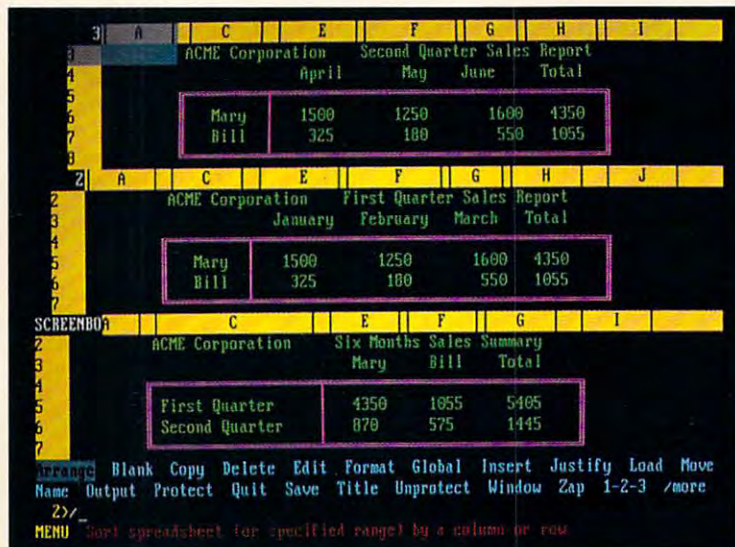
It's a tough choice, but this issue's Test Lab can help. Our reviews of all the power spreadsheets will give you a feel for each product, and the features chart will offer critical info in an at-a-glance format. Whether you know it or not, you can give your productivity a real boost with spreadsheets. They're not just for accountants anymore.

CLIFTON KARNES

CA-SUPERCALC 5.1

CA-SuperCalc 5.1 is a fast, efficient spreadsheet that shares many of the advantages and disadvantages of DOS-based spreadsheets. The interface takes some getting used to, particularly if you're already familiar with Windows spreadsheets.

Although it has many other positive attributes, the most obvious advantage of CA-SuperCalc 5.1 is its low price. For a little more than \$100, you'd have trouble finding a better 1-2-3-compatible spreadsheet. As a DOS product, CA-SuperCalc is fast because it leaves out the layers of interfaces necessary to run Windows. It



CA-SuperCalc 5.1

will also run on machines that Microsoft has seen fit to leave off the Windows guest list—the millions of PC, XT, and AT clones. It can operate in as little as 512K (though 640K is recommended), but it can also be run on a network and supports up to 32MB of expanded memory. There are some drawbacks, however. You can't make use of the DDE and OLE links that will be a part of all new Windows-based spreadsheets (including the Windows version of CA-SuperCalc, which should appear early next year).

The product is not shipped with the reference manual, which contains explanations of all the functions. Only the most basic set-up and quick-start information comes in the package. The reference manual is shipped as soon as Computer Associates receives the registration card. This might be a minor or a major inconvenience, depending on how soon after purchasing a piece of software you want to begin using it effectively. There is a quick reference containing brief explanations of the keypresses, macro commands, and functions.

The user's guide that's shipped with the product includes (on

page 2) information on converting the interface to a more standard Lotus 1-2-3 interface, but, curiously, there are no instructions on how to return to the native interface. Here's how: Go to the CA-SuperCalc menu by selecting SC5 from the 1-2-3-style menu, select Global, select Optimum, select 1-2-3, select All, select SC, and select Quit. Simple, right? Save your configuration, and the program will load with the native interface in place.

I suspect that Computer Associates anticipates that most users will instantly switch to the more familiar 1-2-3 interface the first time they run the program and that they'll never again need the native format. Using the 1-2-3 interface allows you to run 1-2-3

LOTUS 1-2-3 2.3
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VGA for WYSIWYG), hard drive with
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macros unconverted. It also allows you to make use of the dozens of 1-2-3 operations manuals that are available from third-party publishers. And if you're an experienced 1-2-3 user, there would be no reason to wait for the reference manual from Computer Associates before beginning to make use of the product.

Looking for a DOS-based spreadsheet that will fit your budget? Inexpensive CA-SuperCalc 5.1 will reduce your data-processing costs without reducing your capabilities.

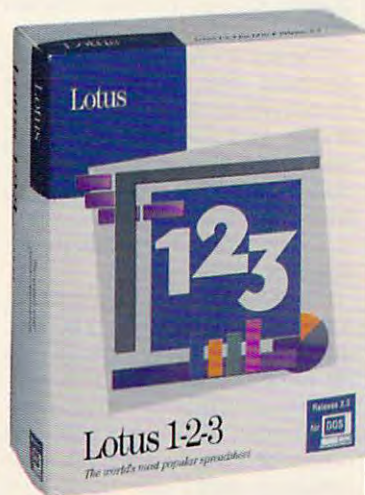
ROBERT BIXBY

Circle Reader Service Number 304

LOTUS 1-2-3 RELEASE 2.3

You can buy spreadsheets with more power and richer features than Lotus 1-2-3 Release 2.3 for DOS, but it's still the ideal spreadsheet for many users who grew up with 1-2-3, don't have advanced hardware, or need to be compatible with the maximum number of other users. Lotus claims there are 15 million copies of 1-2-3 in use; most of them are in the Release 2.x series.

Release 2.3 is totally compatible with all prior versions of 1-2-3, runs all Lotus macros, and



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gives you access to hundreds of third-party add-in products that provide specialized functions inside the spreadsheet. Its WK1 file format is almost an industry standard for file interchange. Although it isn't on the leading edge of technology, it's a mature product. Its code is thoroughly debugged and optimized.

Release 2.3 has all the essential features of a two-dimensional spreadsheet (Release 3.1+ delivers three-dimensional worksheets). New in 2.3 are the built-in Viewer and Auditor add-ins.

Viewer borrows technology from Lotus Magellan to show the contents of other worksheet files in a window. You can then copy or link the data from the viewed file into your active worksheet. Browsing with the viewer can help you quickly locate information when you've forgotten a filename.

The Auditor add-in identifies dependent and precedent cells, finds formulas and circular references, and lists out the order in which formulas are evaluated—quite handy as you attempt to find errors in worksheets or in trying to understand a sheet developed by someone else.

In Release 2.3, Lotus took its spreadsheet publishing a leap ahead by replacing Allways (the Release 2.2 add-in) with WYSIWYG, a similar but more powerful add-in. WYSIWYG supports embedded graphics and table annotations, and it uses up to eight

LOTUS 1-2-3 3.1+
IBM AT and compatibles (286 or higher), 1MB RAM (1.5MB for WYSIWYG, 2MB for Solver), CGA (EGA or VGA for WYSIWYG), hard drive with 5MB available—\$595

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fonts at a time from a larger set of supplied Bitstream fonts. It also centers headings over columns and uses clip art. You won't have lost any Release 2.2 files, though, because WYSIWYG reads and translates Allways formatting codes.

Graphing is adequate, but it's far from the spectacular work you can do with Quattro Pro or the Windows products.

For a longtime Release 2.2 user, Release 2.3 is a breath of fresh air. The WYSIWYG add-in lets you work with graphic formatting elements onscreen as you work on the data. (With Allways, you could only change data in text mode.) Unlike some of the

graphic spreadsheets, this one doesn't lose you in all the graphic elements and lose the feel of the basic spreadsheet. It's familiar enough that you can continue to get your work done without learning a whole new program.

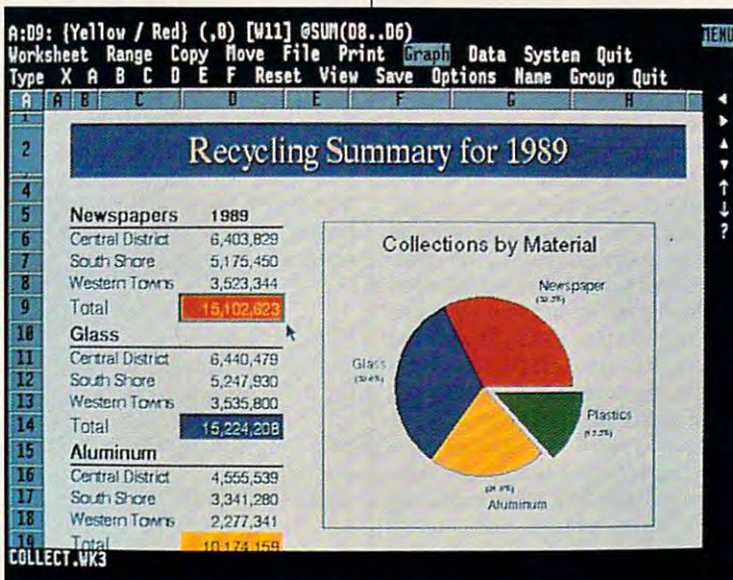
Lotus 1-2-3 2.3 is a proven performer, respectably fast, compatible with entry-level and older hardware, and, most of all, standard. While it doesn't have the highly advanced features of more powerful sheets, its suite of available add-ins gives it access to capabilities and specialties that no other spreadsheet can begin to match. For ordinary daily use by those who aren't power users, it's hard to beat.

RICHARD O. MANN

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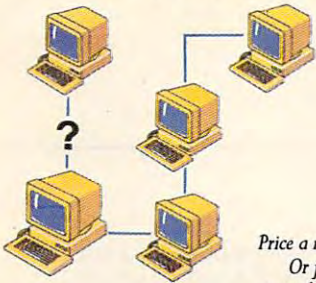
LOTUS 1-2-3 RELEASE 3.1+

Since the introduction of 1-2-3 for Windows last August, Lotus's previous top-of-the-line spreadsheet, Release 3.1+, has been a product without a market niche. It's a high-powered, three-dimensional sheet that's a large step ahead of

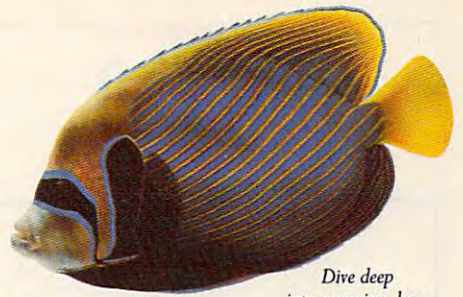


Lotus 1-2-3 Release 3.1+

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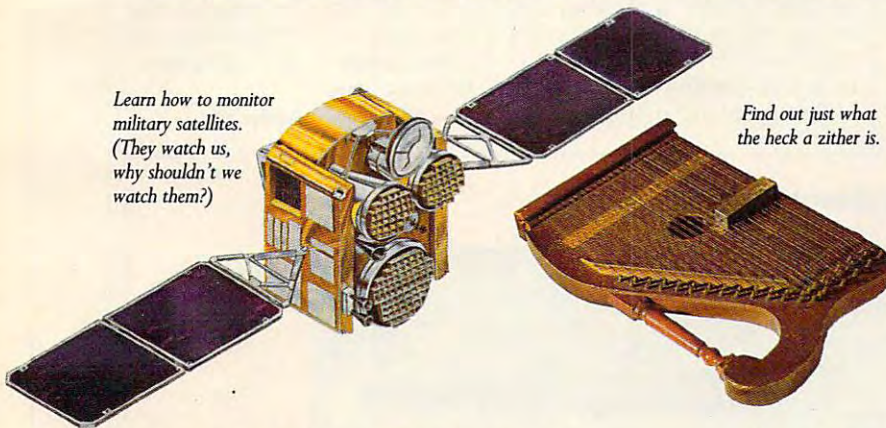
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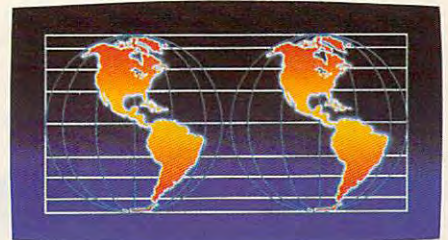


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Release 2.3, but so is the Windows version. It requires the same advanced hardware that the Windows version requires, so why not get the additional advantages that come only with Windows? One reason might be that until there are some substantial improvements to 1-2-3 for Windows and until Windows 3.1 ships, Release 3.1+ for DOS is a lot more stable.

Release 3.1+ is a true three-dimensional spreadsheet: Each sheet has up to 256 pages—a page being a full two-dimensional spreadsheet that fits below the page above. You can reference between pages, build ranges across pages, and do sums and other functions across pages. It's the answer to a prayer for someone who routinely has to consolidate similar reports and analyses. I would've killed for this product four years ago.

You can display the current page only or an array of three

pages. Multipage operations and group mode commands allow you to quickly set up many parallel-structured pages at once. The 3-D operations are well designed and easy to use.

Even with the multipage worksheet files, there is external file linking to other sheets, and the program holds more than one file in memory at a time. The DataLens function in Release 3.1+ gives you access to external database files in popular formats. It uses disk-based virtual memory, effectively giving you as much memory as you need—though when it goes to disk, it's necessarily slow. You're limited in what you can do with your data, primarily by your own imagination.

It has the same Viewer and Auditor add-ins as Release 2.3, and adds Solver, a nonlinear optimizer that was introduced in the OS/2 version of 1-2-3. There's also a goal-seeking function.

The graphing module of Re-

lease 3.1+ is more powerful than that of Release 2.3, but it's still no match for the graphing modules in Excel and Wingz.

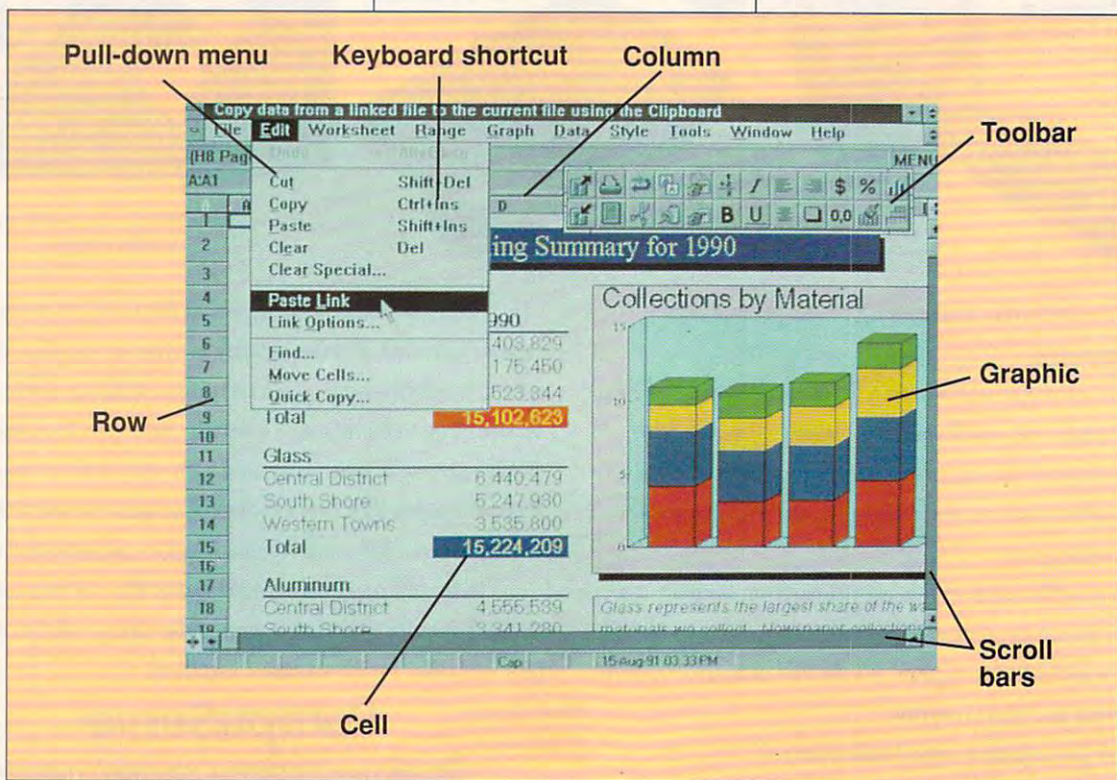
As is true of all versions of 1-2-3, this one is fully backward compatible with all other Lotus products. The key sequences you used with the original Release 1A still accomplish the same thing in 3.1+. Of course, there are many more menu items here, but the macros work and the key sequences work. If you limit your worksheets to two dimensions, you can save them as WK1 files that earlier versions of 1-2-3 and many other applications can read.

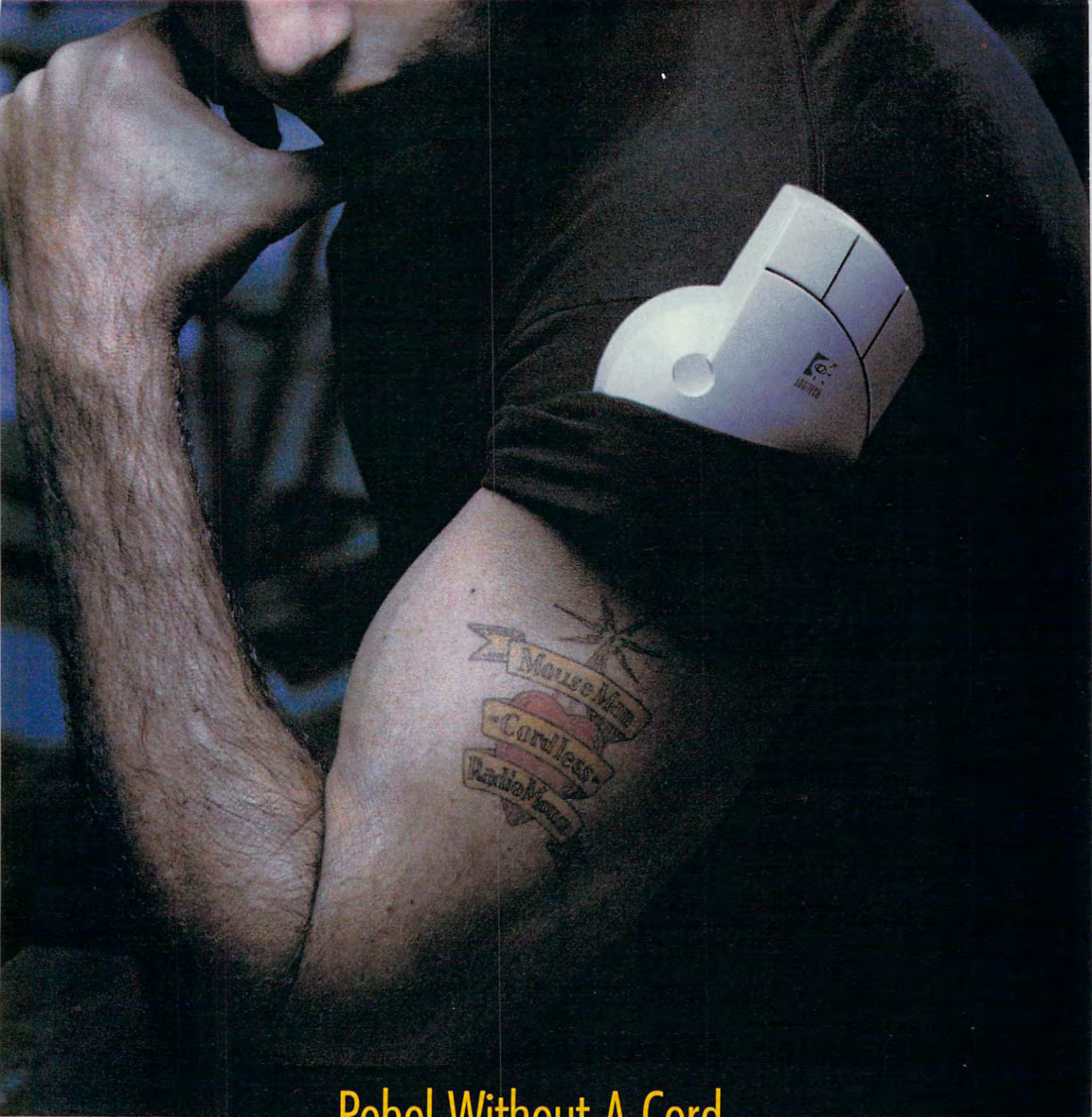
All this power has its price, of course. Release 3.1+ is slower than Release 2.3 (but not as slow as the Windows version).

Lotus 1-2-3 3.1+ is a fine product—well suited for a power user who needs the 3-D capabilities but doesn't want to go to Windows.

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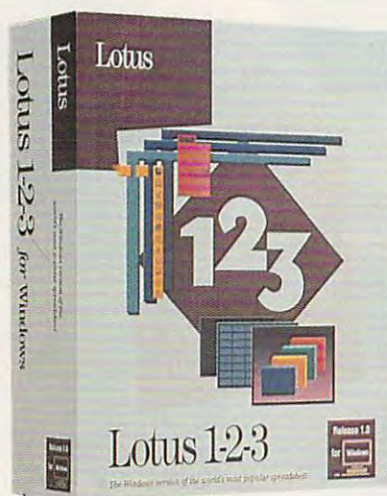
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LOTUS 1-2-3 FOR WINDOWS 1.0A

After the long-awaited Lotus 1-2-3 for Windows hit the market last August, many of its early users found some bugs. It wasn't long before Lotus shipped Release 1.0a, fixing some of the major problems.

In spite of its problems, Lotus 1-2-3 for Windows is a major achievement. Matched feature for feature against Excel, it comes up short, but it has extremely significant advantages over Excel. First, it carries the magic name of Lotus 1-2-3. That alone will sell hundreds of thousands of copies. Second, it's totally compatible with all previous versions of 1-2-3: It runs unaltered, untranslated macros and still responds to slash-key commands that have run 1-2-3 from the beginning.

Changing from a text-based spreadsheet to a Windows-based sheet isn't easy; having the 1-2-3 classic command set available at any time is comforting.

The most obvious innovation in 1-2-3 for Windows is the SmartIcon palette. Lotus provides over 60 individual icons for commonly used processes that usually involve a series of menu choices, such as creating a sum of a column or row. From that set, you select about 20 to go into the SmartIcon palette, a toolbar you

LOTUS 1-2-3 FOR WINDOWS 1.0A
IBM AT and compatibles (286 or higher), 2MB RAM, hard drive with 5MB available, Windows 3.0 or later in standard or enhanced mode; mouse recommended—\$595

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can shape and place anywhere on the screen. It might be a square in the corner or a long, thin bar down one side. You can assign your own macros to icons and include them as well.

Basically ported from 1-2-3 Release 3.1+, 1-2-3 for Windows is a true 3-D sheet, maintaining the layered three-page display option. You can, however, also have as many sheets as you wish in separate windows. Graphing capabilities are beefed up with more types of graphs and with each graph named and saved as part of the basic worksheet file. Live graphs can be embedded in the worksheet, changing onscreen as you change the data in the sheet.

Spreadsheet publishing is

more powerful, including automatic drop shadows and black-and-white page preview. The program reads both Allways and WYSIWYG formatting from prior versions. Adobe Type Manager and 13 scalable Postscript fonts are included, as is a set of HP-compatible soft fonts.

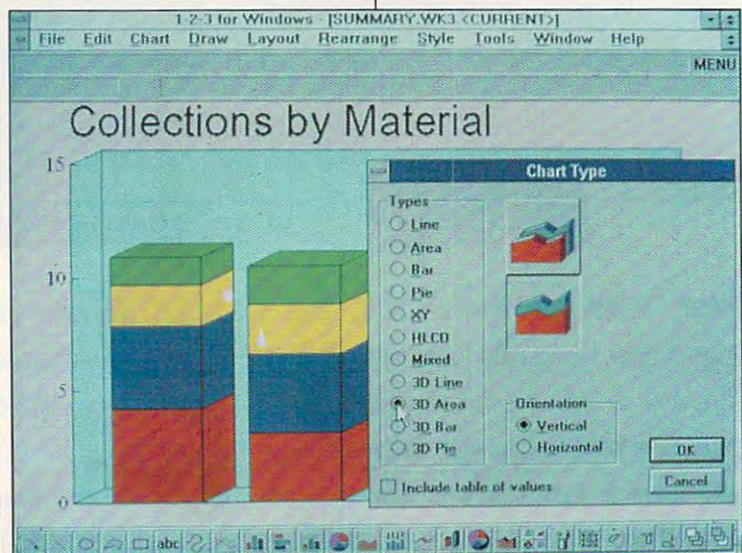
You get the advantages of Windows, including DDE (but not OLE), making file linking with any Windows application easy. Lotus, however, doesn't fully understand Windows conventions yet—it uses the interface in several non-standard ways.

Running on low-end hardware, the program is painfully slow. On a high-speed 386 with plenty of RAM, it's still not fast. Even with the slipstream update in place, bugs occasionally result in the dreaded UAE (Unrecoverable Application Error) message.

Lotus 1-2-3 for Windows shows a lot of promise; it will someday be an outstanding spreadsheet, though I wouldn't bet on its ever surpassing Excel. For now, it's a good Windows spreadsheet—and with the Lotus name attached, that's probably good enough.

RICHARD O. MANN

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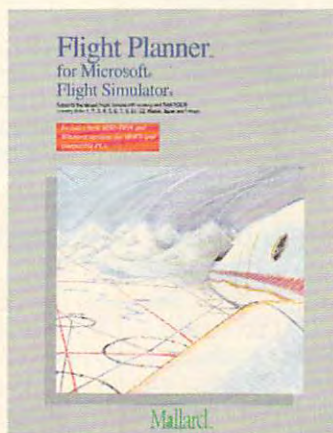
Lotus 1-2-3 for Windows

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MICROSOFT EXCEL 3.0 FOR WINDOWS

If someone told me I could have only one application program, I'd choose Microsoft Excel. Its power, features, and ease of use make it my most-used app—and my favorite one.

What's so special about Excel? First, there's the program's power. In terms of sheer number-crunching savvy, Excel boasts some impressive features. At the top of the list is outlining, which lets you expand and collapse rows, columns, or both with a click of the mouse. Once you use this feature, it soon becomes indispensable.

Next on the power list is charting. Excel packs the power of many dedicated graphing programs, producing dazzling standard and custom 3-D charts. You can easily control each chart's rotation, perspective, and color.

