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January 1993 \$3.95

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24 PC Makers Meet Our Challenge to Build The Best Affordable Windows System

NEW SPREADSHEETS TESTED: 1-2-3, EXCEL, AND QUATTRO PRO

62 EASIEST FONT PACKS

75 WINDOWS AND DOS TIPS



Loosely translated, it just me



All of the spreadsheet innovations in the world don't really matter,

if they don't work for you. Which is why all the innovations in Microsoft[®] Excel are designed to do just one thing: make your everyday job easier.

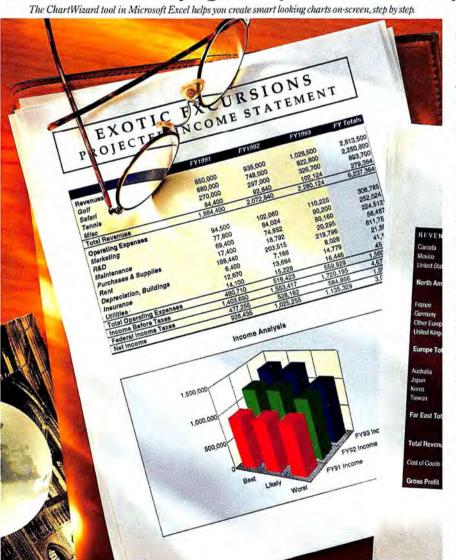
In order to achieve this goal, our product development team spends countless hours studying the way you work with your spreadsheet. Talking to you about the things you need to do with your spreadsheet. And listening to things you'd like to do with your spreadsheet, but can't.

For example, they discovered you like to put charts into your documents, but that often you don't. Why? Because it's too hard to do with your current spreadsheet. So they designed a tool that helps you create a variety of smart-looking

charts on-screen, step by step. It's called the ChartWizard. And it's so easy to use, it actually feels a little like magic.

They also found there are a number of things you have to do over and over again that are time consuming, and tedious. Like filling in dates. Or formatting your worksheets. Or adding up countless rows and columns of figures.

To put an end to this and add some "zing" to creating a worksheet, we developed a set of tools that can accomplish most everyday tasks

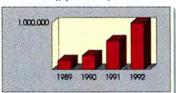


eans it's easier.

with just the click of a mouse. We call them "Autoformat, Autofill and Autosum"." And they work just the way they sound—automatically.

Type January into the first cell, and Autofill will instantly fill out as many (or few) months ahead as you

Over a million Lotus users have already made the switch to Microsoft Excel: the leading spreadsheet for Windows.



indicate on your worksheet. Hit Autoformat and you can instantly ap-

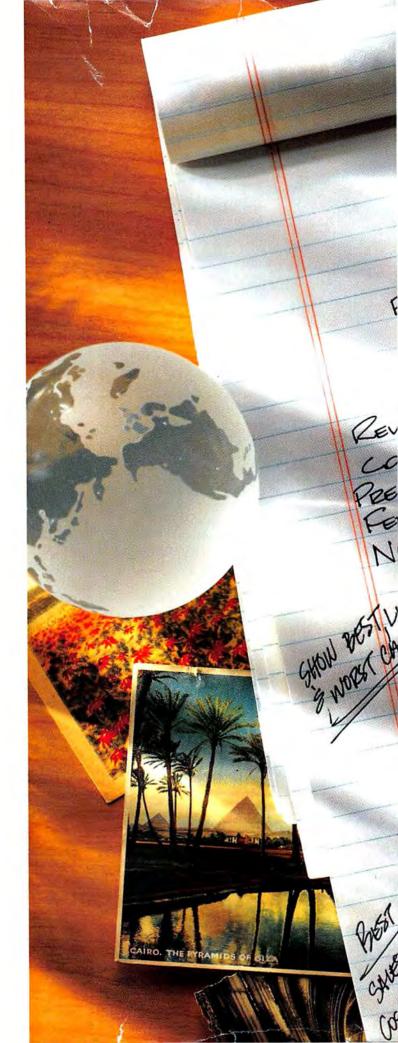
ply a professionally designed format to your worksheet, so that the data points you make will stand out. And Autosum can give you the numbers you want faster than you can say, "one-two-three."

All of which has helped more than a million Lotus users make the switch to Microsoft Excel for Windows—the number one spreadsheet for Windows."

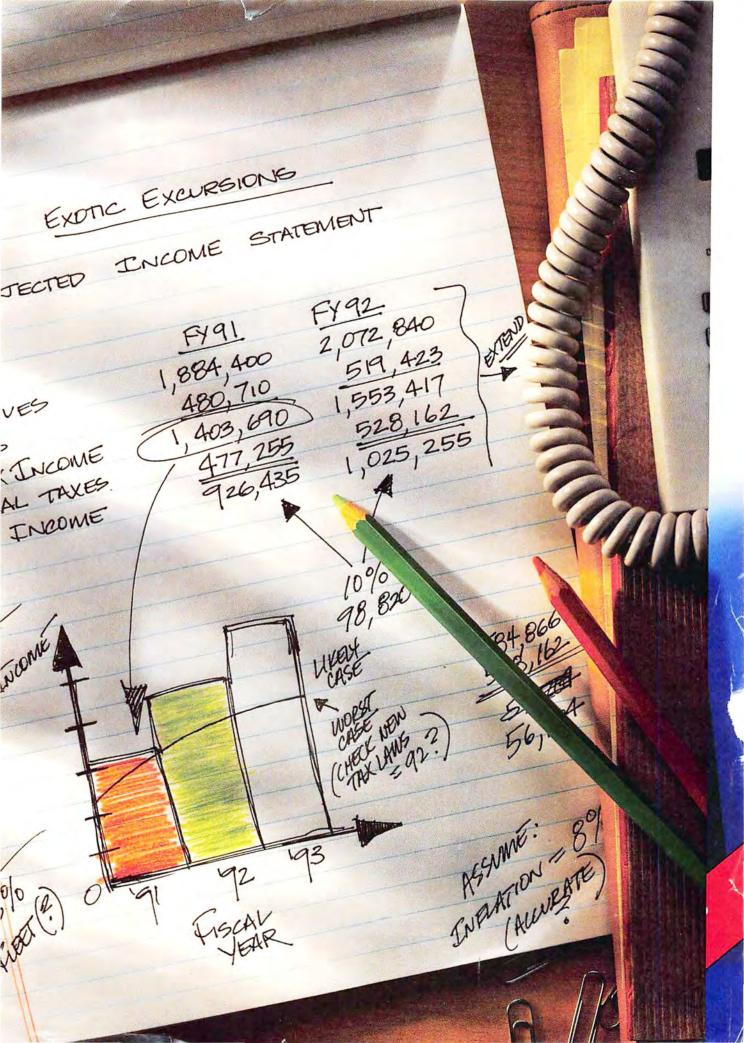
Finally, we've not only made Microsoft Excel easier to use, we've also made it easier to get. Because right now you can make the switch for only \$129. Just call us at (800) 426-9400, Department HY8. Or visit your nearest reseller.

And then see for yourself, why the most innovative spreadsheet is the one that really works for you.

Microsoft
Making it easier



Microsoft Excel has a Wizard that helps you plot nonadjacent selections of related variables with a transposed data series in a multicategory 3-D chart.



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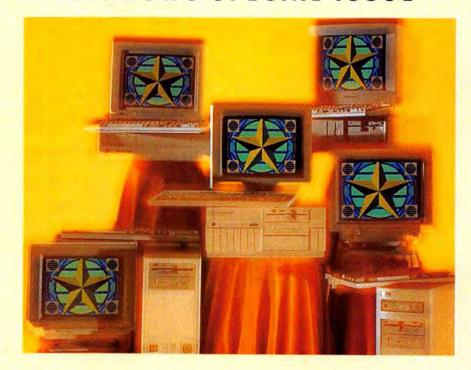
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PC WORLD

WINDOWS SPECIAL ISSUE



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Cover photograph by Robert Cardin Digital composition by Varitel Select



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75 Windows and DOS Speedup Tips

122 Fed up with Windows' poky printing, sluggish screen redraws, and endless disk swapping? Put an end to all that with these 75 surefire Windows and DOS tips, covering everything from memory management to mouse and keyboard shortcuts. Special bonus: 15 basic pointers every Windows user should know.

The Windows Spreadsheet Challenge

146 PG World's spreadsheet guru and a DOS 1-2-3 power user team up to answer the software question of the year. Is the best Windows spreadsheet Excel, Quattro Pro, or 1-2-3? Our rigorous usability tests tell the whole story.





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PC World Adviser: Ramping Up to Windows

189 This month's dilemma: How do you train 200 employees in Windows on only a shoestring budget? Our panel of software training experts examines this common problem and offers three cost-effective approaches to solving it.

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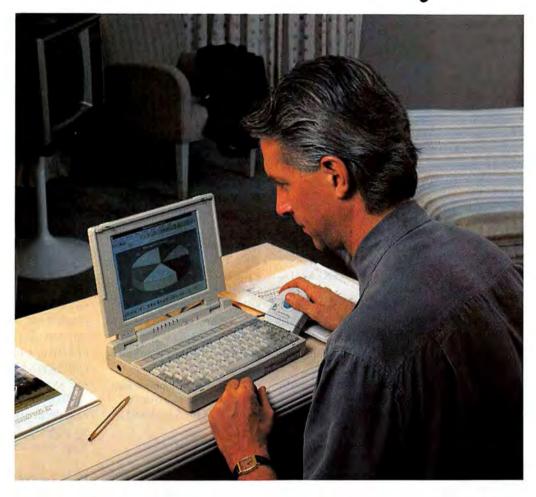
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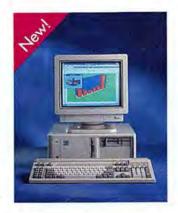