Other impressive power fea-

MICROSOFT EXCEL 3.0 FOR WINDOWS

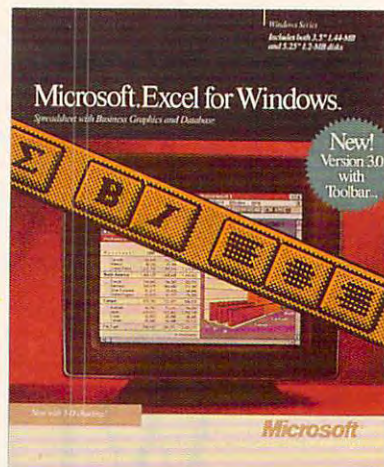
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tures include the ability to use styles (just like most word processors), a palette of as many as 256 unique fonts per worksheet, text boxes for comments, a full complement of drawing tools, links to other spreadsheets using names, print preview, and the ability to embed objects in a worksheet.

Excel's power is impressive, but you're more likely to be won over by the program's ease of use. I've done battle with lots of spreadsheets in my time, and Excel is by



far the easiest to master.

At the top of the ease-of-use ladder is the toolbar. This is a horizontal bar just below the menu bar that contains buttons for commonly used tasks, including buttons for selecting styles, promoting and demoting outline elements, toggling outline display on and off, selecting visible cells, autosumming, applying bold and ital-

SPREADSHEET GLOSSARY

address. The location of an individual cell, usually given in A1 address style (A1, A2, A3, . . .) or R1C1 address style (R1C1, R1C2, R1C3, . . .). Also known as reference. See also **column heading** and **row heading**.

cell. The basic unit of a spreadsheet. Cells are formed by the intersection of rows and columns and can hold data, formulas, or both.

column heading. A heading that identifies a vertical group of cells. The heading is placed at the top of the cells. Column headings are usually labeled in A1 style (A, B, C, . . .) or R1C1 style (C1, C2, C3, . . . or 1, 2, 3, . . .). See also **row heading**.

dimensional. The term is combined with *two-* or *three-* to indicate whether a spreadsheet is

able to establish links among worksheets: 3-D spreadsheets can do it; 2-D spreadsheets cannot. The term *3-D* applies also, of course, to the graphic effects (3-D bar graphs, for example) available in spreadsheets. See also **link**.

formula. A statement that describes a mathematical calculation. Formulas in spreadsheets are linked to individual cells, though they often refer to data and formulas in other cells, allowing a user to perform what-if calculations.

function. A calculation tool that allows you to perform decision-making and value-returning operations automatically. One frequently used function is SUM. It sums a group of numbers. IF is a function that permits you to test a value and take action based on the result of that test.

label (text). A text string often used as a column or row heading.

link. A connection between spreadsheets, with data in one affecting data in another.

macro. A series of commands recorded and saved for future playback. Use of macros can simplify your spreadsheet work, as well as improve speed and accuracy.

row heading. A heading that identifies a horizontal group of cells. The heading is placed to the left of the cells. Row headings are usually labeled in A1 style (1, 2, 3, . . .) or R1C1 style (R1, R2, R3, . . . or 1, 2, 3, . . .). See also **column heading**.

worksheet. A spreadsheet document in which you can store, calculate, and analyze data.

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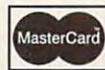
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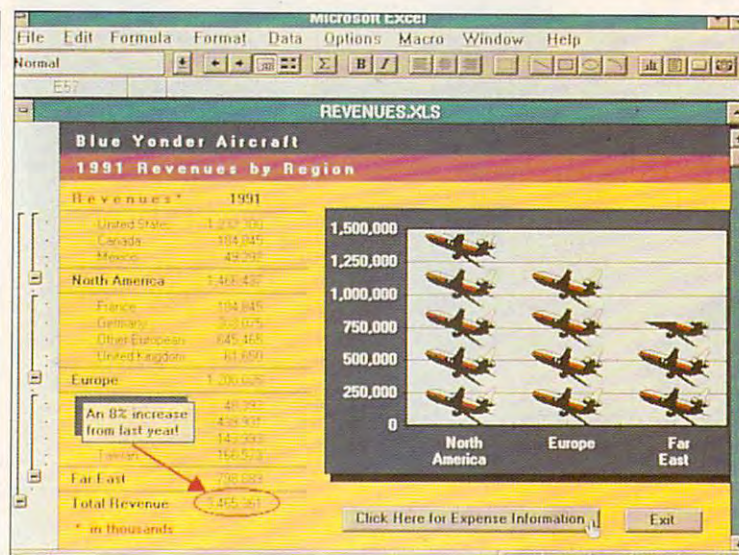
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TEST LAB



Microsoft Excel

ic type styles, aligning text (left, center, and right), selecting graphics objects, drawing (including buttons for drawing lines, rectangles, ellipses, and curves), auto-charting, creating text boxes, creating your own user-defined buttons, and recording macros.

Probably the most used toolbar button is Autosum. Press this button, and Excel will sum the current column or row. How does it know whether you're adding a row or column? It takes a guess, and I've found it to be right 90 percent of the time.

Other features that make Excel easy to use include templates, best fit for column width, text wrap, and cell note markers. The toolbar and most of these features are so intuitive that using them soon becomes second nature.

Mix this power and ease of use together with full dBASE compatibility (Q+E, an excellent dBASE-compatible database, is included with the package) and tons of help for former Lotus 1-2-3 users, and you have an unbeatable product. In short, this is the spreadsheet for the others to emulate and the one for the others to beat.

CLIFTON KARNES

Circle Reader Service Number 308

QUATTRO PRO 3.0 AND QUATTRO PRO SE 1.0

Are you looking for power in a DOS-based spreadsheet? Quattro Pro 3.0 offers both power and plenty of features. Quattro Pro Special Edition (SE) 1.0 includes all the basic features of its full-featured cousin without some of the advanced features. At \$69.95 (suggested list price), the SE version may be the best spreadsheet value available for both inexperienced and advanced users.

Quattro Pro 3.0 includes all the power and ease of use people

QUATTRO PRO 3.0
IBM PC and compatibles; 512K RAM (640K recommended, 2MB required when using Paradox Access); monochrome, CGA, EGA, MCGA, or VGA (EGA or VGA for WYSIWYG); hires monitor to display graphs—\$495

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have come to expect in state-of-the-art spreadsheets. Experienced users will have very little trouble using Quattro Pro 3.0 immediately. Its pull-down menus and optional WYSIWYG interface are easy to master. There's easy access to most of the features, including its complete set of 114 @ functions. Each spreadsheet has 8192 rows and 256 columns. You can link as many as 63 spreadsheets and have 32 open windows at any one time (if you have enough memory).

So what sets Quattro Pro 3.0 apart from other spreadsheets in its class? Unlike other spreadsheets, Quattro Pro includes a complete set of drawing tools and an array of clip art. These tools give you the means to annotate graphs and charts. Reading and writing a multitude of file formats such as Lotus 1-2-3, Symphony, Paradox, Reflex, and dBASE on the fly makes sharing data with others simple.

Quattro Pro uses Borland's Virtual Runtime Object Oriented Memory Manager (VROOMM) technology, which allows it to run on most MS-DOS machines—from the old XT with 512K RAM to the latest 486. This is an important feature if you have an older machine or a limited amount of memory. Although Quattro Pro



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SPREADSHEET FEATURES

	CA-SuperCalc 5.1	Lotus 1-2-3 2.3	Lotus 1-2-3 3.1+	Lotus 1-2-3 for Windows	Microsoft Excel 3.0	Quattro Pro 3.0	Wingz 1.1A
GENERAL							
Global search and replace	■	■	■	■	■	■	■
Undo capability							
Single	■	■	■	■	■	■	■
Incremental	□	□	□	□	□	□	□
Maximum number of rows	9,999	8,192	8,192	8,192	16,384	8,192	32,768
Maximum number of columns	255	256	256	256	256	256	32,768
Number of built-in functions	143	93†	103†	107†	144	114	147††
USER INTERFACE							
Custom menus	□	■	■	■	■	■	■
Pull-down/drop-down menus	□	□	□	■	■	■	■
Keyboard menu shortcuts	■	□	□	■	■	■	■
Context-sensitive help	■	■	■	■	■	■	■
Mouse support	□	■	■	■	■	■	■
Tile windows capability	□	□	□	■	■	■	■
Overlap windows capability	■	□	■	■	■	■	□
Toolbar/buttonbar	□	□	□	■	■	■	■
COMPATIBILITY							
Read/write capability							
WKS	■	■	■	■	■	■	■
WK1	■	■	■	■	■	■	■
WK3	□	□	■	■	■	□	□
WRK	□	■	■	■	□	■	□
WKQ	□	□	□	□	□	■	□
WQ1	□	□	□	□	□	■	□
ASCII import as TXT (tab delimited)	■	■	■	■	■	□	■
ASCII export as TXT (tab delimited)	□	■	■	■	■	□	■
ASCII import/export as CSV (comma separated)	■	■	■	■	■	■	□
DIF	■	R	■	R	■	■	■
SLK	□	R	R	R	■	■	■
dBASE	■	R	■	■	■	■	□
LINKS							
References spreadsheets in formulas							
Loaded	■	□	■	■	■	■	■
Unloaded	■	■	■	■	■	■	□

	CA-SuperCalc 5.1	Lotus 1-2-3 2.3	Lotus 1-2-3 3.1+	Lotus 1-2-3 for Windows	Microsoft Excel 3.0	Quattro Pro 3.0	Wingz 1.1A
Updates dependent spreadsheets at load	■	■	□	□	■	■	□
Updates dependent spreadsheets on command	‡	■	■	■	■	■	■
MACRO CAPABILITIES							
Runs Lotus 1-2-3 Release 2 macros	■	■	■	■	■	■	■
Records macros (autolearn mode)	■	■	■	■	■	■	■
Stores/uses macro libraries	■	■	□	□	■	■	■
Automatically debugs macros	■	□	□	□	■	■	■
GRAPHICAL							
Maximum number of fonts	8	8	8	8	256	8	Unlimited
Uses clip art	□	■	■	■	■	■	■
Edits clip art	□	□	□	□	■	■	■
Has drawing tools	□	■	■	■	■	■	■
Inserts shading	■	■	■	■	■	■	■
WYSIWYG screen preview	■	■	■	■	■	■	■
Automatic column-width adjustment	□	□	□	□	■	■	□
Integrates graph in spreadsheet	□	■	■	■	■	■	■
Wraps text	■	■	■	■	■	■	■
OUTPUT/PRINTING/REPORTING							
Orientation							
Portrait	■	■	■	■	■	■	■
Landscape	■	■	■	■	■	■	■
Prints cell formulas	■	■	■	■	■	■	■
Saves as EPS (Encapsulated PostScript) file	□	■	■	■	■	■	■
Saves as PCX file	■	□	□	□	□	■	■
CHARTING							
3-D charts	■	□	□	■	■	■	■
Rotation	□	■	■	■	■	□	■
Perspective	□	□	□	□	■	□	■
Color	■	■	■	■	■	■	■
†There are also 17 basic mathematical operators not accessed as @ functions. ††This is the number of formula functions. There are also 173 programming functions. ‡Spreadsheets are updated whenever data changes. R=Read capability but not write capability ■ —Yes □ —No							

TEST LAB

QUATTRO PRO 4.0 AND QUATTRO PRO FOR WINDOWS

By the time you read this, Borland may have released two new versions of its popular spreadsheet: Quattro Pro 4.0 and Quattro Pro for Windows. They weren't ready in time to be formally reviewed in this issue, but Borland has supplied us with a summary of the features. Here's a preview of what to expect from these new versions.

The new DOS version, Quattro Pro 4.0, will include all the features in 3.0 plus a number of enhancements. Some of the new features, according to Borland, will be two SpeedBars; intelligent graphics; compatibility with Lotus 1-2-3 version 3.1, Impress, and Always; and a print spooler.

Borland describes Quattro Pro for Windows as the first and only object-oriented software. New features you can look for will include Menu-on-Demand; SpeedBars; PowerButtons; Spreadsheet Notebooks with tab names; 3-D graphics; the ability to customize graphs and spreadsheets with millions of colors, wash effects, and bitmapped images; increased compatibility with other file formats; and the ability to link spreadsheets across a network.

—STEPHEN LEVY

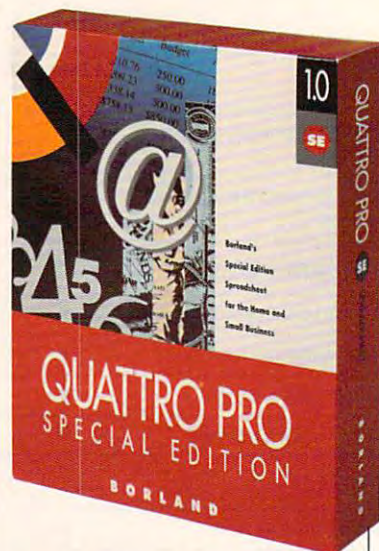
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will run on a machine with 512K RAM, 640K is recommended.

Because version 3.0 may offer more power than many users need, Borland offers Quattro Pro SE 1.0, a less expensive yet very respectable alternative. According to Borland, Quattro Pro SE 1.0 is the spreadsheet for the home and small business. Borland's characterization is probably intentionally modest, since many demanding spreadsheet users will find that the SE version will meet all their needs even though it doesn't contain all the most advanced features.

Some of the advanced features of Quattro Pro 3.0 that you won't find in Quattro Pro SE 1.0

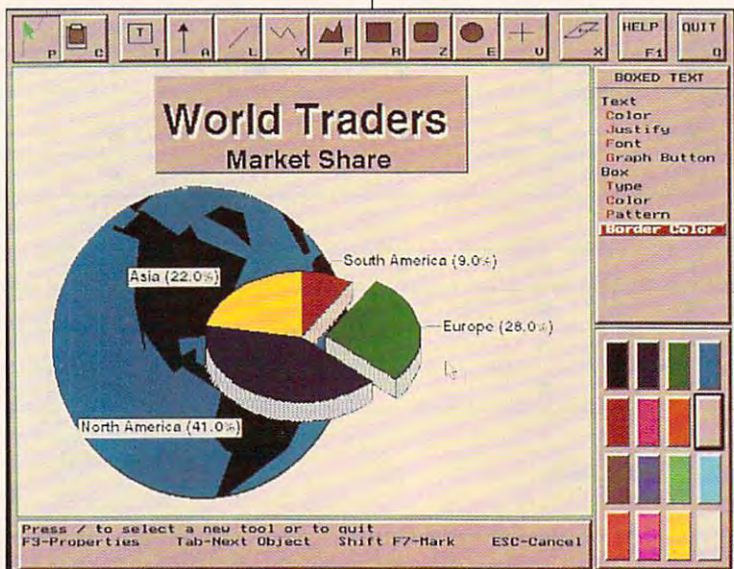


are a WYSIWYG interface option, Paradox access, full network support (SE has no network support), print-to-fit and banner-printing options, and custom and Lotus 1-2-3 menu options. In addition, the SE version comes with less clip art and documentation than its bigger cousin (although you should find that both sets of clip art and documentation are adequate to serve your needs). The graphic features in the SE version are similar to those in Quattro Pro 1.0; version 3.0's graphic features, on the other hand, show some real enhancements over the graphic features of the previous version.

Both these latest versions of Quattro Pro deserve high marks. Quattro Pro is a carefully thought-out, fast, feature-rich application that will satisfy all but the most demanding spreadsheet users.

STEPHEN LEVY

Circle Reader Service Number 309



Quattro Pro 3.0

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WINGZ 1.1A

When Informix introduced Wingz, it made quite a splash. The public relations campaign for this spreadsheet was the most lavish in years. (Remember the popular Wingz bags?) More importantly, Wingz offered 3-D charts and graphs that nearly took your breath away—you could even place them right in your spreadsheet. Informix had demonstrated the possibilities of spreadsheet publishing, and the company seemed more than willing to do battle with Microsoft and Lotus.

Times have changed; Wingz hasn't. While other spreadsheet programs have improved, especially Excel, Wingz has added only one major new feature—and a telling one at that—the ability to read Excel spreadsheets directly. With Excel 3.0, Microsoft added most of the whiz-bang features of Wingz, including the integration of text and graphics, multiple typefaces in a spreadsheet, and a wide variety of charts and graphs, including some in 3-D. After Microsoft released Excel 3.0 for Windows, we stopped hearing about Wingz. The press no longer wrote about it, and Informix stopped running its advertisements.

Given the recent flood of new

WINGZ 1.1A

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Windows-based spreadsheet programs, should you even consider buying this program? The answer is a qualified yes. There are still three major reasons to buy Wingz.

First, you get a free OS/2 version of Wingz when you buy the Windows version. That may not sound as good as it did back in 1990 when the pairing was introduced, but it could be a real plus for an OS/2 fan.

Second, Wingz is available for an unprecedented number of platforms, including IBM-compatible PCs (Windows and OS/2) and Apple Macintosh (System 6.x and 7.x), as well as Unix-based systems from NeXT, Sun, Data General, Hewlett-Packard, Mips, and IBM RISC. All versions share the same features and menus and can even read the same program files written in the HyperScript programming language.

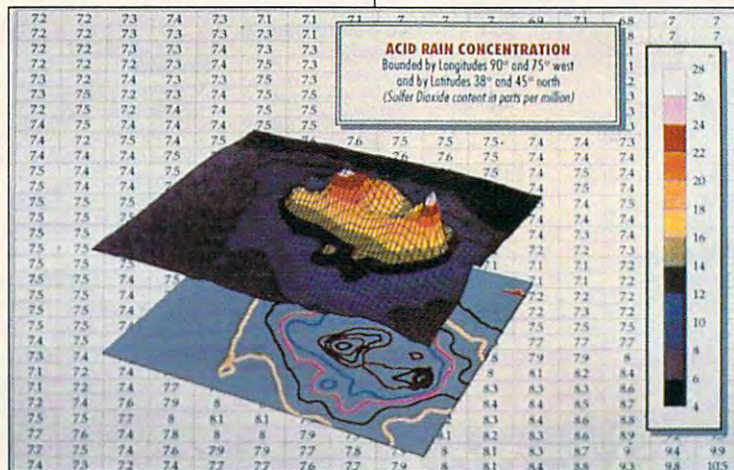


Third, you get the programming power of HyperScript. Much more than a macro language, HyperScript is powerful enough to create a full-blown application. Try out the Test Flight demo that comes with the package, and you'll see what I mean. The entire demo was written in HyperScript. It includes a very playable tic-tac-toe game, a fast-moving and interactive graphics-shape game, and a dialog box with sliding scale controls that lets you adjust the view of a 3-D chart in real-time. If you love to program, you'll love the high-level programming language and compiler.

For those who use OS/2, work on other platforms, or love to program, Wingz is worth a good look. But for the rest of us, Excel is the best overall choice. It's a shame that a program with so much early promise should now be so neglected. Perhaps someday Informix will release Wingz 2.0 and shake up the spreadsheet market just as it did with Wingz 1.0.

DAVID ENGLISH

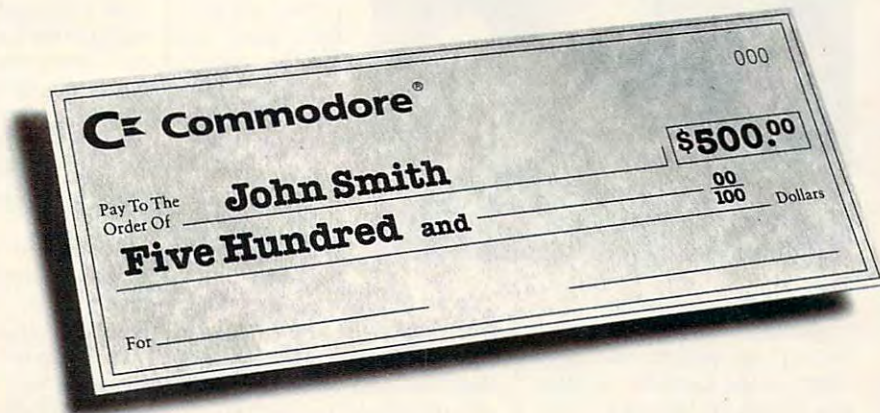
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NEWS & NOTES

Jill Champion

Don't Have a Cow, Man

Fans of the Simpsons can now get their fill of the dysfunctional family in a new PC game from Konami based on the animated TV series.

The Simpsons: Bart's House of Weirdness lets you take the starring role as the radical dude himself, Bart Simpson, in a quest for the ultimate coolest item of all. The game begins as Homer grounds Bart to his room until he's ready to "act like a hu-

man being." To escape confinement, Bart must travel through six weirdo worlds including the Simpsons' attic; the estate of Homer's boss, Mr. Burns; and Itchy and Scratchy's ice cream parlor.



You'll encounter numerous obstacles and traps along the way like burp balls, falling knives, and worms, but as the ever-resourceful Bart, you'll be armed with a burp gun, water balloon, slingshot, spray-paint can, and dart gun.

The price for Bart's House of Weirdness is \$49.95. For more information, contact Konami, 900 Deerfield Parkway, Buffalo Grove, Illinois 60089; (708) 215-5100.

Crime-Fighting Windows
Artists who render criminal sketches for the Bellevue, Washington, police department are getting a little help from the PC these days. Detectives there have begun using

a Windows-based drawing program called Compusketch that makes producing composite drawings of criminals much faster than with the traditional pencil-and-paper method. Crime witnesses are interviewed by police officers for details about a suspect's physical appearance, such as eye, hair, and skin color; hair style; and head shape. The information is entered into the computer, and Compusketch generates a rough onscreen composite.

Once witnesses view the initial composite, the picture can be modified, using a mouse and the menu tools, to show more detail.

The department hopes to install Compusketch on laptops so that officers in mobile crime-investigation vans can take composite descriptions at crime scenes. Detectives will be able to diagram a crime scene on the spot with Compusketch and report from the field using Microsoft Word on laptops. They'll be able to put together a search warrant and send it to a judge by fax or modem.

Living Color

Beginning readers can now turn to the PC for storytelling that's both educational and fun. Interactive Storytime from Multimedia Products is a series of classic children's tales on CD-ROM. Familiar characters like Goldilocks and the little red hen come to life through colorful graphics, voice-over narration, lively music, and vivid sound effects.

The software is so simple to use that children can maneuver their own way through

the stories with very little adult supervision. Clicking on an object shows how its corresponding word is spelled while a voice pronounces it. Clicking on different boxes takes the child to another page or story or prints out a coloring book.

Each disc contains three children's stories for a suggested retail price of \$49.95. For more information, contact Multimedia Products Group, 300 Airport Executive Park, Spring Valley, New York 10977; (914) 426-0400.

Multimedia Made Simple

Eclipse Technologies says its new software for PCs is so easy to use that first-time users can complete a multimedia presentation with sound in about 15 minutes—and they won't have to break the bank to do it. Madison Ave. Multimedia software retails for \$169.95.

To create a presentation with Madison Ave., you capture and then display screens from any DOS or Windows program using the Camera feature. Images are then saved as high-resolution PCX files. Sound is recorded directly to the hard disk with the onscreen Recorder feature. A free music library of original compositions is included with the package, or, if you have a sound board, you can record sounds from any source—through a microphone or from a CD, cassette, or record. You can easily add special effects like transitional fades; even mouse-pointer movements can be recorded.

Using the Carousel feature, you view, sequence, copy, and move or delete captured screens. Voice, music, special effects, and images are all part of individual slides within Carousel, which makes editing a snap. Simply choose a slide or block of slides and move them with a keypress or

Get ready to hunt for the coolest item in the universe in Konami's recent release, *The Simpsons: Bart's House of Weirdness*.

mouse click, and sounds and special effects move automatically with the images.

For more information, contact Eclipse Technologies, 1221 West Campbell Road, Suite 125, Richardson, Texas 75080; (800) 456-6434.

Virtual Hollywood

Virtual reality enthusiasts might have second thoughts about the technology after viewing *Lawnmower Man*, the new Stephen King flick that shows the darker side of a phenomenon taken too far.

This \$10 million futuristic thriller is one of the first films to incorporate virtual reality. New Line Pictures promises "computer graphic animation effects never before seen on the 35mm screen."

Pierce Brosnan, best known for his portrayal of TV's Remington Steele, plays an obsessed scientist who conducts intelligence-acceleration experiments on a slow-witted gardener nicknamed "the Lawnmower Man" (Jeff Fahey). The experiment goes awry, and the Lawnmower Man becomes a superintelligent being filled with hatred, capable of transforming matter with mere thought. The final battle between good and evil is waged in virtual reality.

Becoming Word Smart

Punch up your communications skills with WordSmart. WordSmart is an English language enhancement program that teaches vocabulary, usage, derivation, and pronunciation to help improve spoken and written communication skills at almost any age and educational level.

The program combines computer software with audiotapes for ten levels of learning—fourth grade to Ph.D.—and is designed to dramatically improve reading, writing, and comprehension skills, as

well as clarity and direction in speaking. Each volume contains three floppy disks and five 1½-hour audiocassettes. If you would like to have further information, contact Software Resource, 8 Digital Drive, Suite 100, Novato, California 94949; (415) 485-0800.

Let's Go to the Movies!

Think you've seen a lot of films? Odds are you'll discover something new if you consult the Banner Blue Movie Guide. You'll find information on more than 9000 movies—from the campiest B titles to Oscar winners—produced during the past 65 years. Browse through the entire catalog of movies or conduct a search by category, plot, actor, director, subject—even by typing in one word of a title. The guide includes information on critics' opinions and award nominations and wins. Its retail price is \$44.99.

For more information, contact Banner Blue Software, 39500 Stevenson Place, #204, Fremont, California 94539; (510) 794-6850.

Talking Fingers

Learning sign language is now as easy as turning on your computer, thanks to E&IS SignWare.

Fingerspeller, the most popular signing program, teaches the American Sign Language (ASL) alphabet by displaying high-resolution pictures of correct hand positions for every letter. Instant letter conversion allows you to see the correct fingerspelling of any letter you press on the keyboard. In-

stant word conversion fingerspells any word up to 30 letters long. Learning comprehension tests your knowledge of fingerspelled words, including those in a personal file you create. Suggested retail price is \$39.95.