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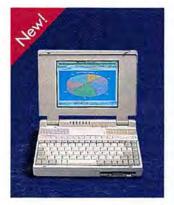
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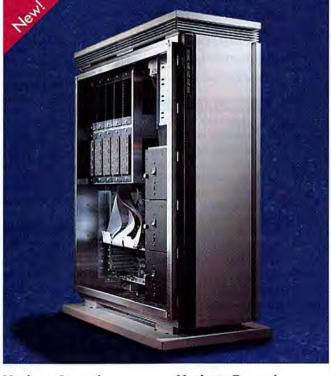
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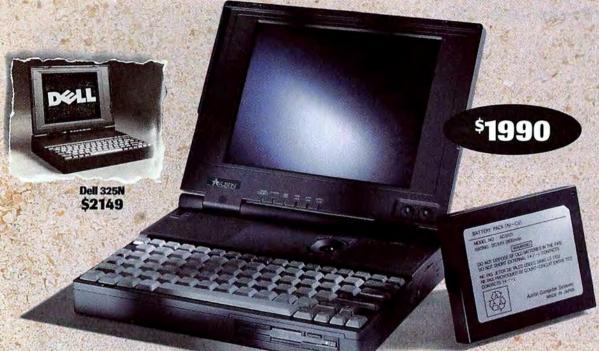
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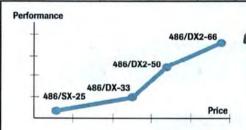
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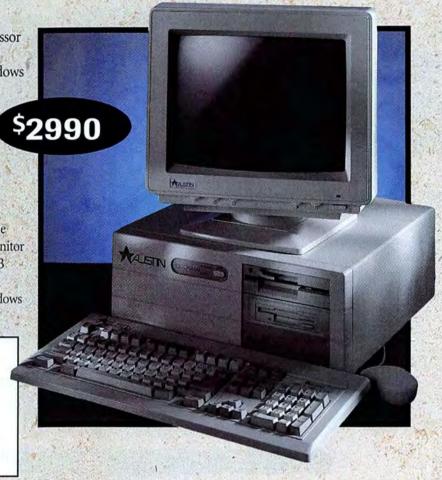
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running at 50MHz	running at 66MHz	running at 50MHz	running at 66MHz	running at 25MHz	
w/128K Cache	w/128K Cache	w/128K Cache	w/128K Cache	2MB RAM (to 8MB)	
4MB RAM (to 32MB)	8MB RAM (to 32MB)	8MB RAM (to 32MB)	8MB RAM (to 32MB)	120MB Hard Drive	-and C.O.D.
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Windows Scores Again

few months ago sales of Windows software surpassed those of DOS software for the first time-a little-heralded but watershed event. Around that time PC World received the results of a reader poll indicating that 59 percent of you were using Windows, with another 10 percent planning to adopt soon.

Perhaps the most stunning statistic of all is that nine of the top ten PC manufacturers now include Windows with their systems, with 91 PC vendors in all offering a Windows bundle. There's a clear message in those numbers: Windows is well on its way to becoming a sine qua non for business computing.

The Windows watershed provides an excellent excuse for us to present this special issue. You'll find these pages chock-full of information on Windows spreadsheets, hardware, fonts, and training, plus a super collection of 75 Windows and DOS speedup tips.

Note that we haven't abandoned DOS users, nor do we plan to. But the writing is on the wall. Ultimately, your computing strategy should take into account where the best minds in software are focusing their efforts. And the industry's intellectual capital is pouring into Windows at a phenomenal rate.

Spreadsheet Inspiration

As evidence, you'll read about some of the best applications ever written in "The Windows Spreadsheet Challenge," a three-way shoot-out starring 1-2-3 for Windows 1.1, Excel 4.0, and Quattro Pro for Windows. Borland and Microsoft in particular have outdone themselves with elegant design and a host of intelligent features.

Take Quattro Pro's concept of "property inspection." Point to any object on the screen (a worksheet range, a heading, whatever), click the right mouse button, and up pops a dialog box that enables you to view or change the parameters associated with that object.

Simple, direct-and an inspired piece of interface engineering.

Or take Excel 4.0's "wizards." These automated step-by-step instructions can make advanced features accessible to those who lack the time or inclination to plumb the manual. The savvy evident in Excel 4.0's Crosstab ReportWizard, which holds your hand through one of the most complicated operations in spreadsheets, deserves applause in and of itself.

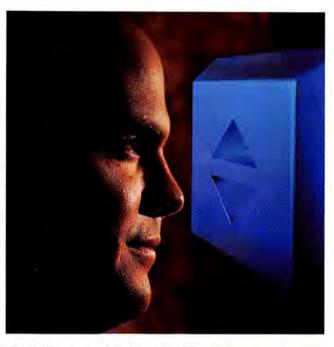
Point-and-click application builders, auto-fill

functions, robust support for linking objects across applications . . . the list goes on and on. And as our sneak preview of 1-2-3 for Windows 2.0 reveals, Lotus plans a strong comeback with innovative groupware features and a help system that promises to raise ease of learning to a new level.

We salute the intelligence and creativity that's gone into this next-generation software. However, lest you think we've been blinded by brilliance, note that our shoot-out relies heavily on rigorous usability testing for its final evaluation, with a special emphasis on ease of learning for those users migrating from 1-2-3 for DOS. Bells and whistles are great, but they're only window dressing unless they help you get your work done.

Calling All GUI Hardware

Just as we're taking a user-driven approach to software reviews, we have turned our usual methodology for system roundups on its head in an effort to deliver more value. For this month's review, instead of picking a processor type and asking vendors to send in,



say, their latest 50-MHz 486DX2, we asked 24 vendors to ship us their hottest Windows system that sells for less than \$2500 on the street. We think this is the way most people buy: They have a

Editor Eric Knorr goes face-to-face with the real appeal of Windows.

fixed amount to spend and simply want to know which machine will give them the most bang for their buck.

As usual we picked the top five systems in this batch, thanks in part to a tough new application-based Windows test suite developed by the PC World Test Center. And as you'll see, the response to our open-ended call for hardware demonstrates that vendors are thinking harder about how people really work and are determined to provide competitive solutions.

That's the way we like to do business, too. We hope it's reflected in this special Windows issue.

Eric Knorr, Editor

IDC Weekly Update Screamers un

You've never seen Windows™ go this fast for a price this low. The new DECpc 486 PCs, with local-bus video and GUI acceleration, are blasting past the competition in Windows performance. How did we do it? We built them ourselves, with a rugged design and high-end features you won't find on other systems priced this low.

"Digital's system was the overall winner in PC Week Lab's tests. Its video subsystem beat out all the others." PC Week, Oct. 5, 1992

"Digital's implementation of local-bus video vields outstanding results on our Graphics WinMark benchmark test." PC Magazine, Nov. 24, 1992

PC Magazine WinMark Test

C	Graphics WinMark megapixels per second)
DECpc 450d2 LP (486DX2/50)	12.98
50-MHz 486DX2 average	je 5.51
Dell System 486D/50 (486DX2/50)	1.58

Higher scores represent better performance. Source: PC Magazine Labs, PC Magazine, Nov. 24, 1992

"I think they're a winner." Andy Seybold, Associated Press, Aug. 24, 1992

"Credible prices and service competition to new 'value-priced' computers from Compag, Dell, and IBM." PC Magazine, Nov. 24, 1992

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Video WinMark 433 dx IP JIGHTAL DECoc ALR FLYER 32DT 4DX/33 AST BRAVO 4/33 MODEL † ZD Labs WinBench 2.5 PC Week, Oct. 5, 1992

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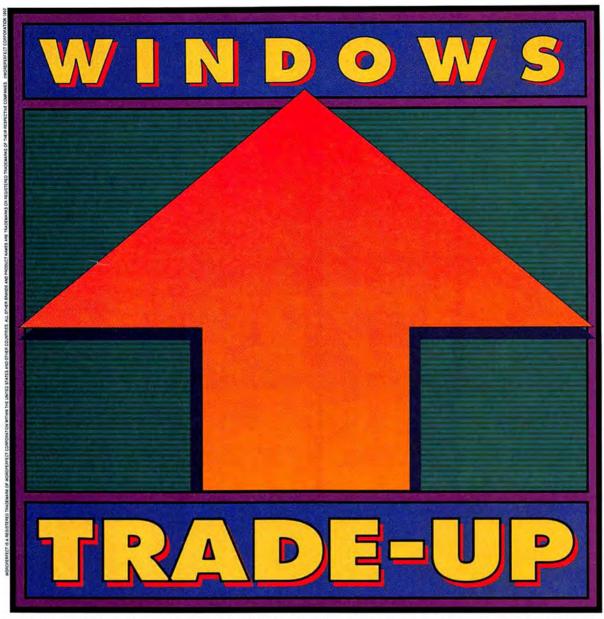
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WordPerfect

Choosing Your Operating Systems, Fighting the Viral Menace

Debating the Alternatives

Thanks for your excellent "Windows Alternatives" article in the October 1992 issue. Comparing *Desquiew*, OS/2, *Windows*, and *GeoWorks Pro* is not easy, and you gave a fair, balanced view.

I would like to add some things that your review missed. While it is true that GeoWorks is incapable of task switching on its own, it is very tightly integrated with DR DOS 6.0's Taskmax. When Taskmax is loaded, other available programs appear in the Express menu at the top of each GeoWorks application, making them only a mouse-click away. Taskmax is also integrated with GeoWorks' clipboard, so you can cut and paste with other applications.

It's not hard to gush about this program; suffice it to say that I can think of no reason to migrate to Windows.

Larry Frederick, Irving, Texas

Editor's response: PC World received several letters noting GeoWorks' capability to multitask using DR DOS 6.0. Although the two products work well together, DR DOS 6.0 does not come bundled with GeoWorks, nor vice versa. Whether you select DR DOS instead of MS-DOS is a separate consideration (see "DOS vs DOS," April 1992).

Why do I see so many letters in PC World that put down Windows? Do these people have any concept of what users really want? Windows provides standards. As a developer I can write applications that perform a business function without getting bogged down with user interface design. Users who are familiar with Windows can jump right into an application without having to learn yet another set of commands.

If you must have the most speed, use DOS. If you must have a standard user interface, use *Windows*. Just don't criticize other people for using what seems best to them.