Elementary Signer uses more than 160 signed words to test word-recognition skills. Learning speed can be adjusted to the user's level of learning—from beginner to advanced signer. Suggested re-



The futuristic flick *The Lawnmower Man* explores the darker side of virtual reality taken to its ultimate limits.

tail price is \$79.95.

FingerZoids (only available for Mac and Apple II) is a game that helps reinforce sign language skills. As fingerspelled letters drop from the top of the screen, your goal is to press the correct letter on the keyboard before it reaches the bottom. Suggested retail price is \$49.95.

For more information, contact E&IS SignWare, P.O. Box 521, Cedar Falls, Iowa 50613; fax (319) 266-7800.

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, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. Although space is limited, all items will be considered for publication. □

Reading single bytes from files with GW-BASIC, motivating a mouse, getting to the root of DeskMate, and taking the short course on scanners

GW-BASIC Binary

Here's a GW-BASIC program that reverses upper- and lowercase letters. It also demonstrates how GW-BASIC can be used to read and write files byte by byte.

```
10 INPUT "NAME OF FILE TO CHANGE",IFILE$
20 OPEN IFILE$ FOR INPUT AS #1
30 OFILE=LEFT$(IFILE$, INSTR(IFILE$, ".")+1)+"Z$$"
40 OPEN OFILE$ FOR OUTPUT AS #2
50 WHILE NOT EOF(1)
60 C$ = INPUT(1,#1)
70 IF C$ >= "A" and C$ <= "Z" THEN C$=CHR$(ASC(C$)+32) ELSE IF C$ >= "a" AND C <= "z" THEN C$ = CHR$(ASC(C$)-32)
80 PRINT #2,C$;
90 WEND
```

DONALD RICHMOND
SAN ANGELO, TX

A Mad Dash for the Exit

The DOS manual states that I should exit to DOS before turning off the computer to extend its life. I have a Tandy, and when I exit to DOS, my screen says C:\DESKMATE. I try entering C:, but to no avail. Is it all right to exit at that point, or should I select Tree in DeskMate, choose C:, and then leave to DOS?

TONI M. MARGUGLIO
MILLVILLE, NJ

When your screen says C:\DESKMATE, you have exited to DOS. There's no reason to return to the root directory. Typing C: at the DOS prompt only takes you to the C: drive, which is where you are already. If you want to go to the root directory, type CD \ at the DOS prompt, and you'll be taken there, though there's no reason to return to the root directory before shutting down your computer.

The reason you should return to DOS involves the tem-

porary files used by many programs while they're running. If you simply turn off the computer while a program is running, the next time you turn it on you'll have many useless files on your disk. Worse, you might turn off the power while the file allocation table (a.k.a. the FAT) is being written to, resulting in an Osterized hard disk. But once you're at DOS with the C: prompt visible (regardless of the path that follows it), it's safe to turn off the machine.

The next question is whether you would want to turn it off at all. Many experts, including our own Mark Minasi, advise that you let your computer run all the time. It uses very little power when it's just sitting there.

Scanned Heat

I plan to purchase a scanner and would like to make an informed decision. I would appreciate any information about costs, system requirements, and so forth.

JASON LOCK
BRANTFORD, ON, CANADA

We get a lot of questions about scanners from our readers, and we believe that the technology is mature enough to be of interest to almost everyone with a computer. Check out the January 1992 issue for a comprehensive look at hand scanners. Briefly, there are a few different classes of scanners, and the kind of work you're doing will determine which scanner is right for you.

Hand scanners are mouse-like devices that can scan a section of a page about four inches wide. Hand scanners are portable and easily stored, so if you're scanning on the road, if space is a premium, or if your scanning needs are very restricted, a hand scanner is the scanner

for you. Because you actually move the scanner over the page, however, this is the least steady and least reliable alternative.

Flatbed scanners are like small photocopiers. They read a page through a sheet of glass or (in the case of Chinon flatbeds) from a head located about a foot above the scanning surface. If you're scanning pages from books, this is your best alternative. Because the page is stationary and the scanner mechanism moves, a flatbed scanner often provides the steadiest scan.

Sheet-fed scanners transport the scanned page through the mechanism much like a standard fax machine. The way they feed paper prevents you from scanning books and makes scanning assemblages of paper (like a page with a Post-it note attached) risky. Because the scanned page moves and the scanner itself is stationary, this scanner can be unreliable, depending on the quality of its paper-handling mechanism.

Most scanners can produce monochrome, gray scale, or dithered grays. If you find a scanner that won't produce one of these forms of images, keep looking. Each is valuable for different purposes, and you'll undoubtedly feel as if you've bought crippled equipment if you get a scanner with less than a full range of capabilities.

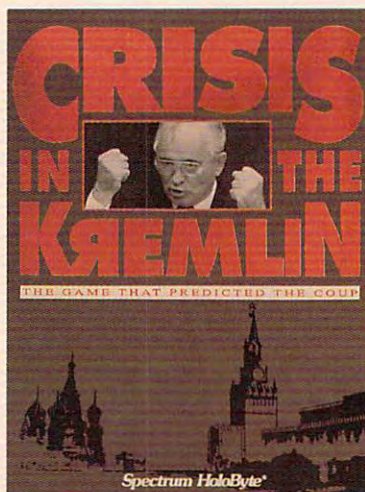
A number of color scanners have been introduced for desktop use over the past year or so. If you can afford it, color seems to be the wave of the future. Dots per inch (dpi) is an important consideration. Many scanners now offer 400-dpi resolution. You should also take a close look at the software provided with the scanner. The competition



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is so intense and the scanner standards are so high that many scanner manufacturers now offer extremely sophisticated software packages with their products, providing optical character recognition (OCR) and photo editing as well as the tools normally found in paint software.

Obstinate Arthur

Being a novice at the computer, I'm at a loss with the following situation. I have an IBM PS/2 55SX 386 computer that when purchased came with the following software loaded on the hard disk: DOS 4.01, Windows 3.0, Window Apps, hDC Apps, Word for Windows, and so on. The mouse functions well with all of this software but refuses to function with other software obtained since the purchase of the computer, including Labels Unlimited, Jack Nicklaus' Unlimited Golf & Course Design, and Instant Recall. Each of these programs states that a mouse can be used and recommends its use.

After referring to various manuals and talking with a few of the software companies and many individuals that have been in the computer game for a long time, I've had no success in getting my mouse, Arthur, to function with the software purchased since I bought the machine.

What am I overlooking? Is it something in the AUTOEXEC.BAT or CONFIG.SYS files? There must be some way to get Arthur to cooperate. Any help you can provide would be greatly appreciated. When a person starts calling a mouse by name, you know the frustration is getting the best of him.

WALT TAPPEN
PARK FOREST, IL

We called IBM and came up with a few ideas of our own. First, you should check your AUTOEXEC.BAT and CONFIG.SYS files to see if you have a mouse driver installed. (Windows has its own mouse driver, which it can load automatically.) If there's a line in your CONFIG.SYS that calls your mouse driver, it should look something like DEVICE=C:\DOS\MOUSE.SYS. If there's one in your AUTOEXEC.BAT file, it might look something like this: C:\DOS\MOUSE. If you have neither of these, try inserting the command into

one of the files and reboot. If the programs still don't recognize the mouse, you need to look for your mouse driver. Go to the root directory and type ATTRIB MOUSE. /S and press Enter. DOS will look throughout your hard drive for a mouse driver. When you find it, enter the path that ATTRIB prints on your screen in your CONFIG.SYS or AUTOEXEC.BAT files (depending on whether it's a SYS or a COM file). If there's no such file, look for it on your installation disks. It should be there. If it isn't, complain to the salesperson who sold you the unit.*

If you found the call in your CONFIG.SYS or AUTOEXEC.BAT and you found the file MOUSE.SYS or MOUSE.COM but the mouse still doesn't work, you may have a TSR program loaded that's interfering with the signal. If so, create a boot disk by formatting a floppy with the command FORMAT A:/S. Write an AUTOEXEC.BAT or a CONFIG.SYS file that contains only the command to load the mouse driver and put it on the floppy boot disk. Make sure the disk is in place, ready to read, and boot your computer. It will boot from the floppy rather than the hard disk, and there will be nothing to interfere with the mouse driver. Run one of your mouse-driven programs. If the mouse driver still doesn't work, take the computer and mouse in for technical assistance from your dealer. If it does work, copy the program calls from the AUTOEXEC.BAT on your hard disk to the AUTOEXEC.BAT on your floppy disk one by one, rebooting each time, until your mouse fails to respond. The last program you copied is the culprit. Call its manufacturer to find out if there's a way to make it friendlier to your environment.

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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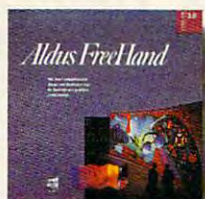
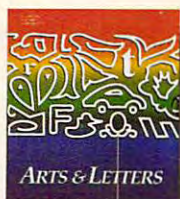
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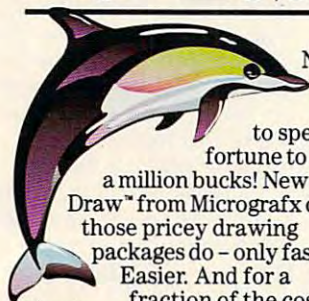
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Object rotation	Yes	Yes	Yes	Yes	Yes
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TIPS & TOOLS

Edited by Richard C. Leinecker

Security Is No Accident

My computer at work is unattended while I'm away from my desk. During that time anyone can come in and browse files on the hard drive. Some of those files are sensitive, so I wrote two simple security programs. One hides them when I'm away, and the other shows them when I need to use them.

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.

DEBUG HIDE.COM

File not found

```
-E 100 BE 80 00 AC 0A C0 74 3C
-E 108 AC 3C 0D 74 37 3C 20 74
-E 110 F7 8B D6 4A AC 3C 0D 74
-E 118 04 3C 20 75 F7 C6 44 FF
-E 120 00 2B C9 B4 2F CD 21 83
-E 128 C3 1E B4 4E CD 21 72 14
-E 130 8C C0 8E D8 8B D3 E8 0F
-E 138 00 B4 4F CD 21 72 05 E8
-E 140 06 00 EB F5 B4 4C CD 21
-E 148 B8 00 43 CD 21 80 C9 02
-E 150 B8 01 43 CD 21 C3
-RCX
CX 0000
:56
-W
Writing 0056 bytes
-Q
```

DEBUG SHOW.COM

File not found

```
-E 100 BE 80 00 AC 0A C0 74 3D
-E 108 AC 3C 0D 74 38 3C 20 74
-E 110 F7 8B D6 4A AC 3C 0D 74
-E 118 04 3C 20 75 F7 C6 44 FF
-E 120 00 B9 02 00 B4 2F CD 21
-E 128 83 C3 1E B4 4E CD 21 72
-E 130 14 8C C0 8E D8 8B D3 E8
-E 138 0F 00 B4 4F CD 21 72 05
-E 140 E8 06 00 EB F5 B4 4C CD
-E 148 21 B8 00 43 CD 21 80 E1
-E 150 FD B8 01 43 CD 21 C3
-RCX
CX 0000
:57
-W
Writing 0057 bytes
-Q
```

To use the programs, type *HIDE filename* or *SHOW filename*. You can use wildcards in the filename.

RICHARD C. LEINECKER
REIDSVILLE, NC

Perfect Memo Forms

Feeding a special memorandum form into your laser printer each time you want to type an interoffice memo can be a nuisance, especially if the printer is away from your desk or in another room. The following WordPerfect macro will create the form for you. And all with just one keystroke! All you have to do is begin typing your memo.

Beginning at a blank WordPerfect screen, invoke Macro Define by pressing Ctrl-F10. Press Alt-M to name the macro. If you don't already have a macro defined on Alt-M, WordPerfect will ask you to describe the macro. Type MemoForm. If Alt-M exists, you'll be asked if you want to replace the macro. Press 1 for Replace and Y for Yes, and then type MemoForm. (Note: If you don't want to replace Alt-M, you can define this macro with any Alt-letter combination you want.)

Set the top margin to .25: Shift-F8, 2 (for Page), 5 (for Margins Top-Bottom), .25, Enter, Enter, Enter.

Set the left margin to .50: 1 (for Line), 7 (for Margins Left-Right), .50, Enter, Enter, Enter, Enter.

Set the base font to Helvetica by pressing Ctrl-F8, 4 for Base Font, and N for Name Search; then type Helv. (If you are using Bitstream or some other font product, Helvetica may have a different name.) LaserJet II and compatible printer users should select a 12-point font and then press Enter. PostScript users press Enter, type 12, and press Enter.

Now that the base font is

set, set the font for the heading at Very Large: Ctrl-F8, 1 for Size, 6 for Very Large.

Turn on Caps Lock, press F6 for Bold, and type MEMORANDUM. Press the right-arrow key to move beyond the Very Large code. Press Enter four times. Change the left margin back to one inch by pressing Shift-F8, 1 for Line, and 7 for Margins. Then type 1, and press Enter four times. Type DATE: and press Tab twice. Press Enter twice, type SUBJECT:, and press Tab. Press Enter twice, type TO:, and press Tab twice. Press Enter twice, type FROM:, and press Tab twice. Press Ctrl-F10 to end Macro Define.

To test your macro, exit the current document. At a blank WordPerfect screen, press Alt-M to see your "stationery."

WILLIAM HARREL
VENTURA, CA

Vaya con DOS

Sometimes it's nice to leave a batch file, go to DOS, and return to the batch file exactly where you left off. Here's how you can do that.

ECHO OFF

REM Do batch file stuff here.

```
REM Now go to DOS.
SET OLDPROMPT=%PROMPT%
PROMPT=Type "exit" to return to
batch file $_.$_$g
%COMSPEC%
PROMPT=%OLDPROMPT%
SET OLDPROMPT=
```

REM Resume doing other batch file stuff.

CLARK WAGGONER
SAPULPA, OK

Easy Startups

Some programs ask you a question or two when they first run. A good example of this is Lemmings. When it first runs, it asks what kind of computer you have so it can

Protect your computer from malicious entry, set up standard forms with WordPerfect macros, and fool DOS into thinking it has received keyboard entry.

adjust its runtime speed for computers of varying clock speeds. My computer runs best on the second speed, so when I run Lemmings, I type ECHO 2IVGALEMMI -V. (The character after the 2 is a vertical bar.) It tricks the program into thinking that I typed the 2 key after the program ran. A batch file with this line makes it even easier to start this program.

I also use this technique when running the PC Tools MI program. It normally shows two screens of information, waiting for a keypress between them. Since I'm never interested in the first screen of information, I run the program by typing ECHOIMI. (The character after ECHO is a vertical bar.) It tricks the program into thinking I pressed a key after the program ran.

And here's one last handy trick that's similar. Instead of typing DEL B:*. * to delete all the files on drive B, just type ECHO YIDEL B:*. *. (The character after the Y is a vertical bar.) DOS will be tricked into thinking you pressed Y and do the deletes. Be careful; you could accidentally delete files that shouldn't have been deleted.

This technique doesn't work with every command. FORMAT is a good example. Microsoft probably made sure you couldn't use such a trick because one mistake could wipe out your hard disk.

BEN SEREBRIN
LAKELAND, FL

Use High Memory

If you have a 386 or better, you can add the UMB command (DOS = HIGH,UMB) so that programs such as device drivers and TSRs can run in upper memory as well. To make this work, you need to install the EMM386.EXE memory manager, and you need to direct your drivers and TSRs to high memory by using the HIGHDEVICE command in CONFIG.SYS and the LOADHIGH command in AUTOEXEC.BAT.

TONY ROBERTS
GREENSBORO, NC

Easier Paths

My path statement contained so many directories that it was slowing things down. Each time DOS searched for

something in the last directory on the path, it had to check all of the other directories first. I created a directory called BATS that contains a batch file to call each of my programs and put the BATS directory in my path. The batch files make sure I'm in the correct directory before running a program.

Here's a batch file called WPB.BAT to run WordPerfect. To use it, I just type WPB, and it gets me in the correct directory and runs WordPerfect.

```
ECHO OFF
CLS
CD \WP
WP
CD \
```

MATTHEW ALEXANDER
PASADENA, NF, CANADA

Hard Disk Real Estate

It's a constant struggle to keep ahead of the demand today's bloated soft-

ware makes on a hard disk. Furthermore, I have to keep a certain amount of hard disk space available for programs to use for temporary and swap files. LHARC has come to the rescue more than once.

If I have a directory that I expect to need in the near future but I'm not currently using, I can simply move all of its files into a single compressed file with LHARC M *dirfile*. Graphics files take up a lot of space, so I compress them, too. I can then examine the list of files within a compressed file with the LHARC *graphfil* command. If I need to expand a single file, I use LHARC E *graphfil filename* to expand the individual file.

Files that may be of interest but don't need to be immediately available can be simply backed up with any commercial backup program, like PCBACKUP (with PC Tools), or the DOS BACKUP command. I often



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make two backups of manuscript and graphics files because, if a disk goes bad, I can lose months of work. Once the backup is made, I can simply wipe out the directory and recycle the hard disk space.

My biggest devourers of hard disk space are PostScript files, graphics files, and applications. Word processors that do automatic backups may also overload your disk with old versions of files. Periodically, I issue this command from my root directory.

ATTRIB *.PS /s > PSFILES

This command creates a file containing a list of all the PostScript files on my hard disk. To find backup files, I substitute BAK where PS appears in the example. Once I know where these files are, I can back them up and delete them.

ROBERT BIXBY
GREENSBORO, NC

Memory Jumpstart

Sometimes, it's hard to remember from Friday afternoon to Monday morning what your current tasks are or what needs to be done before that Monday staff meeting. Sometimes, it's even hard to remember overnight. To leave reminders for yourself, include a command in your AUTOEXEC.BAT file that will display a screen of reminders of what your current tasks are when you first boot up. Near the end of your AUTOEXEC.BAT file, include these commands.

@ECHO OFF

TYPE AGEND

PAUSE HERE IS YOUR AGENDA

Then, at the end of each day, create or modify a text file called AGEND. If your work varies greatly from day to day, you might as well simply create a new file every day, but if you have four or five things that you have to do routinely, place these at the top of the file and use EDLIN or a word processor that can write an ASCII file to change the tasks at the end of the file. If the file becomes long, use the MORE filter.

ROBERT BIXBY
GREENSBORO, NC

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3	RF	BOBBY BOND	LA
4	LF	DAVE DILLON	LA
5	SS	BOB BOURGESS	LA
6	3B	JOE MURPHY	LA
7	2B	JOE MURPHY	LA
8	C	BOB FENNER	LA
9	P	DAVE DILLON	LA

EDIT INDIVIDUAL PITCHING STATISTICS

PLAYER	TEAM	STARTING	INNING	OUTS	PTS	AVG
DAVE DILLON	LA	1	1	1	1	1

STATISTICAL LEADERS

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BOBBY BOND	LA	HR	22
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PROGRAMMING POWER

Tom Campbell

TURBO PASCAL FOR WINDOWS: FIRST STEPS

I think Turbo Pascal for Windows (TPW) is the best Windows development system available for anywhere near its price, especially if you're a Pascal programmer.

Just be sure to budget something extra for CompuServe and a third-party book because the Turbo manuals don't do a great job of turning the new user into a Windows programmer. One way to remedy that situation is to buy Tom Swan's *Turbo Pascal for Windows 3*, which costs \$29.95 from Bantam Books and is more than worth its price. Another way is to read this column.

Turbo Price

The only thing I don't like about TPW is the documentation, which is pretty amazing considering it's a 1.0 product. There's a great deal to like about TPW.

First of all, its price makes it simply the best deal you can find for developing Windows applications and DLLs. Make no mistake about it; your hundred clams (and that's list!) for TPW, plus 30 for the Swan book, gets more bang for the buck than anything else out there by a margin of at least \$150.

Second, and more important, this set of robust, mature development tools is second to none. The debugger is a text-mode version of Turbo Debugger, not the more modestly endowed debugger that comes with Turbo Pascal 6 for DOS. The resource editor, which lets you create Windows dialogs, menus, and other user-interface gizmos, is Whitewater's well-respected Resource Toolkit, which itself

sells for several times more than the entire Turbo Pascal for Windows package. The sample programs, in what is becoming a tradition with Borland, are numerous and of very high quality, illustrating just about every concept a Windows programmer needs to find illustrated.

The ObjectWindows Library is a sheath over Windows to ease the considerable bookwork required to get started in Windows programming, and it does a good job of it. A Help compiler is also included free (\$49.95 if you buy it from Microsoft); it lets you create true Microsoft Help for your applications. Last but not least, the multiwindow development environment and editor work together in inimitable Turbo Pascal fashion, which means that TPW is intuitive and very, very fast.

Dialing for Dialogs

This month we'll take those marvelous tools and create . . . well, we'll create a program that does very little. It merely displays a dialog with a couple of buttons on it. Normally I scorn do-nothing programs of this type, but I wish I'd had a template like it when I was creating my first real Windows app with Turbo Pascal (it's Windows File Finder, available on COMPUTE/NET).

The TPW example programs are all quite sophisticated—too much so for a laggard like me. What I needed to know was the bare minimum required to put up a modeless dialog with a few buttons on it and how to connect the visual entity that is a dialog with the code it's supposed to execute. You should read the TPW tutorial manual, which will make more sense after you peruse this column.

Following are the general steps. Create a dialog using

some sort of resource editor or the mysterious RC (a familiar sight to old Windows hacks). The controls on the dialog must have numeric identifiers, and your program must know what those identifiers are. When the controls are activated (for example, when you click on a button), Windows sends a message to the Turbo Pascal application, which routes it through OWL. You must create a method for that control, giving the method a virtual index containing the value of the control's identifier. This means that every button, scroll bar, edit box, menu item, and so forth can potentially have a method associated with it. It also means that the routines for each button on the dialog can be in widely disparate areas in the source and that there is no intrinsic connection between the code for these controls and the fact that they appear on the same dialog.

This, then, is why Windows programs tend to be modeless and are so much easier to write in a way that keeps modes to a minimum. The user manipulates a physical object on the screen, and that action triggers code somewhere. Your program consists of little more than subprograms (methods, technically) whose sole purpose is to react to those actions.

Button Basics

The program below uses a simple dialog with two buttons. Clicking on one button causes a message to be displayed. Clicking on the other causes the program to end. While you could simulate this with the Windows Message-Box routine—it is in fact used by this program—you would be limited to the Message-Box's own resources. You can easily extend the concepts used to create this dia-

The ObjectWindows Library is a sheath over Windows to ease the considerable bookwork required to get started in Windows programming.

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PROGRAMMING POWER

log to edit fields, other buttons, whatever. My file finder program illustrates several of these concepts. But let's get down to specific steps.

Fire up the Whitewater Resource Toolkit. Click on the New button and enter DLG as the filename. Click on the Dialog button. The default dialog type is perfect for our purposes. You may want to double-click on the dialog and change its caption for practice; I suggest the text *Click on Done to Quit* for reasons that will become apparent.

Click on the Button tool and add a button. Double-click on the button to bring up its Attributes dialog. Change the text to *Test* (don't ever accuse me of dazzling originality) and the item ID to 102. Repeat this for a second button, but name it *Done* and give it the button ID 103. Place the two buttons next to each other on the dialog. Name the dialog DIALOG1.

Save this dialog resource as DLG1.RES; then start Turbo Pascal for Windows and compile the following program. Be certain all identifiers and numbers are correct because they're needed inside the source. When you run it, a dialog with two buttons appears. Click on Test, and a message box acknowledging your action appears. Click on Done, and the OWL CloseWindow method is called, returning the program's resources to Windows and exiting.

The Finished Product

The program contains extensive comments showing you how to hollow it out and replace its code with your own. It's quite simple; the code is about 30 lines long. Use it in conjunction with chapter 11 of the TPW Cookbook, and you'll be well on your way to building your own programs with custom dialogs. □

```
PROGRAM DLG1;                                { Compile using Turbo Pascal for Windows. }
{ DLG1 is a minimal program that simply puts up a dialog box with two
  buttons on it. It puts up a message box when the user clicks on Test,
  and quits when the user clicks on Done. }

{ Adapting it for use in your own program:
- Change the copyright message in the $D directive below.
- Change ResourceName to an appropriate identifier. This has to match
  the name of the identifier in the .RES file.
- If the name of a button, such as the Test button, is changed (very
  likely), change the id_Test identifier as well. Also, ensure that
  the button's ID number, 102, matches the ID number given to it in
  the resource editor.
To add buttons:
- Add them to the dialog resource using the resource editor.
- Make sure they have distinct IDs (the resource editor assigns unique
  IDs automatically, but you can change them--so be careful).
- Add CONST declarations with identifiers using the same names as the
  buttons but prefixed with id_. For example, if a button called
  Done is given the resource ID 103 in the resource editor, use this
  declaration in your program file:

CONST
  id_Done = 103;
}

{ Use the OWL units. }
USES WinTypes, WinProcs, WObjects;

{ Link in the resource file DLG1.RES. }
{$R DLG1}

{ This gets inserted directly into the .EXE. }
{$D Copyright (c) 1991 by Your Name Here }

CONST
{ Symbolic name of the dialog resource. This must match the Dialog ID
  you assign the dialog object in the resource editor. }
  ResourceName : PChar = 'DIALOG1';

{ This matches the resource ID number of the Test button. }
  id_Test = 102;
{ This matches the resource ID number of the Done button. }
  id_Done = 103;

TYPE
  TMyApplication = object(TApplication)
    { Your application must override (have its own) InitMainWindow method.
    PROCEDURE InitMainWindow; virtual;
  END;

  { Points to objects of type TDialog1. Pointers of this type will
  be used to allocate TDialog1 objects dynamically. }

  PD1 = ^TDialog1;

  { This data structure matches the dialog resource 'EMPTY1' in DLG1.RES.
  TDialog1 = OBJECT(TDialog)
    { Executes when the button with ID #102 (id_Test) is clicked on. }
    PROCEDURE TestButtonProc(VAR Msg : TMessage);
      VIRTUAL id_First + id_Test;

    { Executes when the button with ID #103 (id_Done) is clicked on. }
    PROCEDURE DoneButtonProc(VAR Msg : TMessage);
      VIRTUAL id_First + id_Done;
  END;

  { Note that the VIRTUAL cm_First + id_Test isn't in the
  declaration. It appears only in the TYPE or OBJECT definition. }
  PROCEDURE TDialog1.TestButtonProc(VAR Msg : TMessage);
  BEGIN
    { Just put up this message when the Test button is clicked on. }
    MessageBox(HWindow, 'You clicked the Test button!',
      'Testing dialogs', mb_Ok);
  END;

  { Executes when the Done button is pressed. }
  PROCEDURE TDialog1.DoneButtonProc(VAR Msg : TMessage);
  BEGIN
    { Deallocates and removes the dialog box. }
    Done;
  END;

  { This procedure executes when the application's main window appears. }
  PROCEDURE TMyApplication.InitMainWindow;
  BEGIN
    { The only job of the main window is to put up a dialog of type PD1. }
    .MainWindow := New(PD1, Init(NIL, ResourceName));
  END;

  VAR MyApp: TMyApplication;
  BEGIN
    MyApp.Init('Application name');
    MyApp.Run;
    MyApp.Done;
  END.
```


Andrew Visscher's and Bruce Williams Zaccagnino's ...

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Richard C. Leinecker

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You won't believe this month's featured software. It's a commercial-quality, arcade-style, educational game. But you don't have to tell your kids it's educational. They'll have so much fun playing it that they won't notice. It's called *MathVoyager*, and it hones math skills to a sharp edge.

At the start of the game, you'll find yourself in flight school. Selecting the right book lets you set the math problems the way you want them. First, set the operation to addition, subtraction, multiplication, division, or a random mixture of the four. Then, pick the type of numbers from a choice of whole, decimal, or mixed. And finally, select the difficulty level. Because it's so customizable, you'll find the game useful for third graders on up through ninth graders.

After flight school's over, you'll find yourself on the bridge of an interstellar starship. Your mission is to

find home base before you run out of fuel, or you'll collide with a UFO with your shields down. You control the ship's functions by correctly answering the math problem that's on the console. You'll have to work fast, since there's a lot to do. Steering left, right, up, and down; firing; getting fuel; and watching the radar screen for hazards are among your duties. On the hard level the rear-view control will become available, so you can shoot the aliens that sneak up behind you.

The graphics are great. They appear in CGA, EGA, VGA, Hercules, and Tandy 16-color graphics modes. The program requires 256K RAM for CGA and Hercules, and 384K RAM for EGA, VGA, and Tandy 16-color modes.

To find this program, log on to GENie or America Online. Use the menus or type the keyword *COMPUTE* to get to the COMPUTE/NET area. Once in COMPUTE/NET, enter the software library (it's called Files from COMPUTE on America Online). Find the file called *MVOYAGER.ZIP* and download it. All you have to do then is use *PKUNZIP* to unpack it.

If you need to learn more about DOS, you're in luck. *COMPUTE's Releasing the Power of DOS* is online for you to download. Even an experienced user can be unaware of an important shortcut or feature. The fact is that DOS has many intricate facets, and the greater your understanding of them, the more you'll be able to increase your productivity and your ability to handle an emergency situation.

This book describes the internal operation of PCs and DOS, differentiates between the various versions of DOS, explains how information is stored on disks, reveals ways to unleash the power of DOS and your PC, shows how to use the various tools that are

part of DOS, discusses the hidden features and appropriate uses of each DOS command, introduces you to public domain software enhancements, explains the various error messages you could encounter, spells out how to diagnose problems, shows how to configure DOS for different languages, discusses how DOS works in a network environment, and more. You'll find out how to use the often misunderstood advanced features of MS-DOS and PC-DOS. All versions currently in use, up through version 4, are included. Most importantly, you'll be presented with useful applications and techniques for speeding up your computer or overcoming limitations built into the system. You'll see many shortcuts and tricks that are part of DOS but are ordinarily hard to find or decipher.

The syntax or a valid command format for all DOS versions is given along with the meaning of any parameters or switches. Below this is a list of any messages that might appear onscreen when you use the command, with explanations of their meanings.

The text accompanying the command reference provides the conceptual background for using the command, describes a variety of applications, and gives several examples of usage. Almost every DOS command has limitations, so alternative software solutions are also discussed. The author also tells about commercial and public domain programs that do a better job than related DOS commands.

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 RLEINECKER; America Online, screen name Rick CL; or CompuServe, user ID 75300,2104. □

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INTRODOS

Tony Roberts

BACK FROM THE DEAD

The latest versions of DOS—MS-DOS 5.0 and DR DOS 6.0—include utilities that help you recover accidentally deleted files. It's a relief to have this insurance on hand, but to use this software most efficiently, you have to do a little pre-delete preparation.

To get the most out of the file-recovery utilities, it helps to know a little about how DOS stores and deletes files. DOS keeps track of each of its files through a directory entry and a table called the File Allocation Table (FAT). The directory entry includes the file's name, size, and starting cluster number. When a file is opened, the system checks the directory for the filename and the starting cluster number. It then uses the data in the FAT to locate the file's subsequent clusters.

Disk files are usually stored in sequential sectors. Other times, particularly on a crowded disk or one on which files are constantly being added and deleted, disk files are scattered around, filling in the nooks and crannies of unused space. The FAT's job is to keep track of the links to all of those scattered sections so that the entire chain can be recalled when the file is opened.

When a file is deleted, the FAT entry that points to it is changed, but the file's data is untouched. The space occupied by the file is made available to the system for reuse. Therefore, it's possible to recover a deleted file by reconstructing its FAT entry and reclaiming the file's disk space. This operation can only be successful, though, if the file is recovered before new information is written to the disk in the areas previously occupied by the deleted file.

So how do the new un-

delete utilities help? First, both MS-DOS and DR DOS now include the UNDELETE command. At its very basic level, UNDELETE can use a deleted file's directory entry to recover all or part of the file. UNDELETE stands a better chance of making the recovery if the file isn't fragmented or saved in more than one spot on the disk.

The best time to do something about a mistakenly deleted file is immediately after the deletion. Any operation that writes to the disk reduces the chances of your being able to recover a file completely.

UNDELETE is your first level of protection. Even if you take no additional steps to protect yourself, UNDELETE will bail you out of some mistakes.

Both MS-DOS 5.0 and DR DOS 6.0, however, offer additional tools that can make UNDELETE work better and more reliably. MS-DOS has the MIRROR command, and DR DOS has a similar utility called DISKMAP. These utilities take a snapshot of the disk's FAT and set it aside for safekeeping.

When you delete a file, changes are made to the disk's active FAT, but the backup copy of the FAT that was made with MIRROR or DISKMAP is unchanged. If you need the deleted file back, UNDELETE can use MIRROR's or DISKMAP's information to reconstruct the file's chain of clusters and increase the likelihood of a full recovery.

If you use the MIRROR or DISKMAP commands regularly, you give UNDELETE a better chance to succeed. Include the appropriate command in your AUTOEXEC.BAT file, and you'll always have a fairly current backup version of the FAT handy.

Although using MIRROR or DISKMAP along with UNDELETE provides more protection than has been available

with any previous version of DOS, DR DOS offers an even more foolproof safeguard against deleted files—DELWATCH.

If DELWATCH is running, the DEL command doesn't actually erase files; it only *marks* them for deletion. The filename is removed from the visible directory listing, but the file continues to exist and continues to occupy allocated disk space.

DELWATCH, which is a memory-resident utility that runs in the background, keeps track of a specified number of deleted files (200 is the default). Once that limit is reached or the disk becomes full, DELWATCH performs an actual deletion of the oldest file in its pending delete list.

With DELWATCH operating, your chances of recovering a deleted file are almost 100 percent—even if you've saved other data to the disk. The security of DELWATCH comes at a cost, though. First, it occupies memory, and second, the files in the pending delete list still occupy disk space.

As you may have discovered, it's easy to make a mistake and delete the wrong file. If you're using one of the new DOS versions or if you have other undelete utilities, take a few minutes to learn how to recover from a mistake.

Keep in mind, though, that the ability to retrieve accidentally deleted files is no substitute for keeping current backups of your data. Also, because undelete utilities cannot always recover an entire file, they aren't too helpful at recovering deleted program files. You should be able to restore program files from your original disks or their backups.

But even a partial recovery of a data file can be useful. Wouldn't you rather have 18 pages of your 20-page report than nothing at all? □

New DOS versions give the average user a fighting chance at file recovery.

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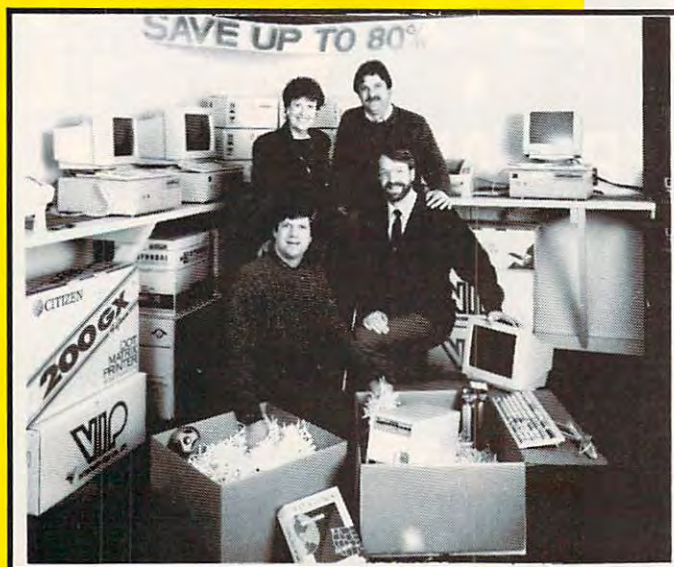
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Tealeaf



Exclaim

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Snooper can help you figure out the purpose of all those mystery files that clutter up your hard disk. And it's great for just snooping—it's always fun to see things you were never intended to see.

Snooper is a free program.

Tealeaf

Here's a DOS screen saver that allows you to select one of several patterns for never-

ending display when you're away from your computer screen.

Another use for Tealeaf is as an attention getter in the window or behind the counter of any business. The program, developed by Gene Woods, is shareware with a registration fee of \$11.95.

Exclaim

Exclaim is a Windows program that acts like DOS. From your Exclaim window, you can read directories or use the TYPE, COPY, and MOVE file commands just as you do with DOS, but you can do so without leaving the Windows environment.

Exclaim is almost essential for anyone running Windows on a 286 because it allows you access to DOS-like commands from a true Windows program. If you prefer to handle file-management chores from the DOS command line, you'll be right at home with Exclaim.

Exclaim is shareware with a \$20 registration fee. If you use the program past a trial period, please register it with its author, Gary B. Gordon.

WinRunner

Here's a utility that puts you back in the driver's seat when you're running Windows programs. WinRunner permits you to specify the size of the window that your application will use. The options include maximized, minimized, hidden, or optimized.

The program can be executed from a Program Manager icon, from a Run command, or through a program association.

With WinRunner you won't have to take potluck when you open an application; you'll be in control. WinRunner is a free program created by Clifton Karnes, COMPUTE's editor. □

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HARDWARE CLINIC

Mark Minasi

HARD DISK SIZE CRISIS

By now, most everyone knows the worst part of PC- and MS-DOS 3.3—they're limited in that they can only address a drive up to 32MB. You may know that DOS 4.x and 5.x can theoretically address a drive of up to two terabytes (two trillion bytes), but you probably don't know that you're essentially restricted to 516MB because of your BIOS. This month, I lead you through the maze of disk size limitations—limitations we'll all have to learn to live with.

First, understand that limitations of various kinds are imposed by the layers that data must pass through from the disk to the applications program. It looks something like this: disk ⇒ disk interface ⇒ BIOS ⇒ DOS.

The first hurdle is the interface. The most common interface is the ST506 interface, so let's start from there. Disk geometry is dependent on how the data is laid out on the disk. There are multiple read/write heads on a disk, as hard disks consist of multiple metal platters on which the data resides. Each disk surface is divided up into circular concentric areas called tracks, which are like the lanes of a racing track, and each track is divided into a number of sectors. Each sector contains 512 bytes of data, or, expressed differently, $\frac{1}{2}$ K bytes of data. An ancient 10MB XT hard disk had four heads, 305 tracks per head, 17 sectors per track, and $\frac{1}{2}$ K bytes of data per sector for a total of $4 \times 305 \times 17 \times \frac{1}{2}$ K, or 10,370K bytes of data capacity.

The Beast with 16 Heads

The common ST506 interface can only support up to 16 heads (8, actually, but most AT-type ST506 controllers break the rules and go to 16),

and it really doesn't care how many sectors or cylinders the disk has. So ST506 imposes the first constraint—the disk can have no more than 16 heads. The newer ESDI interface, by comparison, can support up to 256 heads, up to 4096 cylinders, and up to 256 sectors per track (256 heads \times 4096 cylinders \times 256 sectors per track \times $\frac{1}{2}$ K bytes per sector would be about 135 gigabytes (GB). The other newer SCSI and IDE interfaces don't care about heads and cylinders, as they're designed differently, and are only concerned with the total number of sectors on the disk.

Next is the BIOS. The BIOS disk interface is called INT 13 after the programming command used to access it. It was originally defined for floppy disks, and therein lies the source of many of its problems. An 8-bit register, called CL, stored the sector number. Another named CH stored the track number. And a third 8-bit register called DH stored the head number. Eight bits can represent up to 256 values, so that meant that the BIOS supported up to 256 heads, 256 cylinders, and 256 sectors per track.

For the sake of convenience and compatibility, INT 13 was augmented to support hard disks in the XT and later machines. 256 cylinders \times 256 heads per cylinder \times 256 sectors per track \times $\frac{1}{2}$ K bytes per sector isn't a bad limit—8.4GB. But it's arranged wrong. Nobody makes a drive with more than 16 heads, and virtually all hard disks have more than 256 cylinders.

So INT 13 for the hard disk cheated a bit.

The definition of CH and CL was blurred a bit. CL still stores the sector number, but only in the low six bits of CL. The high two bits of CL were tacked onto the front of CH

for the cylinder number. That means that CL—the sector number—can only assume a value up to 63. CH—the cylinder number—can only assume a value up to 1023, the largest value that can be represented with ten bits.

So the BIOS imposes a restriction of cylinders no greater than 1023, sectors per track no greater than 63, and heads no greater than 256. As you'd imagine, 256 heads isn't a problem. The 1024 cylinder barrier is a major pain, as many of today's drives exceed it, and the 63 sector barrier is being approached by many drives. What should you do if you have a drive with more than 1024 cylinders? You can sidestep the BIOS, as with SpeedStor or OnTrack, but you sacrifice total compatibility with Windows and will be unable to use OS/2.

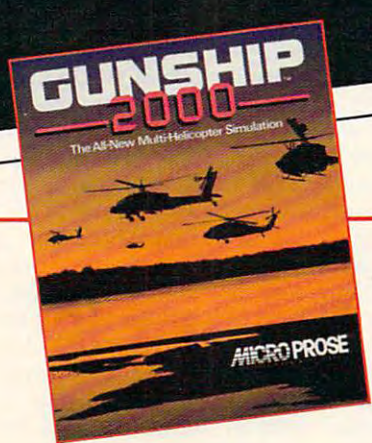
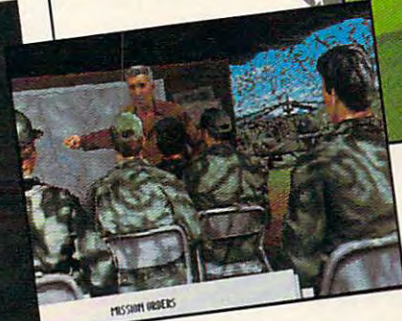
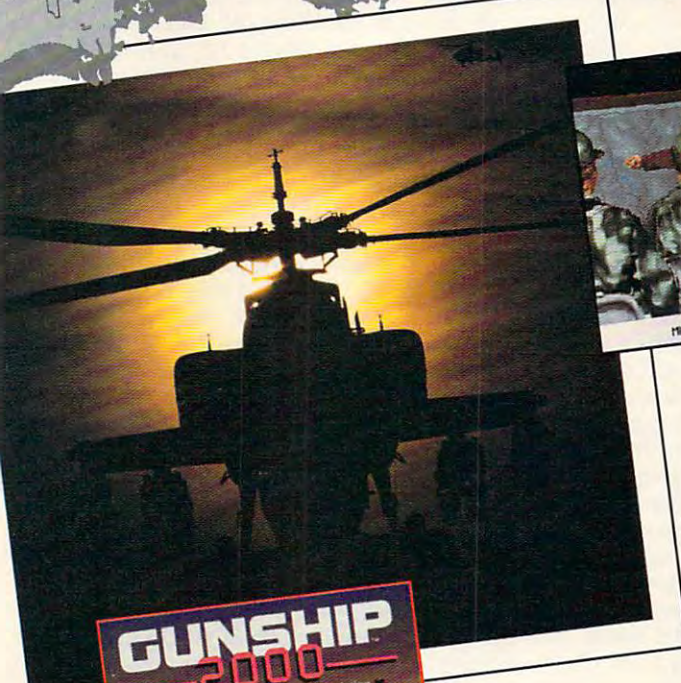
How do some drive makers get around this? They tell their drives to lie to the PC. Rather than saying that they have four heads and 2000 cylinders, they say they have eight heads and 1000 cylinders. The result comes out the same, capacitywise. Doing this is called translation—sector, head, or cylinder translation. Basically, translation is undesirable because it removes much of your flexibility in doing data recovery when problems arise with your drive. I avoid it.

One Size Fits All

Last in the limitations list, DOS has size limitations. The major DOS limitation is imposed by the boot record. There were, prior to DOS 3.31, two bytes—16 bits—set aside for the total number of sectors per logical drive. The size of 16 bits implies a maximum number of sectors equal to 2^{16} , or 65,536, or 64K. As each sector is $\frac{1}{2}$ K in size, the total size of the logical disk was restrained to $64K \times \frac{1}{2}K$

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bytes per sector, or 32MB per logical disk.

DOS 3.31 and later versions have removed this restriction, however, setting aside four bytes for the total number of sectors. Four bytes is 32 bits, describing two terabytes of disk size—enough to hold us for a while.

So how large a disk could you buy today without resorting to translation? Assuming that the large drive was an ESDI, your limitations would be as follows:

cylinders = 1023 (BIOS limitation)
heads = 16 (market limitation—
no drives today have 17+
heads)
sectors per track = 63 (BIOS
limitation)
bytes per sector = 1/2K (only
because most software
expects it)
total (1023 × 16 × 63 × 1/2K) =
516MB

Of course, this isn't the limit. As I've said, if you don't mind giving up OS/2 and UNIX compatibility, device drivers that ship with OnTrack and SpeedStor can double the size of the cylinders to 2048, allowing drives up to 1032MB, or just over a gigabyte, under DOS.

Should you care, given how complicated this all appears? Yes, and the reason is that DOS is reaching a crisis. While 516MB may *seem* like a lot, it's not. You can now buy a 200MB drive for just \$500. Drives exist that store over one gigabyte and cost in the \$3,000 range, not much more than you would've paid for a 60MB drive just a few years ago. In the mid nineties, you'll be able to buy a 500MB drive for just \$700. Something's got to be done: either a general acceptance of device drivers to access hard disks or a new augmented BIOS standard. You can be sure that there will be more than one solution

offered and several proposed new standards hawked by the big vendors.

Short-Term Solutions

Is there another answer? Sure. Two, in fact. But you won't necessarily like them. I recently installed a 631MB drive in a new system, an ESDI drive. As the drive's being put in a system with an EISA bus, I thought I'd try out a bus-mastering controller to see if bus-mastering controllers are all they're cracked up to be.

With ESDI, the drive tells the controller all its vital statistics. Rather than your having to run a setup program to tell the controller that you've got so many heads, cylinders, and the like, you just plug the drive into the controller, and away you go. When it's format time, the controller just asks the drive how it's laid out and formats accordingly.

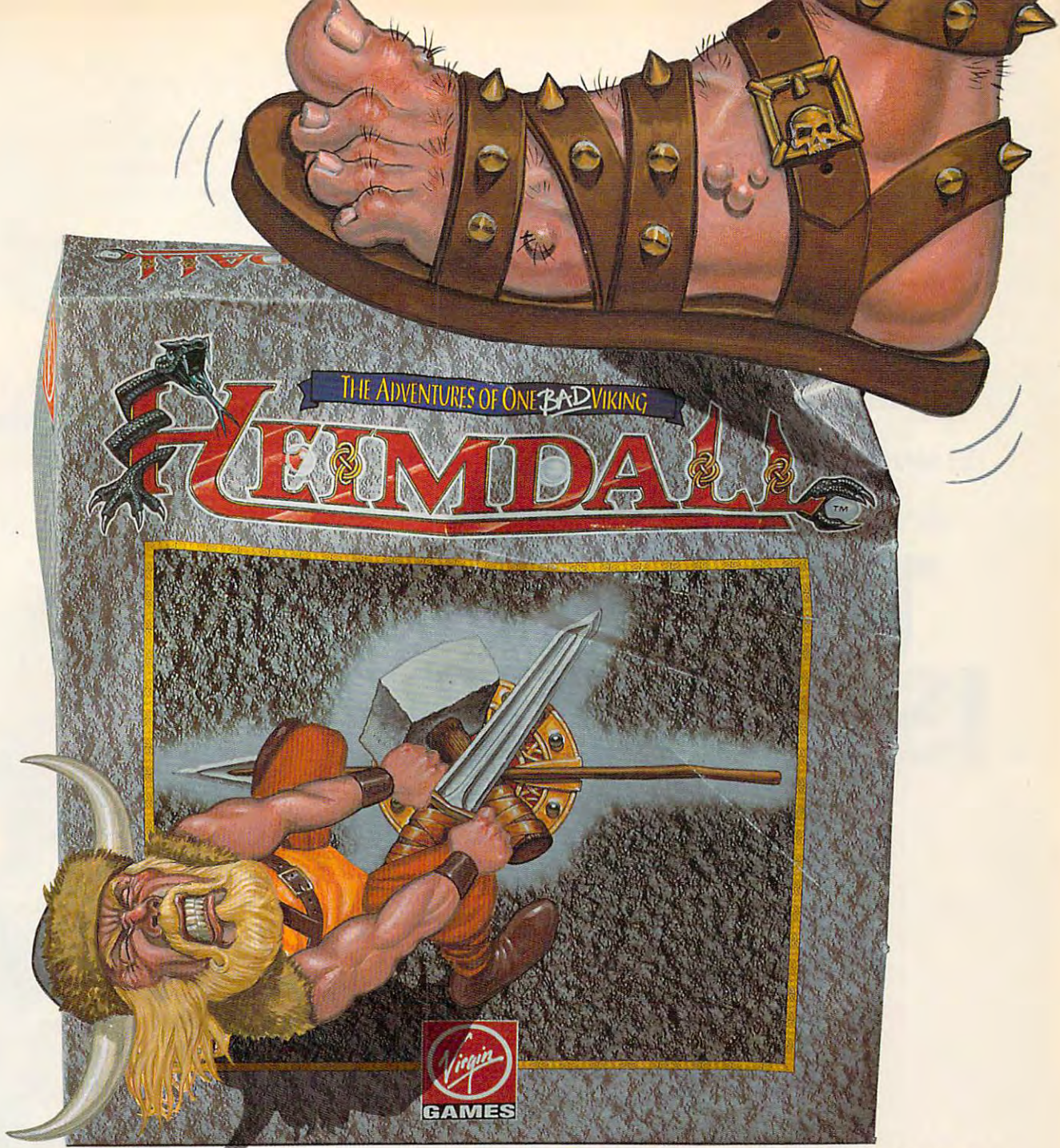
You can imagine my surprise when I ran a disk-tester program on my new 631MB drive and it reported that it had 64 heads, 32 sectors per track, and 631 cylinders. After a moment's thought, I realized that my bus-mastering controller was evading the "How do I deal with more than 1023 cylinders?" problem by doing sector translation. Notice how the controller does it—64 heads, 32 sectors per track. (The actual geometry is 1630 cylinders, 15 heads, and 52 sectors per track.) A little arithmetic shows us that 64 heads × 32 sectors per track × 1/2K bytes per track yields a cylinder that's exactly 1024K—one megabyte—in size. This is actually a fairly popular translation scheme, perhaps because IBM uses it in many of its desktop PS/2s, most of which do some kind of translation. If it has any virtue, it's that the existence of cylinders that are exactly one megabyte in size makes partitioning easy

under DOS 3.3's FDISK. When FDISK under 3.3 allows you to chop up a drive, it forces you to do it in units of cylinders, units that most of us don't have close to hand. By making each cylinder one megabyte in size, the translating controller lets you specify a number of cylinders equal to your desired partition size in megabytes.

So I've got the drive installed. It's incredibly fast, and DOS likes it just fine—but, as I said above, I'm stuck in DOS with this controller and hard disk. As it's a sector translator, it confuses OS/2 and UNIX. That's not the end of the world, however, as the controller manufacturer, Ultrastor, includes drivers for OS/2 and UNIX. The OS/2 drivers work just fine with OS/2 version 1.3, but I'm still just a teensy bit uncomfortable about the future. Will Ultrastor support OS/2 version 2.0? Will the company be around when OS/2 version 47 arrives? We'll see.

I bought that drive because I've worked with one like it before. It's the Maxtor 676E, and it's an excellent device. I've installed it on another machine, gotten the full capacity available to DOS, and still not sacrificed OS/2 compatibility.