Robert W. Howell Farmingdale, New York Comparing OS/2 2.0 against Windows 3.1 and DOS 5.0 on a 386SX with 4MB of RAM is like having a Porsche and a tricycle race around a picnic table—the tricycle is going to win. Instead you should install the same system software on a 486DX-33 EISA with a minimum of 16MB RAM, and then compare 32-bit OS/2 programs such as CorelDraw, Describe 3.0, and R:BASE 4.0 against their DOS and Windows counterparts. Only then will we see the true value of OS/2 versus Windows 3.1. Steven Schneider, Seattle

The OS/2 Cookie Crumbles

s Nathan Even Tableman (Letters, October 1992) bucking to become the Hillary Clinton of the computer world? Having said he can "run OS/2 with 10MB of RAM," he asks "what serious computer user owns a system that's less powerful than OS/2 needs?"—thus managing to insult those with any claim to seriousness who have stayed home and baked cookies, some of them tasty, with vastly less than 10MB of RAM.

Paul Ramsey, Chattanooga

Viral Menace

must take issue with a statement made in "More Protection Against Stealth and Other Viruses" (New Products, October 1992). The author begins the article with "Although the Michelangelo virus scare last spring was blown way out of proportion, computer viruses continue to be a threat."

What occurred with the Michelangelo virus last year was anything but blown out of proportion. At the least, the awareness it created in the PG-user community (not to mention the media and general public) about the threat of computer viruses was extremely beneficial. As a result, information resource and security managers were able to convince their organizations that the threat of computer viruses needed to be addressed. I also believe that as a result of

the publicity Michelangelo received, more users took the steps necessary to search for the virus and remove it.

It is a disservice to PC users to suggest that the attention the Michelangelo virus received was mere hoopla. Rich Beamer, Woodbridge, Virginia



Baled Out

n your article on *Baler 6.0* ("Baler's Fast 1-2-3 Templates," *New Products*, September 1992), you indicate that the program is compatible with *1-2-3* macros. Readers should be made aware that this is only partially true. Macros that use the copy feature to duplicate formulas cannot be reproduced in a *Baler* worksheet.

Bob Mount, Thurmont, Maryland

At a Loss With DR DOS

chose Digital Research's DR DOS 6.0 for my operating system because of its superior command structure and auxiliary features. But when I installed the latest release of *Interleaf* for DOS and tried to run it, I received this error message: 'Requires DOS 4.0 or later'. A few phone calls later I discovered that DR DOS 6.0 is not compatible with MS-DOS 4.0 or 5.0 but emulates DOS 3.31. This fact is hidden in the back pages of the DR DOS 6.0 Optimization and Configuration Tips manual.

After many more phone calls, I finally discovered that I must switch to MS-



DOS 5.0 if I want to run *Interleaf*. I made the switch, and *Interleaf* worked just fine. Now I'm left with the massive task of converting all my system files in order to be consistent with my new operating system. Digital Research and *Interleaf* should send their programmers out into the real world to learn what customers are really using.

J. Reese Brown, Carlsbad, California

Editor's response: Novell, Digital Research's parent company, confirms that DR DOS 6.0 uses the data structures of MS-DOS 3.31. The company claims this is the first time they've encountered an application that required MS-DOS 4.0 or later. According to Novell, a version of DR DOS compatible with MS-DOS 5.0 will be available later this year.

The Old Shell Game

naiel Tynan did WordPerfect Corporation a disfavor by failing to mention

WordPerfect Office in his "DOS Shells" article (September 1992). Office is far better than any of the shells he reviewed. It has file management, including file viewing, searching, and listing; one-key access to the DOS prompt; and one feature that none of the other shells have: task swapping. Office's easy-to-use task swapper, seamless integration with other WordPerfect apps, and compatibility with WordPerfect commands make it an indispensable part of our office routine. Eric Rose, via CompuServe

Editor's response: WordPerfect Office offers many of the functions of a DOS shell and a lot more—such as a clipboard, flat-file database, and a passel of desktop accessories, plus E-mail and group scheduling in its network version. This puts it in a different league than the other products in my article, which are mostly file managers and program launchers. Incidentally, MS-DOS 5.0's shell also lets you switch between active programs, a fact that should have been noted in the piece. —Daniel Tynan

On-Line Country

wonder if the on-line services know how much of the rural computing population they're missing. I've subscribed to CompuServe, America Online, and Prodigy and used GEnie, National Video Tech, and Delphi. Although I've enjoyed these services very much, I've had to cancel my subscriptions because I am a rural user and every phone call was long distance. Can't any of these services provide an 800 number so those of us living in the sticks can come on line without mortgaging the homestead? Henry D. Wise, Lucedale, Mississippi

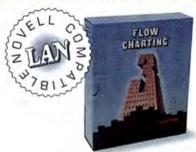
PC World Off Line

recently tried to install the America Online software so I could access PC World Online. After many attempts I was finally able to complete the installation.