First, I got a fairly vanilla ESDI controller, the Western Digital WD1007W. It sees the drive as a 1630-cylinder drive—which is good. I avoid problems with DOS by just not telling DOS that there are any cylinders after 1023. So from the point of view of DOS, UNIX, OS/2, and the bunch, it's a drive with 15 heads, 1023 cylinders, and 52 sectors—a 390MB drive. That's all the drive that OS/2 and UNIX see. But I can recover the remaining 241MB by using Disk Manager. Now I have 390MB available to any system and an extra 241MB just for DOS. Not a perfect answer, but one that doesn't involve translation. □



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AND
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*I, Being of sound
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ING

No matter where you turn, you can't go very far without brushing up against the legal system. If you're like most people, this means hiring an attorney and spending a small fortune, buying a fill-in-the-blank legal form from the local stationery store, or not putting anything in writing and taking your chances.

There is a better way. By investing less than \$100 in the legal software of your choice, you can prepare your own will, contracts, leases, and other legal documents with the speed, ease, and accuracy once available only to legal professionals. And now that lawyers often charge \$100 an hour or more (frequently for documents generated by professional legal software similar to personal legal software), home legal software makes more sense than ever.

Prices are coming down, and programs are getting friendlier. You owe it to yourself to give legal software a try. The Software Publishers Association says that sales of forms software, which includes self-help legal programs, soared by 84 percent through the third quarter of 1991, more than four times the growth rate of the software industry as a whole.

To see why legal software is catching on, consider the case of Harry Hunter. Hunter, who runs a consulting and tax accounting practice in Union, New Jersey, purchased Parsons Technology's It's Legal in November 1991 to help him draft customer contracts.

"But I noticed it had a collection letter, too," Hunter recalls. "So the first thing I did was use it to draft a letter to a client who owed me money. I didn't expect to get paid, but I hoped that the letter and the deadline would at least generate a phone call. Then I expected to take the letter to my lawyer and have him finish the collection. Instead, I got full payment from the client. I never had to show it to my attorney."

The bottom line on this single transaction: Hunter saved the 30 to 40 percent he would have had to pay his lawyer to collect the money, a savings that more than paid for the program.

Unlike do-it-yourself tax software, self-help legal software has taken awhile to catch on. Steve Elias, copublisher at Nolo Press (the Berkeley, California, firm that produces WillMaker, a popular will-drafting program), says many people still fear that they'll mess up if they attempt to draft a legal document on their own.

Those fears aren't entirely unfounded. Even so, legal software represents a giant step beyond fill-in-the-blank legal documents. And unlike the paper forms, computer-generated documents

ONLINE LEGAL

Unsure about springing for legal software? If you have a modem, there's plenty of law-related information available online.

CompuServe offers legal insights on its Legal (LAWSIG) and Work at Home (WORK) forums. Forum members who log on to LAWSIG can browse through such libraries as Computer Law and Software and Lawyer-to-Lawyer, an information exchange for attorneys. What's more, you can even leave your legal questions in messages on a bulletin board called Attorney Wanted. Lawyers thumb through the messages and post answers, giving tips and recommending referrals.

And, unlike scheduling an appointment to see a lawyer in his office, the online advice is free—apart from CompuServe's 22-cents-a-minute connect charge.

"We usually give general advice," says Noel Adler, a New York lawyer who doubles as LAWSIG's sysop. "When somebody poses a question, anyone with an answer can answer it."

America Online, another popular service, offers law-related articles in its Microsoft Small Business Center such as "Avoiding Legal Problems," "Copyright Basics," "Obtaining Good Legal Advice," and "Negotiating Lease Contracts."

For more in-depth information, consider logging on to Dialog's Knowledge Index, a new online service that gives home computer users access to nearly 100 Dialog databases during evenings and weekends at a reduced rate. Subscribers get access to the Legal Resource Index (LEGA1), which features articles from more than 750 law journals and reviews since 1980, and BNA Daily News (LEGA2), which offers daily news coverage of national and international government and private sector activities.

Over at Prodigy, members can sign up for LawPhone, a prepaid legal plan. Though LawPhone doesn't give answers online, it does offer discounts on lawyers' hourly rates plus unlimited consultations by phone or letter.

LawPhone Advisory Communication Systems, a 50-state network of private attorneys, charges \$60 for a three-month membership plus a \$15-a-month continuation fee or \$180 for an entire year. Prodigy members can sign up for LawPhone online. People who aren't on Prodigy can reach LawPhone at (800) 255-3352.

can be updated easily and printed out neatly and professionally. Simply plug your answer into a program's question-and-answer format, and out pops a document written in impeccable legalese.

Not for Everybody

Despite the many pluses, however, legal software isn't for everybody. If your legal problem is complex or if you've been sued or charged with a crime, hiring a lawyer is your best bet. Because of estate tax implications, Elias sug-

gests that small-business owners and people with estates worth more than \$600,000 consult a lawyer when drawing up a will. It's also important to note that few legal software programs will work for Louisiana, which, unlike the rest of the nation, has a legal system based on the French civil code rather than English common law.

"People want life to be simple, but it's not," says Paul Stokes, a trusts and estates lawyer at Kelley Drye & Warren in Miami. "Even when people have small estates, the planning has to be careful. Little mistakes are magnified, and there are all kinds of little traps in a will. But there certainly is a need to develop legal services for the middle class, and legal software is a step in that direction."

Even the software publishers acknowledge their programs' limitations. "We don't publish them to take the place of a lawyer, just to make the law accessible," says Monica Jackson, product manager of MECA's Home Lawyer.

With those caveats in mind, it's reassuring to know that, when it comes to shopping for legal software, there are choices available to fit most people's needs and budgets. Softhink/Expert's one-purpose Expert Will retails for only \$14.95, while other programs, like BLOC's Personal Law Firm, that do everything from drafting contracts to writing collection letters and prenuptial agreements cost less than \$100.00. Specialized programs that create employee handbooks and other corporate documents typically cost more.

The Case for Legal Software

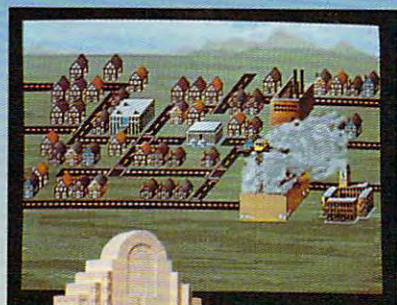
Here's a look at how some of the leading programs in the legal software field stack up:

WillMaker (\$69.95) is the granddaddy of legal software programs. It was first released by Nolo Press in 1985 and has sold nearly 300,000 copies since then. Besides its easy-to-use software, the strength of the WillMaker program is its 200+-page manual containing detailed and accurate information on a variety of topics related to making a will. With WillMaker, you can specify up to 16 different bequests; name alternate beneficiaries; create trusts for your minor children; choose a way to pay your debts, funeral expenses, and estate taxes; and protect against overlooked heirs.

BLOC Publishing's Personal Law Firm (\$99.95) is the largest and most comprehensive legal software program available. It creates documents for both personal and business use. Its 30 documents include such exotics as Trade Secret Protection, License of In-

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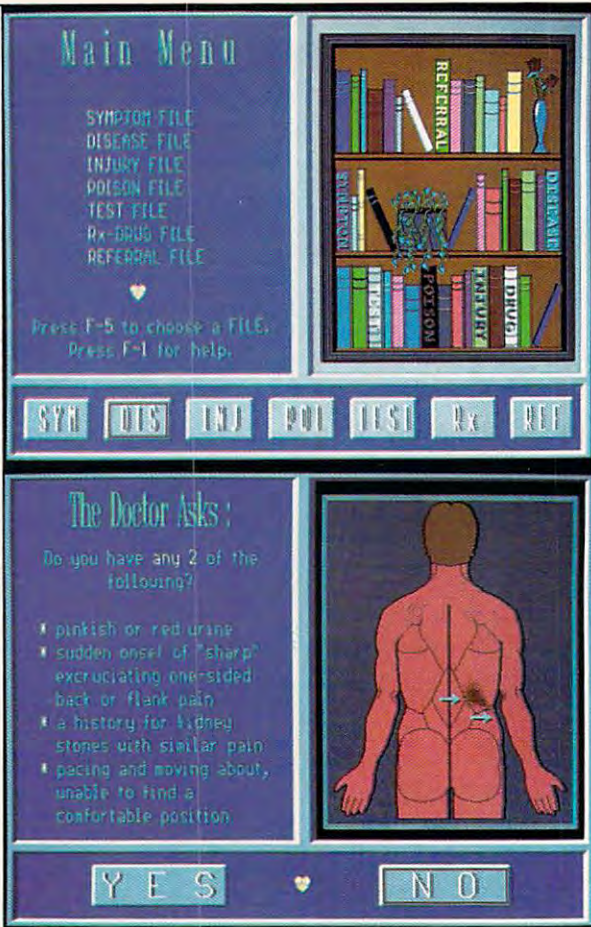
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LEGAL ADVICE

Legal software is fine for routine legal needs, but it's no substitute for the skill and judgment of an attorney. If you're injured in an accident, if you've been charged with a crime, or if you and your business partner have decided to call it quits, it's probably time to call a lawyer.

Here are five tips that will help you make an intelligent choice:

Ask for referrals. The best way to find an attorney is to make a list of lawyers who've achieved good results for family, friends, and other people you trust. Even if these lawyers tell you they don't handle your kind of case, they'll often be able to refer you to a lawyer who can. Another good source of recommendations is your state or local bar association. Many bar groups offer this service free and can arrange initial consultations at a minimal charge.

Shop around. Depending on the lawyer's expertise and reputation and the size and location of the law firm, lawyers' rates can range from \$50 an hour to more than \$200 an hour. If you don't have much money, your local legal aid society may be able to provide a lawyer free. Savvy legal consumers typically shop around, visiting—or at least calling—three or four lawyers before making a choice.

Get answers. Before going to see a lawyer at his office, briefly state your problem and then ask the following questions:

- Have you ever handled this type of case before?
- How much will you charge for our first meeting?
- What's your estimate of the total fee?

If you're satisfied with the answers, make an appointment. Prepare an outline of the facts of your case plus all relevant documents and a detailed list of questions.

Exercise your right to say no. Don't let yourself be pressured into hiring the first lawyer you interview. If you're uncomfortable or have any doubts, press on with your search. Run—don't walk—from any lawyer who promises to win your case or tries to bowl you over with legal mumbo-jumbo. A lawyer with your best interests at heart may even advise you to try to settle your dispute out of court.

Put it in writing. Once you've decided which lawyer to hire, get a written contract that spells out how much he or she intends to charge. Most lawyers charge by the hour, though some lawyers—especially those who handle accident cases—work on a contingent fee. This means the lawyers get a percentage of the jury award or settlement if they win the case but no fee if they lose. It's important to note, however, that even these lawyers will charge you for court costs and expenses, even if you're not awarded any money.

Intellectual Property, Warranty Agreement, and Pre- and Post-Nuptial Agreements. The program's two 250-page user's guides explain features, answer questions, include sample documents, and feature a glossary and an index of legal terms.

Hyatt Home Lawyer (\$79.95), produced by MECA Ventures with help from the Hyatt law-clinic chain, isn't as comprehensive as Personal Law Firm, but it's less expensive and helps you draw up most of the personal and business documents you're likely to need. Among the program's 19 documents are the following: a will, an employment agreement, a power of attorney, a bill of sale for a motor vehicle, and an independent contractor agreement. There's also an online glossary of legal terms to help you wade through the legalese and a help key.

It's Legal (\$69), from Parsons Technology, offers a full range of legal documents—a will, a living will, a lease, a promissory note, a general power of attorney, and others—at an attractive price. The living will, a document not found in several other programs, lets you decide if you want to be kept alive should you become terminally ill or require life support and lose your ability to think rationally. Unfortunately, there

is a downside: Few of It's Legal's documents will help you run your business.

Expert Will and Home Will Kit (\$14.95 and \$29.95 respectively) are produced by Softhink/Expert, a subsidiary of BLOC Publishing. These products offer a low-cost solution for making your will. Expert Will prepares simple wills only, while Home Will Kit generates a living will as well.

The Desktop Lawyer (\$99.95) is unlike the other legal software programs in that it doesn't use a question-and-answer format but functions as a document library on disk. The user simply chooses from 300 documents; then the program copies it, loads it into the word processor, and customizes it to suit your needs. The Desktop Lawyer is the brainchild of Orlando lawyer Laurence Pino, who also offers a consultation service for \$100.00 a year that lets you consult with lawyers by phone as questions arise.

JIAN Tools for Sales offers a line of legal products including LivingTrustBuilder and AgreeMentor, each aimed at a specialized area of the legal assistance market. Like the Desktop Lawyer, these products require that you have a separate word processing program for customizing documents.

No matter which legal software program you buy, make sure it includes the following useful features:

- ✓ A helpful reference manual: Managing your legal affairs consists of far more than simply drafting documents and filling in blanks. WillMaker's manual, for instance, gives advice on how to plan your estate, how to sign and update your will properly, how to name a personal guardian for your children, and other topics related to the will-making process.
- ✓ Clear language: Though it's important for your document to be legally accurate, it's also essential that you understand what you're signing. If you can't make your way through legalese, make sure the program you buy offers onscreen definitions and user help to make everything understandable in layman's language.
- ✓ Interactive capability: The question-and-answer format used by most legal software programs makes drafting legal documents quick and simple. "Comparing the program to forms in books, I'd say it's easier to use because you don't have to type anything," says Hunter, who recently bought It's Legal. "You just plug in the information by answering the questions. It minimizes error because you can customize the letters to the situations."
- ✓ Flexibility: No matter how routine

THE SCALES OF JUSTICE		
Product	System Requirements	Notes
Personal Law Firm BLOC Publishing 800 Douglas Entrance Executive Tower Coral Gables, FL 33134 (800) 444-3363 \$99.95	IBM PC or compatible, 512K RAM, hard drive	Prepares 30 legal documents: wills, leases, cohabit and marital agreements, trade secrets, leases, and others. Has sold 1 million copies since 1990.
LivingTrustBuilder AgreeMentor JIAN Tools For Sales 127 Second St. Los Altos, CA 94022 (800) 346-5426 (415) 941-9191 \$139.00 (LivingTrustBuilder) \$99.00 (AgreeMentor)	IBM PC or compatible, 512K, hard drive, and a word processor	LivingTrustBuilder helps design a living trust but it also includes a living will, health care power of attorney, and asset power of attorney, along with supporting documents; AgreeMentor helps you produce agreements such as employee contracts, leases, partnerships, nondisclosure agreements, referral letter, power of attorney, promissory note, and product warranty.
Hyatt Home Lawyer MECA Software P.O. Box 912 Fairfield, CT 06430 (800) 288-6322 \$79.95	IBM PC or compatible, 640K RAM, hard drive	Prepares 19 legal documents "that Americans most often need" using advice from Hyatt Legal Services. Sales figures not available.
WillMaker Nolo Press 950 Parker St. Berkeley, CA 94710 (800) 992-6656 \$69.95	IBM PC or compatible, 640K RAM; Macintosh Plus	Only prepares wills but comes with a detailed, 200-page manual; emphasizes flexible options and estate planning. Has sold 290,000 copies since 1985.
The Desktop Lawyer The Open University Legal Institute of America 24 S. Orange Ave. Orlando, FL 32801 (800) 874-0388 \$99.95	IBM PC or compatible, 640K RAM; any Macintosh with Microsoft Word 3.0.	Prepares more than 300 documents for all 50 states including Louisiana. Documents load from disk into the user's word processor, and the manual leads the user through the document development. Users can also subscribe to a newsletter and legal consultation service. These are free for the first three months, then \$100.00 a year. Lifetime technical support. Has sold 10,000 copies since 1983.
It's Legal Parsons Technology One Parsons Dr. Hiawatha, IA 52233 (800) 223-6925 \$69.00	IBM PC or compatible, 512K RAM, two floppy drives or a hard drive	Prepares 24 legal documents: bill of sale, consumer and credit letters, leases, power of attorney, employer, promissory note, guardianship, and wills. Sales figures not available.
Expert Will Home Will Kit Softhink/Expert (BLOC subsidiary) 800 SW 37th Ave. Coral Gables, FL 33134 (800) 759-2562 \$14.95/\$29.95	IBM PC or compatible, 512K RAM for Expert Will, Windows for Home Will Kit	Expert Will prepares simple wills only. Home Will Kit prepares wills and living wills. Both are positioned as the bargain will-writing programs. Expert Will has sold 20,000 copies, and Home Will Kit has sold 1,000 copies.

your legal problem may seem, you need a program that lets you tailor each document to fit your needs. If you don't think your kids will be responsible enough to handle an inheritance until they're 30, you need a program that will create a will to hold the property until then. And, since state laws vary, it's important to find a program that creates binding docu-

ments for your particular state. (In Louisiana, that can be a problem.)

- ✓ Good text editing: Unless you're the type who does crossword puzzles in pen, it's a good idea to buy a program that lets you save your document to disk so you can revise or finish it later. The program should also allow you to review your document onscreen and revise it before printing.

IMPORTANT NOTICE FOR COMPUTE DISK SUBSCRIBERS

COMPUTE offers two different disk products for PC readers; the *SharePak* disk and *PC Disk*. *SharePak* is monthly and has a subscription price of \$59.95 for 5¹/₄-inch disks and \$64.95 for 3¹/₂-inch disks. A subscription to *SharePak* does not include a subscription to the magazine. *PC Disk* appears in even-numbered months and has a subscription price of \$49.95, which includes a subscription to the PC edition of *COMPUTE*. You can subscribe to either disk or to both, but a subscription to one does not include a subscription to the other.

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The Knowledge Index's \$35.00 start-up fee includes two hours of practice time. Each minute costs \$0.40 and includes telecommunications charges and all typed or displayed records.

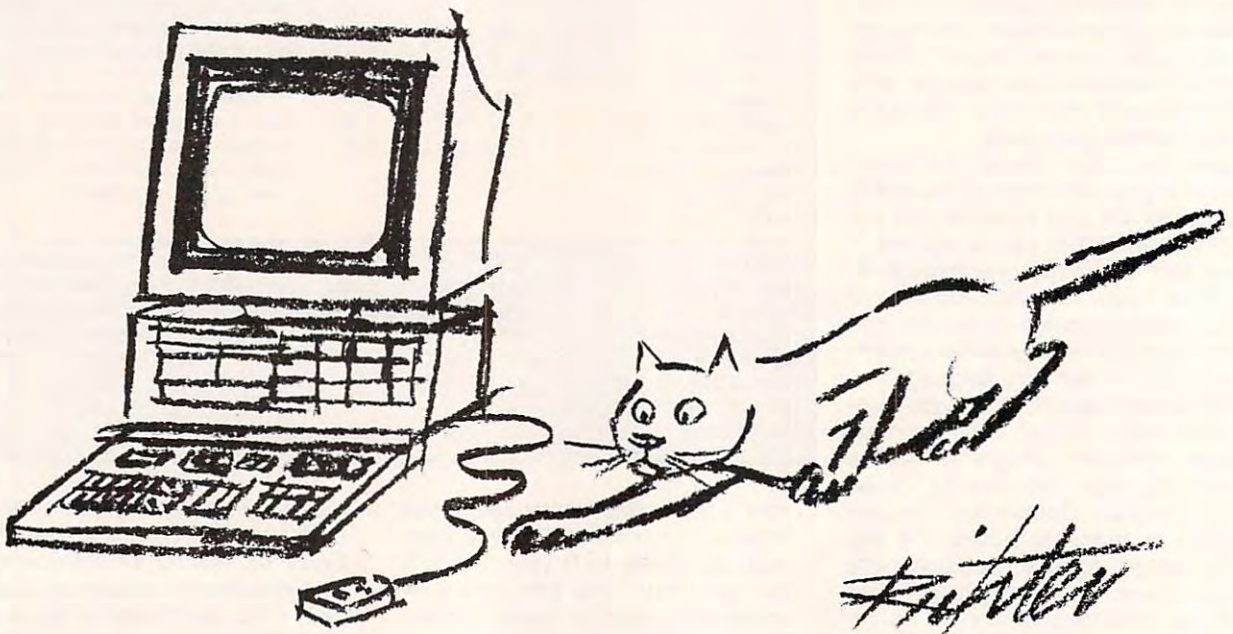
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The Law and You

Now you know the range of software available to you for routine business forms and personal legal matters. But what's next for legal software? The experts say that in the future legal software programs will become speedier, simpler to use, and more complete. Expert systems might help you anticipate problems instead of reacting to them

as they crop up. Still, it's unlikely that a computer program will ever be able to take the place of a lawyer—after all, the documents you draft on your PC can still be challenged in court. Even the best legal software won't make a brilliant closing argument in your defense or help you weasel out of a contract. Besides, without lawyers, who would write the legal software? □



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SHAREPAK

Bruce M. Bowden

WORK BETTER, PLAY HARDER

Spring is here: time to recover from the long winter by being extra aggressive in both work and play. This month's SharePak disk gets into that spirit! LZEXE will pack more executable software onto a disk. Then, to see just how much space remains, use RDIR—a

hundreds of programs from the online services, narrowing the selection down until only the best remain. Consequently, the savings to you as a SharePak subscriber are enormous.

CD Dot Challenge 1.4

This game will look familiar to generations of kids who've teamed up to wile away boring hours at school by taking

directory within the pie includes, as part of its size, the sizes of directories below it—with as many as 16 levels of nesting.

RDIR gives you a free trial period of about 20 uses, after which the program ceases to function. If you register, you get a validation key number to enter, which allows unlimited use of the program.

For this program you'll need an IBM PC or compatible with DOS 2.0 or higher.

Alive Sharks 1.0

Alive Sharks is an arcade-style game of underwater skill and daring. Your mission is to collect rare marine creatures from the bottom of the sea, while avoiding vicious denizens of the deep.

You'll need an IBM PC or compatible with 256K RAM; a joystick or mouse is optional. This game supports CGA, EGA, EGA-Mono, and Hercules graphics displays.

LZEXE 0.91

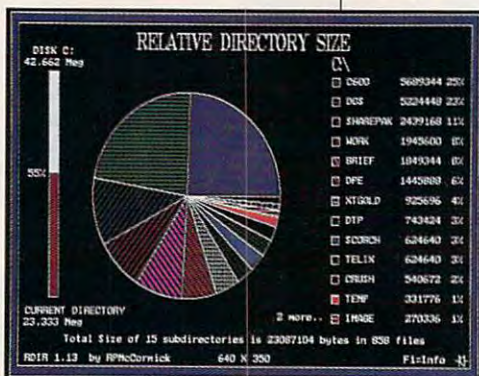
LZEXE differs from the other offerings this month in that it's not shareware but is public domain software—absolutely free. And it's not often that you get this kind of quality at that kind of price!

Use LZEXE to compress executable files—those with the extension EXE. The advantage of this program over many others is that your compressed EXE files are still executable. Files compressed with this utility are almost as small as the corresponding ZIP files and are much smaller than the older ARC files.

For safety and peace of mind, LZEXE doesn't delete your old EXE file; instead, it's renamed with the extension OLD.

LZEXE requires an IBM PC or compatible with 128K RAM and DOS 2.0 or higher. □

May's SharePak
brings you
a powerful selection
of software.



Check relative directory sizes with RDIR.



Fend off the predators in Alive Sharks.

graphical way of viewing directory sizes. When the work is done, playtime begins as you dive for sunken treasure with Alive Sharks. But if tamer pursuits are more to your liking, match wits with a friend or the computer in a game of CD Dot Challenge.

Each month, COMPUTE's SharePak disk brings you the best of IBM shareware. We spend long hours collecting

To play CD Dot Challenge, you need an IBM PC or compatible with DOS 2.0 or higher. CGA, EGA, MCGA, VGA, and Hercules graphics are all supported.

RDIR 1.11

RDIR stands for Relative DiRectory. This handy utility displays a pie chart which shows the relative size of each subdirectory. Every sub-

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DEC 89: *Hearts*, play your computer in hearts; *Bass Tour*, super fishing simulation; *MahJongg*, match and stack colorful tiles; *Ed's Chess*, full-featured chess game. (#CDSK1289)

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)

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PRODUCTIVITY CHOICE

This powerful word processor stands tall in the company of high-end desktop publishing packages.

Robert Bixby

MICROSOFT WORD FOR WINDOWS 2.0

Word for Windows—or Win-Word, as it's affectionately known among its followers—avoids many of Windows' worst pitfalls. It manages to be quick (it has no trouble keeping up with my fastest typing) while providing a suite of formatting options that put it in the running for the most complete desktop publishing option available in a single package. It provides all of the functionality of a first-rank word processor, and it includes frames and linking more commonly seen in desktop publishing packages.

Word for Windows is a very powerful and friendly word processor, but the path to its current release has been far from perfect. Early releases of the 2.0 version suffered from problems such as faulty implementation of templates and inconsistent spelling checks and margin performance. However, Microsoft should have cleared them up by the time this appears in print.

What remains is well worth your full attention. The interface is good—somewhat better than that of WordPerfect's Windows offering because it's more closely tied to the Windows standard.

Winning over WordPerfect users is of concern to the folks at Microsoft, of course, since that program has such a huge market share while Word has had to wear the bridesmaid's dress. The Word for Windows promotional literature stresses how easy it is for WordPerfect users to make the switch. For instance,

Word for Windows includes a special WordPerfect Help system keyed to the specific kinds of problems WordPerfect users may encounter in making the transition. And former WordPerfect users can simply enter keystrokes they're familiar with, and they'll be shown how to execute the same procedure in Word for Windows.

It doesn't matter which word processor you use, if all you're doing is straight typing. The differences between word processors become key when you're engaged in specialized activities like desktop publishing. Word for Windows meets many of these demands.

It supports frames, which are isolated islands of text or graphics on the page. The frames are similar to Ventura Publisher frames: By dragging them with the mouse pointer, you can adjust their position and size. You can link them to the text, causing a frame to move from page to page as the text does. In Word for Windows, you simply drag a tool to create the frame and then click on it and start typing—it's much easier than the process found in WordPerfect for

Windows. You can also eliminate the frame and leave its contents in the page. I experienced some problems with the frames in my test document. At one point, text from the page suddenly became inserted into a frame, and I had to cut and paste to get it back on the page.

Word for Windows supports columns and provides a fairly intuitive way to insert them. Once again, I ran into problems in my test document with columns suddenly disappearing. A quirk that may bother some people is that moving the cursor down to the bottom of a column will take you to the same column in the next page rather than to the top of the next column. To move to the next column, you must move to the bottom of a column and then move right. When you reach the end of the last line, the cursor leaps to the top of the next column.

Part of desktop publishing involves entering graphics and special characters like curly quotes and long dashes. It would be unfair to single out Word for Windows as having poor implementation of special characters because most



Windows products require a very awkward procedure for inserting them. In Word for Windows, you have to switch to Num Lock, hold down the Alt key, and type in four-digit codes to generate curly quotes and long dashes.

I grew so tired of halting my typing every couple of lines to insert a quotation mark or a long dash that I eventually assigned these functions to macros. Word for Windows shines in this area, making the key assignment part of the process of initiating macro recording.

Once you've created a macro, it's very simple to edit it. Though Word for Windows won't allow you to edit the macro in the regular text area the way Ami Pro and WordPerfect will, its macro editor allows you to have access to all of the menus. And you can even create macros to use in the macro-editing window.

Word has adopted OLE (Object Linking and Embedding), which Ami Pro has had for some time. You may be familiar with Windows' dynamic linking. It allows you to paste cells from a spreadsheet to a word processor document and have those cells made current each time the spreadsheet changes. OLE goes a step beyond this by having the embedded cells in the word processor document "belong" to the spreadsheet. To access the spreadsheet program from the word processor document, you just click on the cells. It's as if there were a rectangular hole in the document through which you can see the actual spreadsheet.

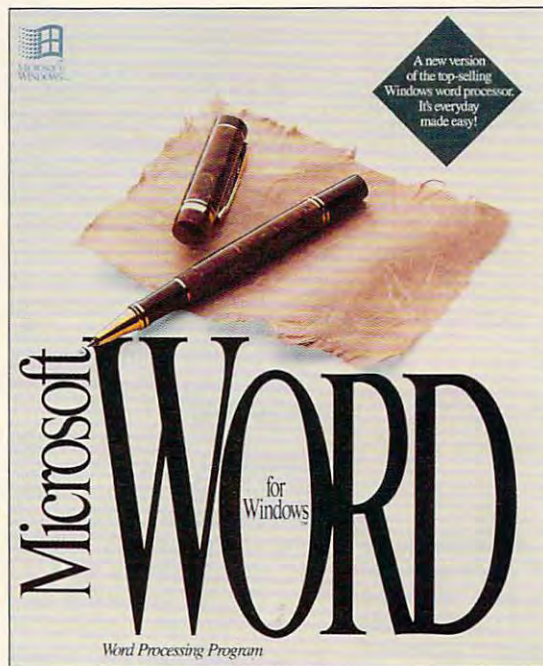
If you're looking for a real traffic stopper in Word for Windows' features list, it's the integration of an online grammar checker. Although limited, as

are all such programs, it represents a real advantage over the competition. When you've finished writing, you can invoke the grammar checker from a menu option as if it were a spelling checker. Word for Windows will also provide readability statistics (such as grade level) on a document.

Software publishers seem to think that no one will respect them unless their products are truly massive. And make no mistake—Microsoft is highly respectable in this regard. Word for Windows is huge. I had to buy a larger hard disk and upgrade from MFM to IDE so I could have Ami Pro, WordPerfect for Windows, and Word for Windows on my hard disk. If you want a Windows word processor, clear about 15MB from your hard disk. At least Word for Windows seems more amenable to running on the basic Windows box—an 80286 or 80386 with 2MB of RAM. (Word for Windows claims to need only 1MB of RAM, but I had no way to test this.)

Almost like children going through a troubled adolescence, Windows word processors loom large in potential but are sometimes maddening to deal with on a daily basis. Most people who've used a really demanding Windows program have stumbled across a few unexplained application errors (UAEs). You'll be working along, thinking everything is fine, when suddenly a box appears informing you that Windows has experienced an unexplained application error and is shutting down your application. Your work is gone.

Word for Windows seems to have far fewer UAEs than the competition. While I've found it advisable to close WordPerfect



for Windows every hour or so to prevent the UAE monster from appearing, I have yet to encounter a single UAE with Word for Windows 2.0.

Word for Windows has an equation editor, a simple drawing program, and a graphing program, so it's clear that Microsoft knows who the competition is—and that it plans to match both Ami Pro and WordPerfect feature for feature.

If you want a solid word processor that stands toe-to-toe with high-end desktop publishing programs, you're looking for Word for Windows. Microsoft has a proven track record for support and upgrade options, which should keep you economically up-to-date as long as you stay with Word. It will meet your needs for word processing, and it offers a complete suite of specialized options for formatting, publishing, and data handling. □

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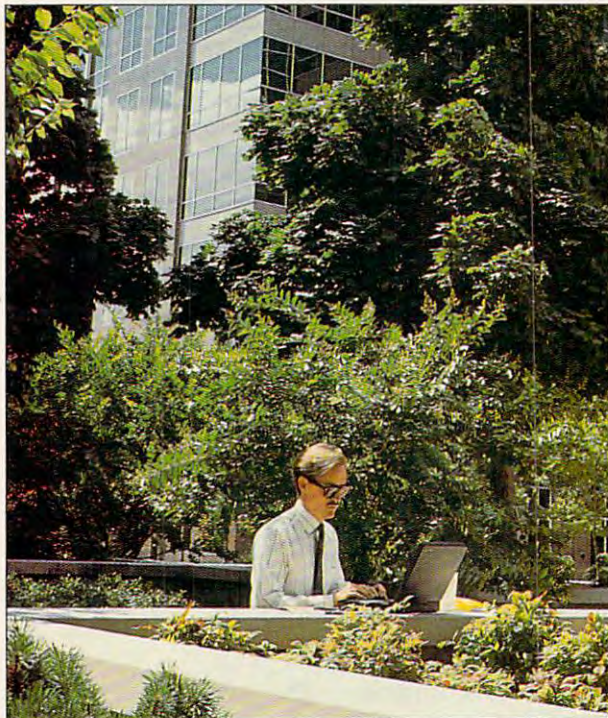
Peter Scisco

HOW MUCH IS ENOUGH?

Zenith Data Systems recently commissioned a study that documents the rise of portable computers as a viable alternative to large desktop computers. Fully 100 percent of the survey's respondents, all laptop owners, said they used their portable computers at home. Executives and managers looking for ways to extend their office hours without sacrificing all of their family time are choosing portable computers as "time-shifting" and "environment-shifting" devices.

It's not good policy to base conjectures on a single survey, but something quite striking seems to be happening as computers become smaller and more powerful and as the number of computers purchased for personal productivity continues to grow. America, the birthplace of the modern mobile society, is thrall to the au-

If location is the key to business success, teaming a laptop with business computing makes the world your private office.



tomobile and to the opportunity over the horizon, is taking its work into the world outside.

The power in today's laptop and notebook computers makes it possible for you to carry financial reports, business presentations—really your entire business—in a seven-pound package. All of this functionality comes at a price, of course. The best notebooks—those that sport state-of-the-art video screens, big and fast hard disks for storing large amounts of data, and powerful processor chips for speeding your work—cost from \$2,500 to \$4,000. But you can get a decent laptop or notebook computer for less—sometimes for much less.

Since the business world has adopted the 386SX processor for its notebook and laptop computers, the price for 286-based laptops has plummeted. A 286-based notebook is a very capable machine; with a decent-size hard disk and a portable mouse, you could even run Windows applications on one (except for those requiring enhanced mode performance, such as Excel). You can pick up an AT-class notebook these days, with a hard disk, for around \$1,000. If that still sounds like too much money, you can get an XT-class machine like the Toshiba 1000XE, with a 20MB hard disk, for around \$800. Match a system like that with a package like Works, and you'll have almost everything you need for running a home-based business away from your home base.

Good things come to those who wait. The same companies that are producing high-powered SX notebooks are also moving quickly to adopt Intel's 386SL chip, which offers the same processing power with decreased energy consumption—which translates into longer battery life.

As the focus shifts to the 386SL, home computer users can look forward to a further drop in the price of 386SX notebooks. For 286, 8088, and V20 processors, price should cease to be much of a factor at all. Portable computers for word processing, simple databases, and telecommunications will be as prevalent in college dormitories as typewriters, VCRs, stereos, televisions, and videogames.

Increased functionality and usefulness aren't just the result of lower prices and higher processing speeds, however. A major stumbling block to efficient portable computer use has been the transfer of data from one system to another—from the desktop machine at work or home to the notebook in the hotel, out in the yard, or on the plane.

A few software companies, such as Traveling Software and DataStorm, have carved their niche by constructing file-transfer programs that make it easier to shift data from one machine to another. And Ergo has made headlines with portable systems that you can attach to a monitor and keyboard—all you carry is the CPU and the hard disk.

Recent developments in hard disk storage—autoparking, better shock mounting, increased capacity, and smaller footprint—are giving us families of systems that can share storage media. Companies like Samsung and Epson are leading the way. In fact, Samsung aims to create a series of computer systems, from desktop to notebook to pen-based, that will share the same plug-and-play hard disk. The hard disk will weigh only ounces and will come in a variety of sizes. That's portability.

The road to portable computing for home office workers is clear: An office without walls is a business without limits. □

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Many people wouldn't dream of putting a For Sale sign on the front lawn without slapping a fresh coat of paint on the house. The first thing a job-hunter does is get a haircut and maybe a new suit. Cosmetics makers search out perfect models for photos to accompany their products. Why? Because, for better or worse, looks sell.

Still, many home-business owners continue to use uninteresting, blah-looking business cards, letterheads, and brochures, wasting an opportunity to grab the attention of potential customers. That's too bad because now there's no reason why a small business has to look its size. With a computer, a little imagination, and some simple desktop publishing software, it's easy to make your business look like a million bucks without spending a fortune at the printer.

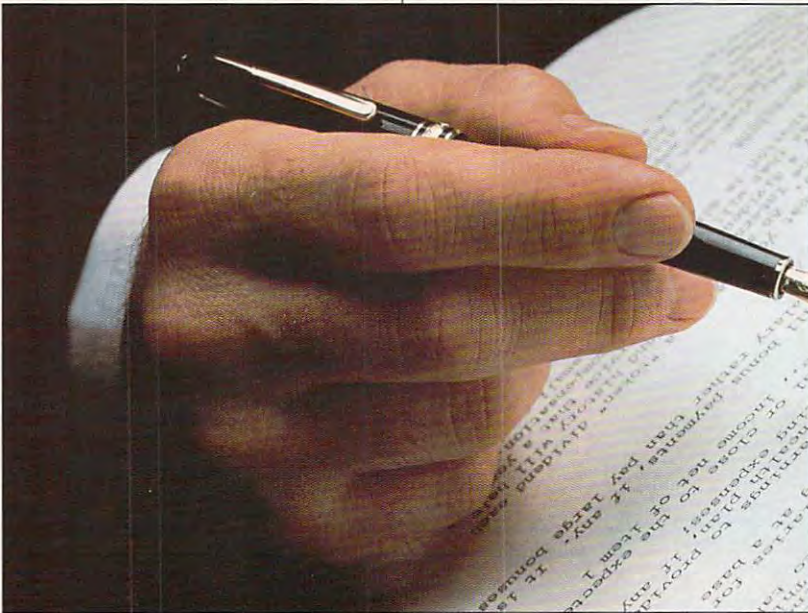
Even if you're not a professional artist, you can jazz up your company's image by choosing bolder typefaces, adding color, or incorporating graphics. It all depends on the message that you want to send—traditional, competent, funny, even outrageous. The key is getting your customers to sit up and take notice. Even a member of the most staid profession can benefit from a business card that shows panache. Professionalism doesn't have to equal boredom.

"The idea is to quickly describe, both visually and verbally, what your company does best," says Rob French, who helps redesign company logos as senior art director at Tatum Toomey & Whicker, a High Point, North Carolina, advertising agency. "If you can create an image that helps make you look more professional, you've got a leg up on the competition."

Here are ten ways to give your business a fresh look without busting your budget:

1. Copy from the pros: "The best thing to do if you're a beginner is to look at other stuff," says Daniel Will-Harris, an author and designer who writes about desktop publishing. "Find business cards and stationery that you like, and start by copying." If you can't tell serif from sans serif, however, it also may be a good idea to look for ideas by leafing through some catalogs at your local print shop or graphic arts store.

2. Find your own style: The style of type you use, be it on envelopes, business cards, or even the body text of your letters, tells your customers who you are. That's why it's important to choose a typeface that sends the message you want. A lawyer, for instance, might choose a conservative type-



FIRST AND LASTING IMPRESSIONS

BY ROSALIND RESNICK

PRODUCTIVITY

face to suggest competence and evoke trust. A computer consultant might opt for a more modern look to stress creativity. You can also convey your personal style by combining upper- and lowercase, italic and bold. As a rule, mixing upper- and lowercase type conveys a friendlier feel than using solid uppercase. It's a good choice if your customers are small businesses. Type that is all uppercase tends to impress big corporations, while italic type can make potential customers think of speed and efficiency when they see your card.

3. Keep it simple. When creating your design, don't get carried away and use a whole lot of rules and a big mess of typefaces. While you want your business materials to convey information, cramming too many words, fonts, or graphics into too small a space will mark you as an amateur.

4. Be consistent: Whichever typeface you choose, be sure to use the same one on all your written materials—letterhead, envelopes, business cards, advertisements, and brochures. If you have a logo, include that on all your materials, too. "The classic example of this is IBM," Will-Harris says. "[It's] used the same type of Bodoni in every ad. Even before you've read the ad, you know it's IBM."

5. Dare to be different: You don't have to type your letters on hot pink stationery to get clients to notice (and if you did, you might not get the kind of attention you want). On the other hand, you may want to switch from horizontal business cards to vertical. Or you may want to type your letters using a typeface other than the two that are tried-and-true, Times Roman and Helvetica. To make your letters stand out, Will-Harris sug-

gests trying other typefaces such as Trump Medieval, Baskerville, Cheltenham, Galliard, Souvenir, and Palatino. "You can use any of those typefaces and still get a fairly traditional look," he says.

6. Add a splash of color: Nobody ever said that business communications had to be conducted in white. Though you'll want your clients to be able to read what you send them, "choosing a color other than white will get people to notice it," Will-Harris says. "If you have something very artistic and you want to use purple paper, that's fine." On the other hand, it's important to beware of certain colors, such as goldenrod, a favorite of grade-school teachers, which can come across as ordinary and cheap. Go for thicker paper. A sheet of 24-pound paper stands out from a sheaf of letters written on 20-pound. And, if you can af-

ford it, use a linen- or cotton-content paper. Even a blank sheet of fine paper carries a message about the person who uses it.

7. Design a logo: A good logo sums up your company's image in one easy-to-remember graphic. If you're not artistic, consider hiring a freelance designer or a local art student. If you don't want to start from scratch, many software programs offer clip art you can use free of charge. You can also use an image from a book, though you'll need to check to see if the photograph or illustration is copyrighted.

8. Brighten up your business cards: "For someone in business for himself a business card can serve as a minibillboard," French says. It's also the one piece of business literature that customers see every day while leafing through their Rolodexes. French recently redesigned a card for a client who installs cabinetry. Before the redesign, the card looked pretty ordinary—a horizontal card with the client's name in the center and his address at the bottom. French made the card vertical, changed the typeface to one that looks hand-tooled, and drew a border that looks like the exterior frame of a cabinet door. The result is a card that sells a service.

9. Get your computer to help:

Though word processing programs such as WordPerfect and Microsoft Word are fine for publishing the occasional newsletter or flier, you may need to invest in some desktop publishing software as your needs grow. Will-Harris suggests Ventura Publisher for its speed and precision, though he says that Lotus's Ami Pro is easier to use. French, who uses a Macintosh, recommends PageMaker for desktop publishing novices.

10. Say it right: No matter how classy your business materials look, your efforts will be wasted if you can't get the message across to your customers. Misspelled words and grammatical mistakes can cast doubt on your abilities in other areas. "Don't fall into the trap of spending more time formatting your work than you do writing it," Will-Harris says. "If the content isn't good, nothing else will matter."

Your Design Is Your Fortune

It's important to realize how valuable a first impression is. The first time you saw the car you drive, the house you live in, perhaps even the person you're involved with romantically, chances are that something clicked. Something made you look a second time. That's the impact you want your business card and documents to have.

No matter what your first impression was, though, you probably wouldn't stick with a car, a house, a partner, or a friend if the quality weren't consistent throughout. That's why you should approach every design decision from letterhead to invoice with the same industrious attitude. If you make a good first impression and live up to its promise, success can't fail to find your door. □

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Robert Bixby

ONE MAN'S STORY

One of the purposes of art is to bring joy into people's lives. And even in these days of unauthorized biographies and kiss-and-tell autobiographies whose whole reason for being seems to be to embarrass and/or injure as many people as possible, the publishing art can occasionally rise to its higher purpose and generate a book whose interest lasts beyond a single season. This is the story of such a book.

For several years a gathering in my wife's family meant the opportunity to read the typed memoirs of my wife's grandfather, John Russell Beal. He prepared them on bond paper and kept them in the kind of binders you probably used in high school to turn in important history papers.

If asked, he probably couldn't have said what he wanted to do with his story other than share it with the very people who were helping—with their memories, photographs, and encouragement—to put it together.

The book grew year by year until it filled several binders. As memories became clearer or were proven inaccurate, erasures, strike-outs, margin notes, and handwritten addenda accumulated in the opus. This was the state it was in when my wife and I agreed to put it together in book form. Night after night she would return from her second job and type a few more pages into our trusty Commodore 64.

Then we transferred the text to PC disks, and my work began. I used a desktop publishing package to typeset it. Family photographs were scanned in and placed in the book as TIF files. I generated the pages using a borrowed laser printer and sent them to Thomson-Shore with an order for 50 copies in a brown cloth

binding with the author's name in gold on the cover.

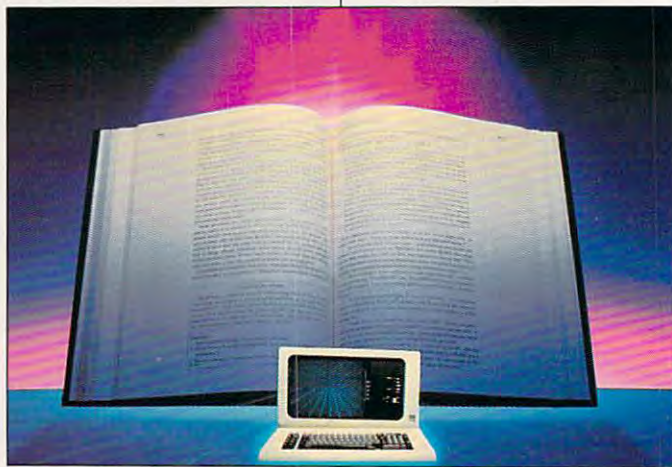
Thomson-Shore of Dexter, Michigan, is preeminent in the tiny field of "short-run" book printers. It offers low-cost, high-quality printing and binding for book runs from 50 to 5000.

The cost for a short run of books is so high, on a per-book basis, that few people are willing to pay it. Our order of 50 came to approximately \$14 per book (the complete cost was around \$700), but the economies of scale would have made another 50 copies cost only \$200 more—or about \$9 per book.

family gathered from all over the eastern half of North America. Weddings serve a vital function in her family. They give the grownups an excuse to hide things like rotting fish in the glove compartment of the groom's car. The modern history of the family is a list of wedding atrocities involving shaving cream, cheese, balloons, and leather unmentionables.

At the reception, the champagne and dance music were put on hold while my father-in-law presented a framed document to my wife's grandfather: the copyright registration of his autobiography. It's a gov-

Publishing returns to its original purpose when the story of a family is set in type.



Thomson-Shore prints only on acid-free paper, which is stable enough to last 300 years, or 15 generations.

Reading the adventures of a man who helped survey Colorado for the first settlers and started his career as an automotive metallurgist when the trolleys were horse-drawn caused us to start thinking in broad historical terms. That's probably the most important function of autobiography. It's devoted to putting historical events on a human scale, to making them as real—or as unreal—as daily life.

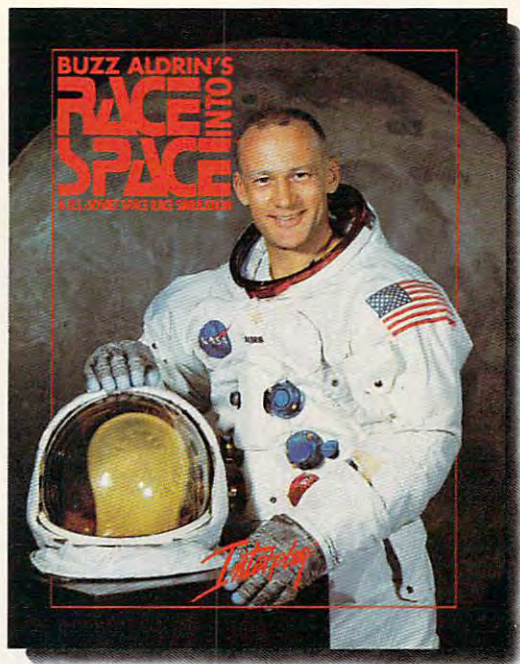
The end of the story came at the wedding of my wife's cousin in Ontario, when the

ernment form about as attractive and functional as an application for SSI. But in this case it stood for much more than the fact that two copies of the book had been checked into the Library of Congress. It meant that one man's experiences—and his memories of his parents and others of a generation long past—would be preserved. They would be available not only to the children, grandchildren, and great-grandchildren gathered at the reception for this emotional moment, but for hundreds, perhaps thousands of his progeny who would never have the opportunity to hear the stories firsthand. □

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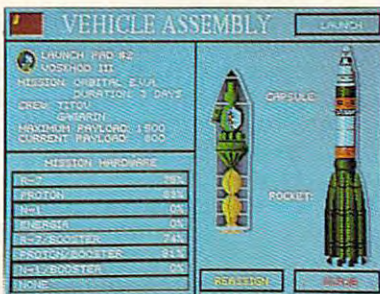
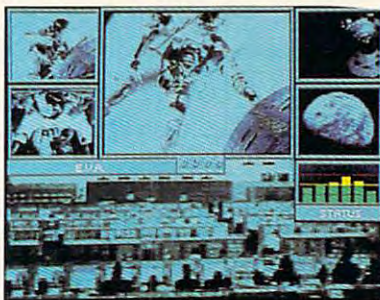
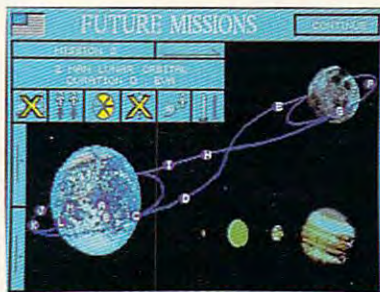
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DISCOVERY CHOICE

Enjoy multimedia effects—even on an average PC system—with this innovative educational program.

Peter Scisco

KNOWLEDGE ADVENTURE

For a few years now, the computer industry has tried to define the term *multimedia* in terms of computer equipment. This definition revolves around something called the MPC—a 386SX-based personal computer with a CD-ROM drive, a high-quality graphics monitor, and a sound card compatible with Microsoft's multimedia extensions to Windows.

The problem with this definition is that not all computer users have MPC-compatible machines nor are they prepared to upgrade their present computers to meet these rigorous demands. For these users, however, the world of multimedia computing is not completely out of reach. A company called Knowledge Adventure, with its same-named Knowledge Adventure software, brings a multimedia-flavored environment to regular-edition personal computers.

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Knowledge Adventure isn't a game: You don't score points, and you don't race against a clock. Neither is it just an encyclopedia. Instead, you take a leisurely journey through a storehouse of facts, images, and sounds. For adults and children already imbued with healthy curiosity, the journey becomes as invigorating as any adventure game. For students who need prompting and encouragement to pursue their studies, the fact that this is a computer-based product with high-quality images and sound effects may be enticing enough to get them hooked on learning—at least for a while.

Knowledge Adventure is designed as a modular applica-



tion. To the basic program, the company is planning to add special voyages into the worlds of music, literature, science, sports, law, math, religion, and philosophy. If these additional modules perform as well as the basic program, you can look forward to many hours of adventure and discovery. The graphics are well designed and produced, and the sound effects, including voices, are quite clear when played through a Sound Blaster card.

It's hard to speak of a program like this as being well organized. While there are several threads and options that allow you to direct your explorations or retrace your steps, the point is to promote free travel and discovery.

Such freedom can at times be disconcerting, even jarring, in its juxtapositions. For example, while reading a short biographical note about Leonardo da Vinci, you might click on the small graphic of the *Mona Lisa* and find yourself looking at a larger representation of

this famous portrait. Clicking on the *Mona Lisa* might take you to a screen displaying the *Venus de Milo*. The connection between these two artworks is unclear, and the matter is further complicated when you click on the statue of Venus and are transported into space for a spectacular view of the planet Venus.

The program's manual suggests making a game of discovering the connections between such apparently disparate pieces of information. As any student of liberal arts will tell you, it's in these links, and not in the facts themselves, that real knowledge resides.

To assist you, Knowledge Adventure employs a simple interface of icons and directional indicators. The buttons lined up at the top of the screen represent the categories of Art, Science, Literature, Architecture, Music, and Nature. Selecting any of these buttons with the mouse (the program also accepts keyboard input) moves you to a screen that falls within the selected

category. Selecting the Literature button, for example, guides your search to a biographical note about a famous author or perhaps a description of a work with particular literary significance.

The category buttons can be used as more than linear passageways through time, however. By highlighting a button, you can limit your voyage to a specific category. For instance, if you were to highlight the Nature button, all of the information that you'd receive during your search would be confined to that category.

The Help option is a good example of the program's interactive screens. The Help area appears as a library reference room. There's a large "card catalog" with lettered drawers from which you can get an alphabetical listing of subjects contained in the program.

For example, selecting the L drawer brings up a list beginning with LAB and ending with LYNDON. These main subjects—in uppercase—can't be selected, but the underlying subjects are linked to information screens. Under LAB, you'll find G. Washington Carver and Penicillin. Clicking on Carver brings up a biographical entry about the inspirational scientist who invented hundreds of ways for using the peanut and the sweet potato—and in so doing, helped to lift many Southern black farmers out of poverty.