But trying to run AOL resulted in more system lockups. When I called technical support, I was amazed to find that the product would not run on a system with Stac Electronics' Stacker 2.0 installed, and that it had problems coexisting with Quarterdeck's QEMM 6.02 memory manager. You may as well have told me to reinstall DOS 2.1, program in GW BASIC, and not run any device drivers or TSRs. PC World should have made an effort to communicate these prob-

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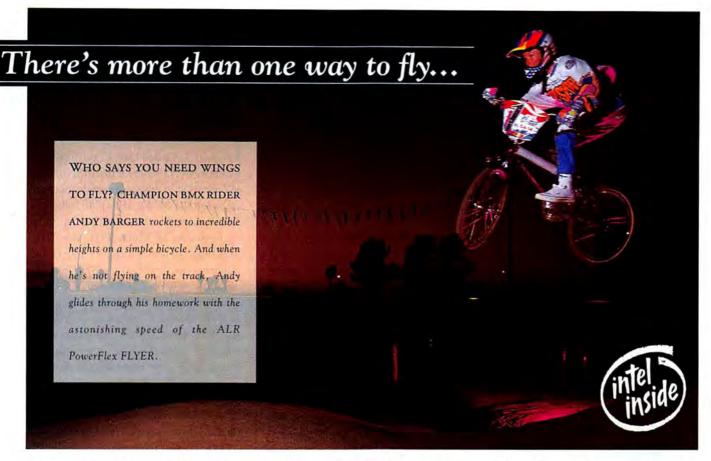
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lems to potential users.

David B. Trowbridge, Nashville

Editor's response: We're sorry about the problems you've encountered. Although some of our subscribers are able to run *Stacker* and *QEMM* with America Online, we recommend that you do not run communications programs, including America Online's software, on a stacked drive. As for memory manager conflicts, you may want to modify your AOL.BAT by adding /NOMEM

after the command KERNEL.

Then start up America Online, click the Setup button in the sign-on box, and select Advanced Setup • System Preferences. Click on the Computer icon, and turn off all extended or expanded memory in the Extra Memory Type dialog box. There have been documented reports of upper memory conflicts with the software.

America Online has been responsive to incompatibilities in its front-end software.

At press time, it was developing an enhanced GeoWorks version and a Windows version, which run with QEMM and Hyperdisk.—Bundy Chanock, Manager, On-Line Services

The Wrong MO

n your September 1992 review "Personal Rewritable Optical Drives," you listed the wrong model number for the IBM magneto-optical (MO) drive you tested. Your article listed the Model MD3125B, when in fact you tested the Model MD3125A.

Announced in March 1991, the MD-3125A was the first 3½-inch MO drive in the industry. The newer MD3125B offers significantly enhanced performance for the same price. The MD3125B is currently available to original equipment manufacturers for use in their systems and will be available as an option for PS/55 systems in the future. Had your tests been performed using the MD3125B, your review's conclusions would have been much different.

Michael F. Mitoma, manager, personal systems storage, IBM

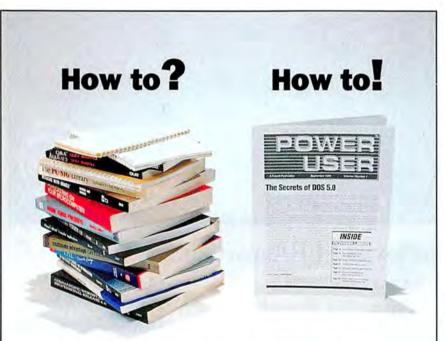
Editor's response: We did test the Model 3125A drive, not the Model 3125B listed in our review, as the 3125A was the only IBM drive available at that time. We plan to review the Model 3125B when it becomes available to users.

Corrections

The bulletin board number published in Consumer Watch (October 1992) for the Pittsburgh Area Computer Club was incorrect. The correct BBS numbers are 412/967-9452 and 412/771-5763.

In our October feature "The Less-Paper Office," we stated that Discoversoft's *Tree-Saver* program lets you fit up to 4 pages on a single laser-printed page. In fact, *Tree-Saver* can fit up to 32 pages on an 8½-by-11-inch sheet. Discoversoft can be reached at 510/769-2902 or 510/769-0149 (fax). *PC World* regrets the errors.

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so it now gives you more of the features you've been looking for in a Windows spreadsheet. Second, we

lowered the price to just \$495.* (Plus, for upgraders, and for a limited time only, we've included the SmartPics™ Clip-art Sampler absolutely free.)

Of course, when you come right down to it, there are plenty of other reasons why 1-2-3 for Windows is the

best spreadsheet choice you can make.

Its features and performance are better than ever.

1-2-3 for Windows now includes more than 25 new features and usability enhance-

ments, as well as a robust set of GUI development tools.

Recent performance enhancements also make 1-2-3 for Windows the fastest-printing Windows spreadsheet for Postscript* output. It also makes the most efficient use of system resources when handling 3D files.

Better still, we're offering license packs for network users so you can set up your network configurations more cost-effectively. All of which makes Lotus® 1-2-3 for Windows the best deal in a Windows spreadsheet.

It's a better transition from DOS to Windows.