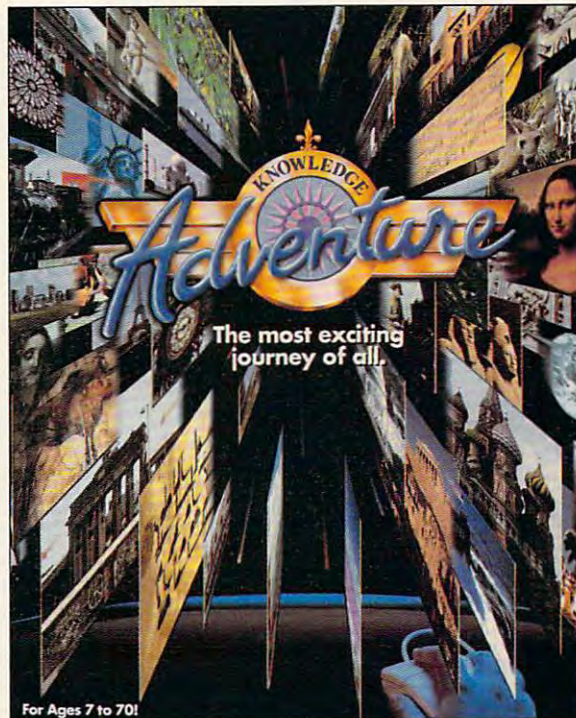
The Help screen also has a graphic of a checkerboard. Select it, and you move to the program's only game element—a quiz game. In it, you must answer a question by navigating through the database. Your score is determined by how many mouse clicks it takes you to answer the question.

Knowledge Adventure is further bolstered by a globe and a time line that are always present. Rotate the globe using directional arrows beneath the box to have access to almost any point on the earth. When you reach the spot you want, click on it to receive information linked to that geographical point. Besides the directional arrows, you can use a sliding scale to zoom in on and out from the globe.

The time line at the bottom of the screen encompasses the eons from 15 billion B.C. (the start of the universe, according to proponents of the big bang theory) to Beyond 2000, which offers a glimpse of the world tomorrow. The last two entries are for 1989 (the collapse of the Berlin Wall, presaging the disintegration of Communist influence in Eastern Europe) and 1990 (the launch of and the problems with the Hubble Space Telescope).

The strength of Knowledge Adventure—its promotion of discovery at the expense of overly rigid organization—is, paradoxically, also its greatest weakness. The program can be used effectively as a launching pad for further exploration, but it's neither complete nor comprehensive enough to be used as a research tool in its own right. Descriptions are brief and reasonably accurate; however, they aren't annotated in any way and shouldn't be taken at face value. Adults who buy this program for their children should assist them in finding suitable reference materials once the spark of discovery has been lit.

Knowledge Adventure, unlike MPC-based reference tools such as Microsoft Bookshelf for Windows, doesn't of-



fer research and writing tools other than its printing utility. Also, there are no animated sequences such as those you might find on a CD-ROM-based multimedia product.

However, bringing this kind of free-form database, complete with sound and images, to the PC in a disk-based product is an achievement that should be recognized as a challenge to the notion that only MPC-equipped computers can make use of multimedia elements. Long after the standard for multimedia computing has been defined, innovative companies like Knowledge Adventure will use the theory of multimedia—linking images, sound, and text in an interactive context—to take us back to where we've been and forward to where we've not yet gone. □

IBM PC and compatibles, 384K RAM, EGA or VGA, hard disk with 6MB free space; printer and mouse optional; Sound Blaster, Disney Sound Source, or Covox Speech Thing required for playback of digitized sound effects—\$79.95

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Circle Reader Service Number 301

Steven Anzovin

SCANNING THE WORD OF THE LORD

Computers are helping to crack the world's longest-running proofreading problem. One of the oldest texts in continuous use is the book Jews call the Torah (or Pentateuch), which consists of the first five books of the Bible. The Torah is written out in Hebrew on a large scroll that's read in the synagogue on every Sabbath. This scroll, which according to traditional Jewish belief contains the word of God as it was given to Moses on Mount Sinai, is the most precious and often the single most expensive possession of a Jewish congregation.

There are exactly 304,805 Hebrew characters in a Torah scroll, and ideally, all of them have to be perfect for the scroll to be considered fit for use in worship. To use a defective scroll would be an insult to the Almighty. But making a perfect Torah is no trivial task—you can't just type one

out on a word processor and use a spelling checker. According to Jewish law, the scroll must be inscribed by hand with a quill pen and special vegetable-based ink on parchment made from the skin of a kosher animal, such as a sheep or a goat. Highly trained Torah scribes and proofreaders, who take up to a year to complete one scroll, follow strict rules laid down in the twelfth century by the sage Maimonides. Great pains are taken to avoid mistakes and to correct any that are found before the scroll is delivered. Inevitably, however, some errors creep through. In fact, it has been estimated that up to 85 percent of the scrolls written since World War II (when thousands of accurate scrolls were destroyed by the Nazis) contain mistakes.

The problem of imperfect Torah scrolls is an interesting example of how difficult it is to transmit exact information using analog means—in this case, looking at words and copying them by hand. (The word *analog* itself comes from the Greek roots *ana-* and *-logos*, meaning "according to the word.") Just one repetition is all it takes to corrupt analog information, as anyone who has ever been the victim of gossip can attest. Only with great effort has it been possible to transmit the text of the Torah essentially unchanged over the 2½ millennia since its codification. Now a company in Israel is applying digital technology to increase the accuracy of Torah scrolls. Mishmeret Stam of Bnai Brak (offices in Jerusalem, France, and New York, among other places) uses an optical character reader (OCR) to scan photocopies of Torah scrolls for errors. The software to proofread the Torah text is lengthy and complex, since it's far more difficult for an OCR program to recog-

nize handwritten characters than printed ones, which are much more uniform. Once a particular scroll has been scanned, it's compared with a computer copy of the text of the Torah which has been checked and rechecked for accuracy. A list of errors is then returned to the scroll's owner, who can arrange for a scribe to make repairs to the original. The computer doesn't guarantee a perfect Torah—the OCR scanner may not be able to recognize certain subtle mistakes—but Torah scrolls checked by computer are so much more accurate overall that most contracts for new scrolls require that they be checked by optical scanner before the scribe is paid.

A proper Torah can never be generated by a PC, but study of the Torah and the Bible can certainly be enhanced by computer. PC-based Bible-study tools are offered by several different software publishers, each with its own slant on this vast subject. Parsons Technology (One Parsons Drive, Hiawatha, Iowa 52233; 800-223-6925) offers the most comprehensive selection, including HebrewTools, which contains a Hebrew lexicon database, a set of flashcards, and a Hebrew word processor for those studying Hebrew scriptures in the original language. There's also GreekTools, for those who want to master enough Biblical Greek to check out the New Testament in its original language. Parsons also publishes several on-disk English Bible translations—the King James and the New International, for example—for use with its QuickVerse 2.0 searching, indexing, and annotation program.

These programs, with their instant access and a wealth of approaches, make Bible study and scholarship easier than ever before. □

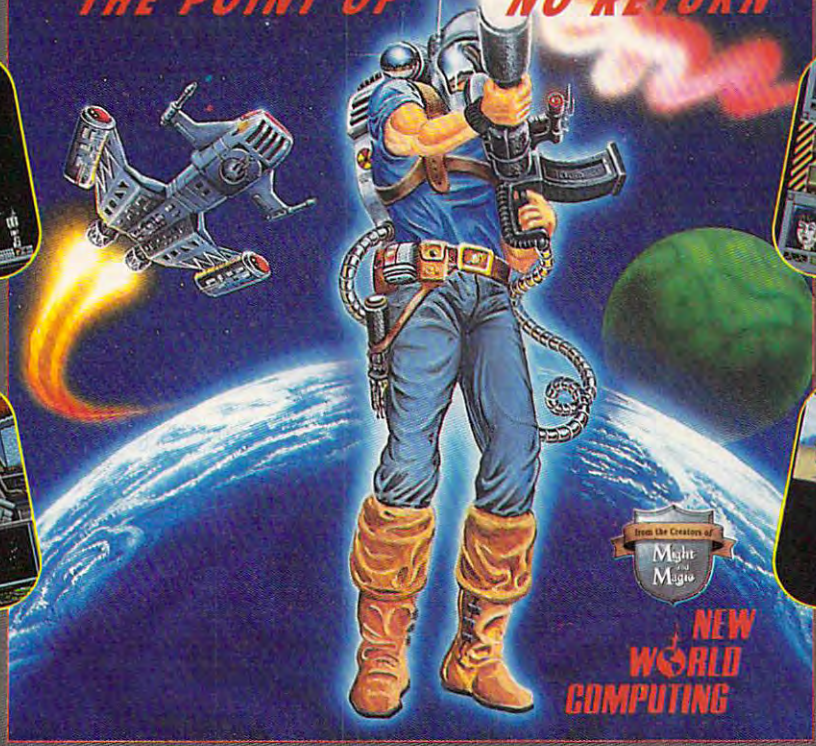
Great pains are taken to eliminate mistakes before the Torah scroll is delivered.



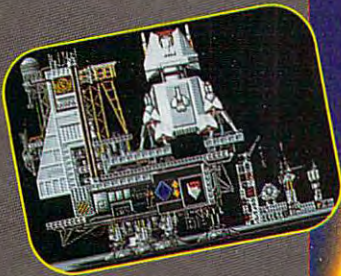
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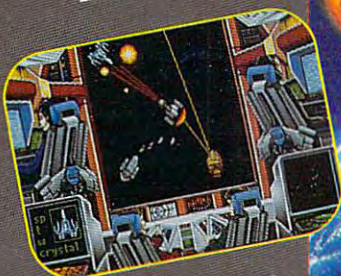
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MULTIMEDIA PC

David English

TRIPLE THREAT

Seven years ago, Microsoft began preaching the gospel of CD-ROM when no one wanted to listen. Two years ago, Microsoft began pushing multimedia when most people thought the technology was at least five years away. Now that multimedia is here and beginning to catch on, what has Microsoft done lately to promote the Multimedia PC (MPC) standard?

Of course, we wouldn't have MPC without Microsoft's Windows with Multimedia. It's the foundation on which all the

soft Multimedia Beethoven: The Ninth Symphony; and Microsoft Bookshelf for Windows.

Microsoft Works for Windows, Multimedia Edition (Microsoft, One Microsoft Way, Redmond, Washington 98052; 206-882-8080; \$199) is essentially the same program as Microsoft Works for Windows except that the multimedia version comes on a CD-ROM and includes a multimedia-based tutorial. Using sound, video, and animation, the tutorial actually makes learning fun. Clearly, some talented people were involved in creating these highly entertaining lessons.

Microsoft Multimedia Beethoven: The Ninth Symphony (\$79.95) is actually a port of a Macintosh CD-ROM created by The Voyager Company. It's a multifaceted and detailed look at the greatest symphony ever

written. Robert Winter, a music professor at UCLA, wrote the text for each of the four sections.

The four sections are Beethoven's World (a vivid look at Beethoven's life and times), The Art of Listening (a short course in musical concepts, using the Ninth Symphony for examples), A Close Reading (a listening tour of the entire symphony with information displayed at various points in the symphony), and The Ninth Game (a game that tests your knowledge of the material in the other three sections).

The recording itself is a 1966 recording with the Viennese Philharmonic. You can hear it through your CD-ROM drive's audio outputs or through any sound card that

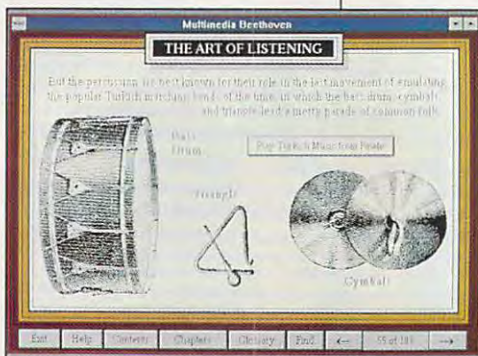
meets the MPC specs. You can even play the symphonic tracks in a regular audio-CD player.

Multimedia Beethoven is a terrific example of how to bring high-quality music to an MPC title. The software lets you easily compare musical themes and hear individual instruments. The only flaws in this otherwise stellar product have to do with its translation from Macintosh to MPC. Originally based on a low-resolution, black-and-white HyperCard stack, the graphics are still mostly low-resolution and black-and-white. In addition, rather than rebuild the program from the ground up, Microsoft chose to translate the Macintosh-based HyperCard stack into a PC-based ToolBook 1.5 book and touch it up a bit. That's fine, except that ToolBook can be slow, so Multimedia Beethoven is sometimes slower than it should be.

Microsoft Bookshelf for Windows (\$195) is a reworking of the popular DOS-based Microsoft Bookshelf. It's practically a full reference library on a single disc, including as it does *The Concise Columbia Encyclopedia*, *The American Heritage Dictionary*, Roget's II Electronic Thesaurus, *The World Almanac and Book of Facts*, *Bartlett's Familiar Quotations*, *The Concise Columbia Dictionary of Quotations*, and *Hammond Atlas*. Added to these text-based works are over 1000 images and maps, 20 animations, and over 65,000 audio pronunciations. You can also hear many speeches, national anthems, and snippets of music. The interface is easy to use and allows keyword searches through one or more of the seven reference works.

For those of us who thrive on information, Microsoft Bookshelf for Windows is like a gift from heaven. □

Microsoft Multimedia Beethoven: The Ninth Symphony provides a detailed look at the greatest symphony ever written.



MPC titles are built. While the MPC standard is officially set by the Multimedia PC Marketing Council, it was Microsoft that developed the original standard. Fortunately, Microsoft designed Windows with Multimedia to be an open platform, so it can be easily extended with new hardware and software drivers. Microsoft also continues to sponsor the annual International Conference & Exposition on Multimedia and CD-ROM, an important meeting place for swapping ideas and displaying new CD-ROM products.

In addition to its contributions on the systems side, Microsoft is committed to developing and selling its own MPC applications. The company has recently released three MPC titles: Microsoft Works for Windows, Multimedia Edition; Micro-

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ENTERTAINMENT CHOICE

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Clayton Walnum

CONQUESTS OF THE LONGBOW: THE LEGEND OF ROBIN HOOD

Surely everyone who isn't filthy rich has at some time wished to be Robin Hood. How noble it would be to help those in poverty and take the ultrarich down a notch or two. Justice would be served, and the underdogs would get their just rewards.

Now's your chance to live the legend. In Sierra On-Line's spectacularly illustrated adventure, *Conquests of the Longbow: The Legend of Robin Hood*, you're Robin Hood as he strives to collect King Richard's ransom. Along with your merry men, you must correct the injustices being perpetrated in the name of Prince John and the Sheriff of Nottingham. If you're successful, you'll save the throne for the king. You'll even gain the hand of the luscious Maid Marion. If you fail, you'll die a rogue's death at the hands of the sheriff's men.

For those unfamiliar with the details of the tale, here's a brief review. King Richard the Lionheart sets off for the crusades with high hopes. But the crusades take a bloody turn, and the king is captured by Austrian soldiers.

Back in England, Prince John has his eyes on the throne and privately swears that Richard will never be freed. Conspiring with the likes of the Sheriff of Nottingham, he weaves a web of intrigue and treachery that drives King Richard's faithful subjects into poverty and despair.

Accused of banditry and other crimes against the prince

and his people, Robin Hood, a disillusioned member of the rich class, becomes an outlaw and sets up a hidden camp with a small group of followers. Stealing from the rich in order to feed and clothe the poor, Robin becomes the people's champion.

Sierra has brought the legend to life. *Conquests of the Longbow* is a carefully crafted and researched tale, bursting with druid magic and medieval English lore. Over two dozen books were used in the game's research, as evidenced by the bibliography included in the manual. As a result, the graphics, the text, and even the story line ring with an authenticity that inexorably draws the player into the game.

Adopting a pleasing cinematic approach to computer storytelling, *Conquests of the Longbow* begins with a lengthy graphic introduction that is sung by an animated bard. After the introduction has ended, you, as Robin, find yourself in your cave, and the adventuring begins.

To keep this long quest manageable, *Conquests of the Longbow* is divided into days. Each morning, you awaken and talk to your men to learn what you need to do that day. Then you sally forth to solve that day's puzzles.

You might, for example, need to acquire a disguise so you can enter Nottingham incognito, or you might need to rescue someone from the sheriff's clutches. Often, you'll find yourself on Watling Street, relieving rich travelers of their gold, battling the sheriff's cronies, or bargaining with innocent passersby.

At first, the game is fairly easy, with quickly solvable puzzles and many animated sequences to guide you into the story. However, don't let the first few game days fool you. *Conquests of the Longbow* is a challenging adventure that requires much ingenuity to solve—inexperienced adventurers may have a rough time solving some of the puzzles. This is a toughie!

Usually, after solving a major puzzle, you're treated to an



animated sequence in which the characters take over the game in order to advance the story line. Each ensures that the game's story is captivating and cohesive. At the end of each day, you and your men gather around a campfire to discuss the day's events. When a character speaks, his animated portrait appears on the screen, allowing you to see your men close up and further adding to the game's realism.

If you discount the many "rooms" that make up Sherwood Forest, there are few locations in the game—so you won't need to do a lot of mapping (hurray!). In fact, *Conquests of the Longbow* includes its own map. To move to one of the game's main locations, you bring up the map and click on your destination, saving you from much wandering through the forest.

Of course, there are locations you must discover on your own. Once you've found them, they're added to the map. Other adventure game designers would be wise to incorporate this feature.

As you travel through this medieval fantasy, you'll visit the Watling Street overlook, the town of Nottingham, a mysterious fens monastery, and more. When you enter castles, the display changes to show the building's floor plan. You can visit any room by simply clicking on it in the display. Once again, Sierra avoids meticulous and boring—and senseless—mapping.

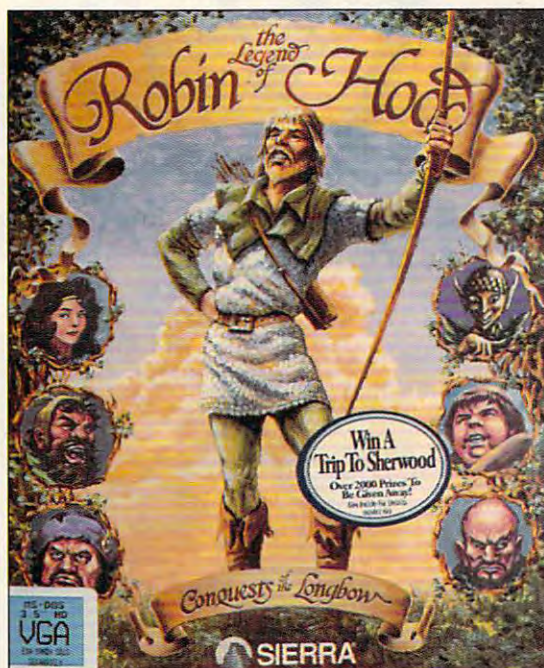
The adventure is packed with Sierra's trademark humor, so talk to everybody and look at everything. That way you won't miss important clues, and you'll discover some zany comedy bits. At a fair, for example, you'll run into a lazy gos-

sip named George Bush. Then there's the log-laden peasant who confesses, "I used to be a programmer for Sierra On-Line, but hauling wood is much easier work."

Conquests of the Longbow features not only Sierra's famous mind-bending puzzles but also several arcade sequences, and there's even an authentic ancient English game called *Nine Men's Morris*. The arcade sequences and *Nine Men's Morris* are fully playable games within the adventure. However, if you prefer straight adventuring, you can set the game's arcade level to 0, which assures that you'll win all arcade sequences on your first attempt.

As with all recent Sierra games, no typing is required to enter commands. You can choose commands from a menu or you can use the right mouse button to cycle through the commands, with the mouse cursor changing to a different icon with each click. There are only about half a dozen commands to choose from, but they can be used in many ways. Even with the limited command set, you won't reach the end of this adventure quickly.

No game is perfect. There are a couple of minor but annoying problems with *Conquests of the Longbow*. For example, if you click the mouse button at the wrong time, you may inadvertently dismiss an important text box that has just appeared on the screen. Moreover, although your outlaw band comprises over 30 men, the only ones you ever see are the five main characters. You never get the feeling that you're leading a large band of men. Finally, I came across one important pass-



word that was misspelled. Ouch! Remember *i* before *e* except after *c*.

These are just quibbles, though—all easily overshadowed by the many strong points of *Conquests of the Longbow*. The 256-color graphics are marvelous; the text is, for the most part, impeccably written; and there's a large helping of mystery, mayhem, and magic. Even romantics will get their due as Robin woos the beautiful Maid Marion.

The *Legend of Robin Hood: Conquests of the Longbow* is a delight, accurately portraying a long-gone medieval age. If you've played Sierra games before, this game's high quality will be no surprise. If you've never played a Sierra game before, *Conquests of the Longbow* is an impressive introduction to this company's fine fare. This feathered cap fits perfectly. □

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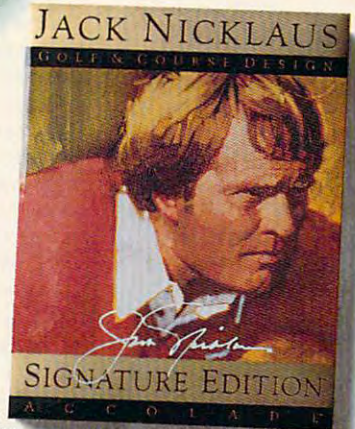
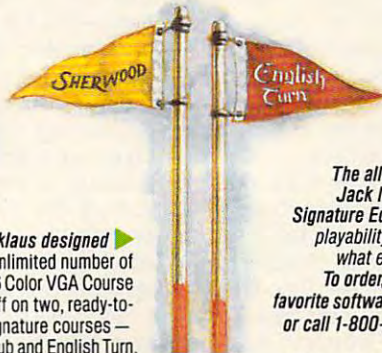
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They shoot on location; they put actors on the set. They work from scripts and storyboard nearly every scene. They employ teams of creative people, from musicians and background artists to writers and animators.

Moviemakers? No way.

Not even the best computer games look like movies—not yet, anyway—but their creators have cribbed notes from film school, because as time goes by, more and more games are made like movies.

Have you noticed a similarity between movies from the Golden Age of Hollywood and the latest computer games? It's no accident.



Computer game makers have played the movie analogy card for years. Trip Hawkins, founder of Electronic Arts, hammered home "The New Hollywood" theme in the mid 1980s when he assembled a game company around a group of producers—people who would develop and guide independent programmers, artists, musicians, and writers just as a film producer leads a director, actors, and cinematographers.

Dynamix was once one of those independent shops that contracted work for the big boys. Dynamix created titles like *Ghostbusters II* and *Arctic Fox* for publishers like Activision and Electronic Arts. In 1989, Dynamix went solo, and a year later Sierra bought the

company. Today, Dynamix has several serious hits on its hands, from *Red Baron* to the hard-to-pigeonhole *Adventures of Willy Beamish*.

The infrastructure needed to produce state-of-the-art software titles is both impressive and sophisticated. Teams of specialists—artists, animators, programmers, and musicians—work on projects in a ballet of scheduling, deadlines, and cost controls.

Dynamix's payroll includes not only the programmers and computer artists you might expect, but also writers, musicians, animators experienced in cel-animation techniques, a full-time photographer, and even a costume designer.

Disney-style animators? A costume designer? Sure. Their expertise comes in handy because of the way Dynamix produces much of its work. When the way games *look* is

so important, you have to start with the realistic and the professional. In a game like *Willy Beamish*, for example, the cartoon-world adventure is created in much the same way as an animated picture. Backgrounds are drawn and painted by hand. Individual cels—one for each frame in an animated film—are drawn and painted, too. So far, like a movie. But rather than photographing each frame, with layers of cels atop a background, artists at Dynamix scan these handmade images into the PC with a Targa scanner and then touch them up electronically.

Dynamix's costume designer outfits the live actors—actors, not models—who portray characters in some of the com-

pany's adventure games. *Acres of the Pacific*, a flight/combat simulator based on the successful *Red Baron* model, incorporates digitized photos of actual WWII aircraft, shot on location at an air show. Even the background clouds come from a photograph, not an artist's imagination. Videotape taken at a semipro football game will end up in an upcoming sports title.

Not only its dependence on such real-life images and Disney-style animation mark Dynamix as a studio kind of shop. The nuts and bolts make you think of films, too.

To kick off an adventure game at Dynamix, a designer submits a treatment—a description or proposal composed by the game's designer. Next, writers flesh out the game's story line. If it's an animation-based title, character studies are drawn for months; if live actors are needed, screen tests take place. A shooting schedule, complete with multiple and overlapping deadlines, is compiled, while in the art department, storyboards of sketches that outline each shot and scene stretch across entire walls. Finally, when as much as possible has been done away from the computer, teams of programmers, artists, and writers work simultaneously on the program, each team completing its own piece, which is then bolted together near the end. And all the while, a production budget (a major game at a major publisher typically carries a price tag of over half a million dollars) looms overhead.

Are games made just like movies? Hardly. They're games, after all, not cinematic art. Game designers aren't pressing the flesh at Cannes, putting hand prints in cement, or punching out the paparazzi. But give them time. □

Pacific Islands

THE SEQUEL TO TEAM YANKEE

The year is 1995 ...

Disaffected Renegade Soviet communists, backed by North Korea, have invaded the Pacific atoll of Yama Yama. Your tank platoon, returning from the Persian Gulf, is the closest American unit to the scene

Pacific Islands is a hectic race against time.

Battle Selection

- All five islands on the Yama Yama atoll must be re-taken.
- Non-linear gameplay allows you to attack each island in many different ways.
- Call up artillery and lay minefields.

Tank Battles

- Test your mettle in this campaign of over 25 interlinked scenarios.
- Liberate villages, destroy ammunition dumps, disrupt jungle supply lines, defend bridges.
- Infra-red imaging, laser range-finding, TOW missiles and DPCM artillery back-up.