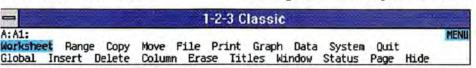
| Trains: GA25 Pet

Only 1-2-3 for Windows, with its built-in Classic Menu, lets you use familiar 1-2-3 commands whenever you choose. Excel, on the other hand, only supports 80%

of 1-2-3 Release 2.01 commands. And has no support for releases beyond.

What's more, only 1-2-3 for Windows offers

front-end tool of choice." Excel's data access capabilities rely on a third-



you a better compatibility bridge from DOS to Windows. And unlike Excel, 1-2-3 can read and

execute any 1-2-3 for DOS file, style and macro.

All of which means you'll retain your full investment in 1-2-3 for DOS files when you move to 1-2-3 for Windows.

Its 3D technology and external data access capabilities are better than Excel's.

In 3D technology, 1-2-3 is unsurpassed. It gives you easy access to 256 worksheets and lets you build true 3D formulas, Excel's Workbook is a mere imitation. That makes 1-2-3 for Windows a more powerful tool that truly helps you consolidate data, spot trends and make better, more timely business decisions.

Corporate Computing (8/92) wrote that "for the experienced 1-2-3 database user, 1-2-3 for Windows with DataLens is the

party product with limited relational capabilities.

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to help you better communicate through your spreadsheet; it'll do the same with any Windows application.



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Can One Call Solve it All?

n this age of clock doubler chips and super-fast 486s, we've come to expect what we want, when we want it—and that usually means now. But when it comes to software support, reality does not always meet our expectations. After-hours questions, jammed phone lines, and problems affecting more than one application are just a few things that can keep us from getting our questions answered promptly.

Software companies offer a variety of programs to address the demand for service. Fax-back options for frequently encountered problems, and bulletin boards where users can post questions and download information, are two of the most widespread alternatives.

But there are times when nothing can replace the sound of a human voice. What happens when you can't reach the company? That's where third-party software support comes in.

Time for a Change

Independent hardware maintenance firms have been around since the earliest days of mainframe computers, but third-party software support has traditionally been available only from a few major resellers who've offered the service to large corporate customers. Individuals and small companies looking for support alternatives were generally out of luck. Fortunately, this is changing,

Rising support costs for developers and dealers, coupled with the complexity of supporting a wide range of applications running together under Windows, has spawned a new market for independent software support. A handful of start-ups, together with at least one veteran player in the corporate support market, have begun offering such services to the long-ignored individual and small-business user.

Software Support, of Lake Mary,

by Roberta Furger

Florida, which began providing nationwide software assistance in October 1991, was one of the first to enter this new market. "Resellers were consolidating and a new channel-superstores-was emerging," says company president Joseph Jacoboni. "Mass merchandisers don't have the expertise or personnel to support customers," he notes. "And publishers, although they try to provide complete, accurate support, sometimes fall short."



It'll Cost You

Independent support firms offer a variety of payment plans: 900 numbers for impulse calls; three-month or one-year contracts that include unlimited access to a toll-free service line; and the purchase of a block of transactions to be used as needed over a year. Costs range from \$2.95 per minute on the 900 lines, to thousands of dollars for some of the annual contracts.

If you grew up in the era of free phone support, you may question the wisdom of paying for this service. But many software developers are starting to charge for phone assistance, says Lori Kleinman, manager of software support research at Dataquest/Ledgeway, a market-research firm in Framingham, Massachusetts. "Vendors are doing a lot of experimenting with pricing," says Kleinman, adding that developers such as Lotus and Aldus have started charging for support after a preliminary break-in period. Self-help support, such as fax-back or BBS services, are free, she notes. "But when you need personal attention, that's starting to cost."

The question then changes from if

you're going to pay, to who's going to get your money. If all your software comes from one or two developers, you may be better off using them

PC World Consumer Watch editor Roberta Furger

for all your support needs. But, if you're running applications from a host of companies, it may be more economical—and more efficient—to sign up with a software-support firm.

Software Support's Jacoboni argues that dedicated support firms are much better equipped than individual developers to handle questions involving more than one application. Third-party providers, he adds, have no vested interest in the answer to any software question. So users—in theory, at least—won't get stuck between companies fighting over a compatibility problem.

"We're willing to answer a broader range of problems," says Michael Arata, founder of PC Help, a new softwaresupport firm started by Anderson and Arata, in Sunnyvale, California. Targeting the home and small-business market, PC Help was scheduled to begin offering support through a 900 number

CONSUMER WATCH

last month. Technicians will do everything from talk users through a printing problem to advise them on how to optimize their system or select the right mix of applications. At \$2.95 per minute, though, you could wind up paying a hefty sum.

Third-Party Limitations

Not everyone is convinced, however, that third-party support is the way to go. With a few notable exceptions, third-party providers aren't really giving better service, says Jeffrey Tarter, publisher of Soft-letter, which sponsors a semiannual customer service conference for software developers.

It's a question of who has access to the information, according to Tarter. "On the really tough questions, the company's will have to bounce back to Microsoft or Lotus anyway. It really only works for sunset products—those that the developers have decided not to support with continued development."