Use your strategy skills to effectively fund your campaign.

- Financial reward for destroying enemy installations.
- Fines imposed for collateral damage.

Communications Facilities

- Satellite dishes, radar towers, radio aerials.
- Spot opposition 'scout' vehicles before they give your position away.

Unrivaled 3D

- Fast action, 3D real-time tank simulation using Empire's unique bit-mapped technology.
- Watch buildings explode as you make a direct strike.

TEAM YANKEE SCALED THE HEIGHTS -

PACIFIC ISLANDS REACHES A NEW SUMMIT!

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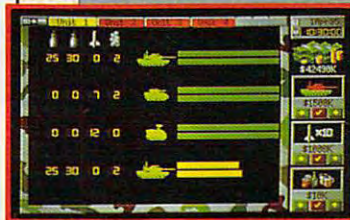
- Simultaneous command of four tank units.
- View the battlefield from four perspectives.
- Control 16 different vehicles at once through an elegant yet simple control system.

THE SCREENSHOTS ARE ONLY INTENDED TO BE ILLUSTRATIVE OF THE GAME PLAY AND NOT THE SCREEN GRAPHICS WHICH VARY CONSIDERABLY BETWEEN DIFFERENT FORMATS IN QUALITY AND APPEARANCE AND ARE SUBJECT TO THE COMPUTER SPECIFICATIONS. SOME FEATURES MAY ALSO NOT BE AVAILABLE DEPENDING UPON THE COMPUTER SPECIFICATIONS.



- You must destroy all communications facilities as swiftly as possible. The longer you take, the more information the enemy have about your position and strength.

- Cope with multiple objectives - can you destroy an airfield, support a convoy, and make a reconnaissance within 40 minutes?



- Purchase all your equipment.
- Is there enough time and money to repair your damaged tracks and give the crews some rest?

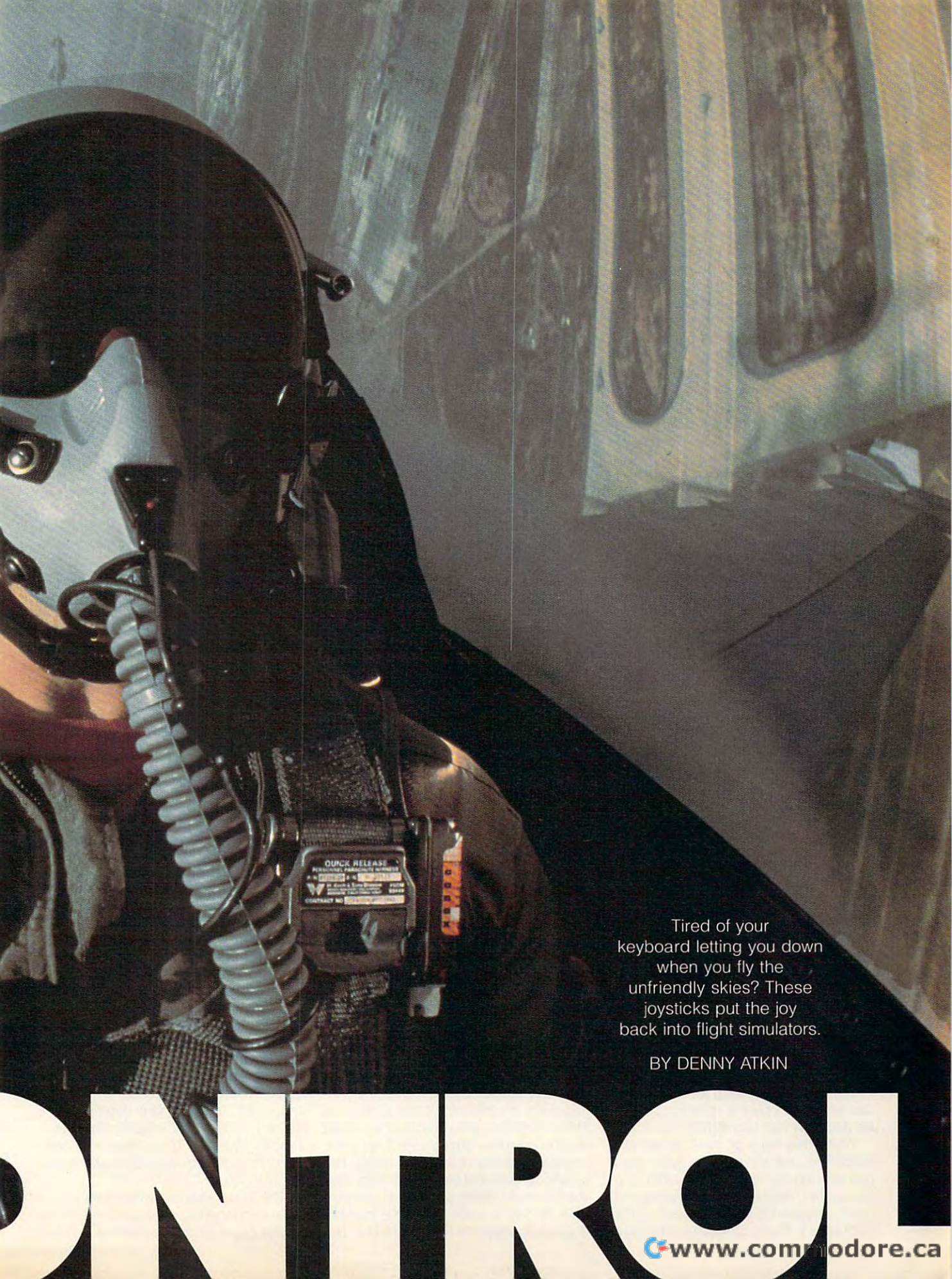


- T72s, BMPs, Hughes 500 Helicopters and SA9 Gaskins.
- Eight different types of fighting vehicles modelled so that you even see the rivets!
- M1 Abrams, M2 Bradleys, M113 APCs, ITVs.





TAKE COO



Tired of your keyboard letting you down when you fly the unfriendly skies? These joysticks put the joy back into flight simulators.

BY DENNY ATKIN

CONTROL

www.commodore.ca

Everything's looking good for a successful attack run. It seems the enemy air force is too chicken to take to the air today. Not a SAM launcher in sight, and ack-ack fire is minimal. A couple more minutes, and I'll be in range to launch-drop a couple of laser-guided bombs on the Scud emplacement, and then I can head for home. Suddenly I see my threat warning light burning—a radar-guided SAM is headed for my plane! OK, I think, drop some chaff and pull some evasive maneuvers to get out of the missile's way. Let's see—which key controls chaff? Yikes! That one turned off my electronic countermeasures jammer! I'm really a sitting duck now. Which key drops the chaff? Here comes the missile—break right! Oh, no! I hit Page Up instead of Cursor Right—I'm flying right into the missile. Good-bye, cruel world.

If only I had a joystick.

Let's face it: If American combat aircraft were equipped with PC keyboards, we'd never win a war. Flying one of the hot new PC flight simulators such as Falcon 3.0 or Secret Weapons of the Luftwaffe with the keyboard is like steering a Porsche with a touch-tone telephone. Luckily, a PC pilot has a wealth of controller options that can turn a computer desk into the hottest simulated cockpit this side of the Air Force Academy.

While a real fighter pilot has to flip a number of switches during the course of a flight, actual combat is usually performed with a HOTAS (Hands On Throttle And Stick) setup. This system puts all essential switches and toggles for air combat right on the pilot's joystick and throttle. A HOTAS system prevents the pilot from having to reach for the instrument panel during combat, preventing deadly delays. With the right accessories, you can approximate a HOTAS setup on your PC's screen.

Stick with It

Modern computer flight simulator controls barely resemble the flimsy plastic joysticks used by folks to fly blocky little biplanes across an Atari VCS video game screen. Those early videogames used switch-based joysticks, which can only sense whether you're holding the stick up, down, left, right, or diagonally. The Apple II introduced a better kind of stick, the analog joystick, which can sense not only the direction but how far and how fast you move the stick.

While this type of stick is actually harder to use for the Pac-Man-style games popular in the late 1970s, it's the perfect choice for an innovative program released for the Apple in 1979: SubLogic's Flight Simulator. The con-

trol afforded by an analog joystick helps bring an extra degree of realism to Bruce Artwick's innovative simulation.

Just as flight simulations have come a long way from the low-resolution, black-and-white Flight Simulator, the newest PC joysticks barely resemble the primitive controllers of the early Apple II days. Those early sticks are little more than a couple of buttons and potentiometers crammed in a boxy off-the-shelf plastic case; they're hardly stylish, and they aren't very ergonomic, either. Those days are gone; many modern PC analog joysticks would look at home in the cockpit of a real F-16.

With all the features available nowadays, picking out the right joystick controller can be as confusing as buying the right PC. Among the features that differentiate various joysticks are on-board throttle controls, extra buttons, auto-centering, and trim controls.

The controller most popular with dedicated flight-sim aficionados, CH Products' FlightStick, has all these features. This large gray-and-black controller features a heavy pistol-shaped grip, trim controls on both axes, and handle-mounted fire buttons. Instead of the ball-joint joystick base found on many joysticks, the CH stick handle uses a gimbaled mount. This allows more precise control—if you want to pull back without turning to either side, the gimbaled mount makes it easy.

One FlightStick feature that comes in particularly handy is its throttle control wheel. Mounted just to the left of the stick, this wheel simulates the y-axis of a second joystick. So if your program supports the use of a second joystick as a throttle (Flight Simulator 4.0, Falcon 3.0, Chuck Yeager's Advanced Flight Trainer 2.0, and A-10 Tank Killer 1.5 are among the simulators that do), you can use the FlightStick's throttle wheel to control your engine power. It's much handier to have this control right at your fingertips rather than on a second stick you have to reach for. The throttle makes an annoying clicking sound as you move it; it would be more comfortable if the wheel would advance smoothly. (Instructions on disabling the throttle click are available on bulletin boards and online networks.)

Kraft's sleek all-black Thunderstick shares a number of features with the FlightStick, including a gimbaled mount, a throttle control, x and y trim adjustments on the top of the stick, and stick-mounted fire buttons. However, the Thunderstick just doesn't have the professional feel of the FlightStick. The joystick movement isn't as smooth, and the handle is lighter and not as comfortable. To Kraft's credit, its throttle implementation is easier to use than CH's. The

Kraft throttle is a slider on the side of the joystick, and it's easier to set to a specific setting than the CH wheel. Also, Kraft includes a switch to disable the throttle in cases of software incompatibility or if you want to use a second joystick instead. And Kraft's five-year warranty is hard to beat; CH offers only one year.

Both the FlightStick and the Thunderstick work nicely as general-purpose joysticks as well. Their trim adjustments let you use them even with older games that don't include joystick calibration routines. However, both sticks are auto-centering and can't be used in free-floating mode, where you can leave the stick in any position. If you need that feature for CAD or other work, you might consider a second general-purpose joystick, such as CH's excellent MACH III. This smaller, more traditional-looking stick features three fire buttons, trim adjustments, sturdy construction, and switchable self-centering on either or both axes.

Advanced Gravis Analog Joystick is also a contender if you need a general-purpose stick. It has a unique adjustable-tension centering feature—you can select how hard you have to push the joystick to move it off-center, or you can defeat the centering entirely. The Gravis stick has three fire buttons, one on the stick and two on the base. Each of these buttons can be assigned as joystick button 1 or 2, or disabled. The stick handle is fairly large and foam-padded, and it's more suitable for use in combat flight simulators than the CH MACH III. The Gravis joystick has one major problem—adjusting the trim requires a screwdriver, so it's not feasible to tweak it in mid flight.

Suncom's Analog Xtra is billed as a "Flight Simulation Joystick"; it's probably only a good choice if you want to simulate getting blown out of the sky. The stick is one of the most impressive-looking in the bunch, and it sports a full feature list: throttle slider, three fire buttons, adjustable-rate rapid fire, trim sliders, and optional suction cups. However, the stiff rubber boot at the bottom of the stick handle makes it very difficult to move the stick, robbing you of necessary flight control.

Total Control

Even if a joystick has a throttle control, you're still forced to reach for the keyboard for functions like deploying the speed brake or changing radar modes. With the ThrustMaster system, though, you can approximate a true HOTAS setup.

The ThrustMaster system consists of two components, each sold separately: the Flight Control System (FCS) joy-



KICK BACK

and relax, you've got a CH Products Controller!



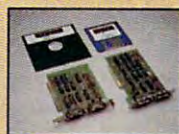
Flightstick™



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stick and the Weapons Control System (WCS) throttle. The FCS is probably the most authentic control stick available for any computer. Its heavy-gauge molded plastic stick looks just like the side-stick in an F-16. It has four buttons (the extra buttons are currently supported by Falcon 3.0, where they toggle speed brakes and change weapons modes, and by Chuck Yeager's Air Combat 1.1) and uses a unique nonlinear spring system to provide more tension as you push the stick farther—just like in a real plane. It has no trim adjustments, however, so it's only suitable for flight simulators that let you calibrate the stick within the program.

The WCS is a throttle control with six buttons and a three-position toggle switch. The throttle works just like a side throttle in a fighter jet: Push the throttle forward to the detente stop to go to full speed; push it farther to activate afterburners. The buttons and toggle switch activate different functions, depending upon which simulator you're using. In Falcon 3.0, the buttons control flares, chaff, target selection, lock on, lock clear, the air brake, and combat mode. In Secret Weapons of the Luftwaffe, on the other hand, they control the gun camera, map mode, weapons mode, arming and launching rockets, flaps, and landing gear. Be prepared for a bit of confusion if you fly a number of simulations, but it's no worse than memorizing different keyboard controls.

The WCS acts as a keyboard device and plugs in between your PC and its keyboard. (Note that you'll need adapter cables if you have a PS/2-style keyboard.) It works by sending the key codes to the computer as if you'd pressed them on the keyboard. This works great for weapons toggles and such, but the WCS sends throttle movements by sending keypresses, also. This isn't as responsive as the analog throttle control used by the FlightStick and Thunderstick. Also, some programs, such as Secret Weapons of the Luftwaffe, can't accept a fast series of keypresses, so quick throttle movements can result in little more than a series of "too-many-keypresses" beeps.

Because the WCS has to send different keypresses depending on which simulator you're running, you have to change a set of DIP switches on the back of the case each time you boot a different simulator. You also must replace a ROM chip inside the stick to add support for new programs. The stick currently supports 14 of the hottest flight simulators—including Falcon 3.0, Yeager's Air Combat, Wing Commander, and A-10 Tank Killer—and the ThrustMaster company regularly

releases update ROMs for a small fee. Even with these minor problems, though, I'd recommend the WCS to all flight sim fans, no matter which joystick you choose. With a good joystick in your right hand, the WCS in your left, and a set of rudder pedals at your feet, you've got a true HOTAS system that can make combat easier, more realistic, and much more exciting.

It's in the Cards

To attach any of these joysticks, you'll need a game card as well. Many PC sound cards include joystick ports, including the Sound Blaster Pro and Thunder Board. Besides, a sound card is another must-have flight simulator accessory; combat is more exciting when your guns thunder than when they click.

I tested all of the sticks here with a Thunder Board and had no problems. However, if you're going to be using more than one joystick-port device (such as two joysticks and rudder pedals), you'll need to attach Y cables to the single joystick port on the back of the sound card. I've heard reports of incompatibilities with such setups and the Sound Blaster Pro card, so you might be better off just buying a game card with two joystick ports.

Both Kraft and CH manufacture dual-port cards that will automatically adjust to your PC's speed, and both include calibration software on disk. The Kraft Programmable MultiSpeed Game Card will autoadjust to speeds up to 35 MHz, while the CH GameCard III Automatic will work at up to 50 MHz. Suncom's GamePort 2 Plus card works only up to 16 MHz and requires you to manually change switches on the back of the board to alter the card's speed.

Advanced Gravis Eliminator Game Card takes a unique approach to the calibration problem, offering an external adjustment dial that plugs into the back of the joystick card. Although this setup ensures that you'll be able to adjust the card specifically to your computer's speed, I didn't have any problems with the automatic cards.

Take Off, Eh?

There are a number of good options for the dedicated PC pilot. My setup of choice is either the FlightStick or the ThrustMaster FCS, along with the ThrustMaster WCS. Jerking back on the stick while shoving the throttle forward is an experience totally different from holding down the + key while hitting 2 on the numeric keypad. Another accessory the dedicated pilot will want is a set of rudder pedals. The Maxx Pedals from Maximum are popular with PC pilots, but they didn't arrive in time to be included in this feature.

If you're considering buying some of these accessories, you should check your flight simulator's manual to see if it supports some of the more esoteric options, such as rudder pedals or second-joystick throttles, before buying. A good source of compatibility information and product recommendations is CompuServe's FSFORUM, an online forum dedicated exclusively to talk about flight simulators. A couple of FSFORUM pilots are even putting together a custom HOTAS system, which will sell for around \$300 and be completely user-programmable.

Put away that keyboard and grab a real flight controller. The wild blue yonder will never be the same. □

PRODUCTS REVIEWED

Advanced Gravis Analog Joystick—\$59.95
Eliminator Game Card—\$44.95

Advanced Gravis
1602 Carolina St., #D12
Bellingham, WA 98226
(604) 434-7274

FlightStick—\$79.95
GameCard III Automatic—\$49.95

MACH III—\$49.95
CH Products
970 Park Center Dr.
Vista, CA 92083
(619) 598-2518

Sound Blaster Pro—\$299.95
Creative Labs
2050 Duane Ave.
Santa Clara, CA 95054
(408) 986-1461

Thunderstick—\$49.95
HiSpeed Game Card—\$29.95
Programmable MultiSpeed
Game Card Two Ports—\$44.95
G/S+ Adapter Card
(for Micro Channel)—\$149.95

Kraft
450 W. California Ave.
Vista, CA 92083
(619) 724-7146

Thunder Board—\$169.00
Media Vision
47221 Fremont Blvd.
Fremont, CA 94538
(800) 845-5870

Flight Control System—\$99.95
Weapons Control System—\$99.95
ThrustMaster
705 SW Ellis
Lake Oswego, OR 97034
(503) 697-3200

Analog Xtra—\$46.99
GamePort 2 Plus—\$27.99
Suncom
6400 Gross Point Rd.
Niles, IL 60648
(708) 647-4040
(708) 647-7828 (fax)

64/128 VIEW

More Commodore user groups emerge as a new generation of 64 and 128 owners discover the machines' appeal.

Tom Netsel

Last month, we printed an updated listing of about 90 Commodore user groups. Then, just as that list was rolling off the presses, I learned of yet another new group.

An envelope arrived containing a letter, a disk, and Issue 1, Volume 1 of a newsletter from the Carbonaro Commodore Users Group in Valley Stream, New York. The newsletter was a one-pager that contained a lot of information. In fact, I don't remember when I've seen so many words squeezed onto one sheet of paper.

The newsletter contained a welcome from the editor, information about the companion disk, and tips on turning your disk drive into a racehorse with JiffyDOS. Among other items were concise reviews of Rocket Ranger and Who Framed Roger Rabbit?. The reviewer liked Rocket Ranger's graphics, soundtracks, and digitized voices, so he gave it an A+. Roger Rabbit was criticized for not having different playing levels, so it got an A-.

Since this was the first issue, the Questions Forum was empty, but the editor requested that readers send him their Commodore-related questions. The address for those questions was a little odd, however. To submit a question, readers are instructed to jot it on a note and deliver it to the editor, John Edward Everson, in Miss Celona's sixth-grade class, room 10 at R. W. Carbonaro School in Valley Stream. Oh, yes—John requests that you include your name, class, grade, and room number with your questions. He'll answer your

questions to the best of his ability and expertise and, if necessary, seek further information on QuantumLink.

The Carbonaro Commodore Users Group is open to 64 and 128 users at the school and to Commodore users in the community, as well. Just because the editor is in the sixth grade, don't think he's a lightweight when it comes to knowing his way around a computer. The accompanying disk—which came free with the first issue of the newsletter but will cost \$1 from now on—contains two of John's programs. One of these, Bowman, made the top ten download list on Q-Link for several months last fall.

John, who has access to several computers, chose a 128 with Paperclip Publisher to produce his newsletter. The 128 has a 50MB hard drive and a 13MB RAMLink, and it's connected to a Star NX-1000 color printer. It's not exactly a lightweight system, but John's father is also an avid Commodore fan.

Through word of mouth, the Carbonaro user group has grown considerably in just a short time, and John is sending out several hundred copies of his newsletter each month. As I write this, another issue is about ready to hit the school corridors and mailboxes across the country.

In a day when many user groups are closing their doors, it's refreshing to hear about a new one being started by a new generation of 64 and 128 users. We at Gazette want to wish John good luck with his newsletter and hope the Carbonaro User Group prospers. □

GAZETTE

64/128 VIEW

G-1

A new generation of computer users is discovering the 64 and 128. One young enthusiast has started a user group at school and has his own newsletter. By Tom Netsel.

FEEDBACK

G-2

Questions and comments from our readers.

D'IVERSIONS

G-6

The grand-prize winner of the Design-a-Robot Contest is Gordon H. Smith of Kenosha, Wisconsin. His winning robot is named GOLMER. By Fred D'Ignazio.

BITS, BYTES, AND BLOOPERS

G-8

Have you ever done something stupid while working at your computer? Cheer up. When it comes to computer boo-boos, you aren't alone. By Julia L. Wilkinson.

REVIEWS

G-14

Back to the Future Part III, Goofy's Railway Express, and Donald's Alphabet Chase.

PROGRAMMER'S PAGE

G-18

Here are some dazzlers to show off your machine. By Randy Thompson.

BEGINNER BASIC

G-22

Learn to write an amortization program so you can check your bank's or mortgage company's figures. By Larry Cotton.

GEOS

G-24

Fonts are an exciting aspect of using GEOS, and literally hundreds of them are available. By Steve Vander Ark.

PROGRAMS

Milk Run	G-25
Turbo Poker	G-29
File Lord	G-30
Pixel Mover	G-33
Batch File 64	G-38

Machine Language Demos

Could you tell me what I need to make superb demonstration programs in machine language? To help me learn about the 64 and machine language programming, I have purchased COMPUTE's *Commodore 64/128 Power BASIC*, *All About the Commodore 64*, *Mapping the Commodore 64*, and *Machine Language for Beginners*.

STEVEN MCCLAUGHERTY
HURRICANE, WV

The books you've purchased are a great beginning for learning and applying machine language for the 64. Machine language programming can be broken into two broad groups: machine specific and machine general. Machine specific programming takes the properties of the computer itself into account, often making use of built-in machine routines, such as those from BASIC or the disk operating system. Using these routines to handle many essential computer functions frees the programmer from a lot of tedious programming.

In order to use existing routines, however, you need to know what routines the computer uses to do its job and what the routines do. Do they need values passed to them to work? Do they return values? How do they affect the operation of the computer? You'll also need to know the logical internal arrangement of the computer, how the memory is laid out, and how to access these locations and manipulate the associated data.

Each microprocessor has its own set of codes for machine language. You need to know these commands, or at least be familiar with the group of mnemonics. This is where an assembler comes in handy as a programming aid.

As to the other broad divi-

sion of machine language programming, general ML, there are some fundamental rules and standard operations. All of this sounds like an awful lot to learn, but you can start small and build up your knowledge. Because everything in the computer is interrelated in some way, it all falls into place with time. Applications can then be found for your knowledge as you learn. Thinking in machine language terms is a departure from thinking in high level languages such as BASIC, but the learning curve is no steeper. So plunge in and have fun!

Orderly Directories

Is there any program for altering the sequence of files in a directory or for listing directory files alphabetically?

GLEN M. SHUE
SILVER SPRING, MD

There are several. Commodore provides such a utility with its disk drive test/demo disk for the 1541 and other drives, and COMPUTE's Gazette published one called *Directory Magic* (October 1987). *Directory Magic* lets you alphabetize, change file names, and move entries where you want them. You can also scan the contents of both programs and text files.

A copy of this disk and any Gazette Disk earlier than June 1990 can be had for only \$3.50. Order by writing to Single Gazette Disk Sales, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. Be sure to specify the month and year of the desired disk. A copy of *Directory Magic* can be also be found for downloading in our COMPUTE/NET area of Quantum Link. Also, you may find several utilities of this kind in user group archives and on local bulletin board systems and networks.

Mind-Reading 64

Can you help me with a program that would appear to read people's minds? If someone held up a pencil, I would type in "Please tell me what this person is holding," and the computer would display PENCIL. If the person held up a computer disk, I would type "Describe this item," and the computer would display DISK. The secret would be that the first letter of the item name would correspond with the first letter I type in when I ask what the item is.

EARL WALKER
LANSDALE, PA

Here's a BASIC program that should do what you need.

```
HF 10 INPUT "{CLR}{DOWN}
{N}WHAT NUMBER OF
{SPACE}ITEMS";N:DI
M I$(N)
CJ 20 FOR X=1 TO N:PRINT
"WHAT'S ITEM";X:I
NPUT I$(X):NEXT
JE 30 PRINT "{CLR}
{2 DOWN}THE AMAZIN
G COMPUTDINI!"
RK 40 PRINT:PRINT:INPUT"
WHAT IS YOUR QUEST
ION";Q$:PRINT
XA 50 FL=0:FOR X=1 TO N:
IF LEFT$(Q$,1)=LEF
T$(I$(X),1) THEN F
L=X
GJ 60 NEXT
QK 70 IF FL>0 THEN PRINT
"THAT IS ... ";:FO
R X=1 TO 1000:NEXT
:PRINT I$(FL):GOTO4
0
MG 80 IF FL=0 THEN PRINT
"I'M STUMPED ON TH
AT ONE!":GOTO40
```

Line 10 sets up an array according to the number of items involved. Notice that by pressing Ctrl-N we are using upper- and lowercase letters in the program.

Line 20 asks the magician for the item names. If the first letter of your question in line 40 starts with a capital letter, then the item you enter must also start with a capital letter if it's to match. (Don't let your audience see you enter data

Questions
and answers about
ML demos,
alphabetical directory
listings, mind-
reading programs,
and more