Another downside of independent support: These companies rarely have access to beta software, so their support technicians may be learning a new application just when you most require their assistance.

One exception to this is Corporate Software, which recently began offering HelpLine Express, a new support service to individuals and small businesses. Corporate Software has been supporting Fortune 1000 companies for eight years. Since the company is also an authorized reseller of all the leading applications, it has access to beta software, and technicians will be familiar with new applications when they are released, according to Nathalie Cao, marketing programs manager.

There's only one way to determine if an independent provider is going to be able to answer all your software questions—give them a call. Fortunately, two of the firms—Software Support and Anderson and Arata's PC Help—have 900 telephone support, so you can test the service before you invest in it. Corporate Software doesn't offer 900 phone service, but you can buy "transactions" in blocks of as few as five.

Right now only a handful of companies provide nationwide, independent software support. But rest assured, if these pioneers are successful, more are sure to follow in their footsteps.

Shop Talk

Where's my Software?

In June I sent a check to Parsons Technology for their upgrade to version 7.0 of *MoneyCounts*. It was supposed to be shipped July 1 and I just found out it will be delayed for about six weeks. They wasted no time cashing my check, though.

Paul Keene, Oviedo, Florida

Editor's note: According to Anne Rawland-Warner, director of corporate communications at Parsons Technology, critical issues were brought up during the beta test cycle, which the company felt should be addressed before the upgrade was released. This decision delayed the shipment of *MoneyCounts 7.0* by six weeks. *It's Legal* was also delayed, due to difficulties in addressing the legal requirements for setting up a living trust (a feature included in the new release) in all 50 states. In both cases, said Rawland-Warner, the goal was to ship the "best possible product."

Rawland-Warner emphasized that everyone who ordered their upgrade through the mail received a postcard (as required by the Federal Trade Commission's Mail Order Rule) indicating that the product would be delayed. Customer checks were cashed before orders were shipped, she said, because they could be lost, stolen, or otherwise destroyed in the interim. Customers who pay by credit card, on the other hand, are not billed until the product goes out the door.

Rawland-Warner also indicated that customers can at any time check on the status of a product by calling the company's toll-free information line, 800/223-6925. Further, customers who have paid in advance of shipment can receive a full refund (including shipping costs) anytime before the product ships.

Support at Your Fingertips

Interested in investigating third-party support? Here's a list of companies that provide independent software support to individuals and small businesses.

Computer Hand Holding offers software support to small and medium-size businesses. Contracts are tailored to fit the needs of the client firm and can include everything from handling overflow support calls for companies with their own technical staffs to taking over support for an entire company. Computer Hand Holding, 1800 Market St. #91, San Francisco, CA 94102; 415/864-2343.

HelpLine Express from Corporate Software includes support on 800 Windows, DOS, and Macintosh applications. The service is available toll-free from 8 a.m. to 8 p.m. eastern time, Monday through Friday. Customers buy between five and 100 transactions, at a cost of \$25 to \$50, depending on the number purchased. Corporate Software, 275 Dan Rd., Canton, MA 02021; 617/821-4664.

PC Help provides technical support via a 900 line for \$2.95 per minute. The first minute is free while technicians assess your problem and determine if they can help. Service is available from 6 a.m. to midnight (Pacific time), Monday through Friday. Anderson and Arata, Inc. 599 N. Matilda Ave. #120, Sunnyvale, CA 94086; 408/746-3032.

Software Support, Inc. offers a variety of support alternatives for both PC and Macintosh packages. Customers can buy 90-day (\$49.95) or one-year (\$175) support packages for unlimited access to a toll-free hotline, which operates seven days a week, 24 hours a day. Service is also available through a 900 number for \$2.95 per minute. Businesses can contract with Software Support by buying blocks of calls or blocks of hours of service. Software Support, Inc. 30 Skyline Dr. Second Floor, Lake Mary, FL 32746; 407/333-4433.

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Lotus Organizer contains six tabbed sections that work together seamlessly to make you more productive. Entries can be instantly linked for fast cross-referencing. The Calendar displays your choice of day, week or two-week periods. You can include the durations of specific appointments to avoid conflicts and set an audio/visual alarm to alert you in any Windows application. Even supports e-mail!



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BDF5185 Lotus Organizer . \$99.90 286 or higher running Windows 3.0 or higher, 3MB of hard disk storage, VGA monitor and

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HALO Desktop Imager is the #1 solution for images in all your desktop publishing needs. Whether you're capturing screens for a User's Guide or importing images for a presentation, Desktop Imager is the one tool you can't live without. Everything you need is right here in this marvelous new product. Desktop Imager is not only a joy to work with (because of it's simplified menus and commands), its powerful and unique capabilities lets you do things you never thought possible. We fell in love with the Poster Print feature that lets you print an image up to a humongous 50-by-50 page poster.

You don't have to be a professional graphic artist to use HALO Desktop Imager. Even a first time user will be able to enhance their images so they'll look magnificent. HALO Desktop Imager has all the basic tools to make your color, black and white, or grayscale images sparkle with new life. Don't worry about different file formats because Desktop Imager lets you open, convert and save your files in the most popular file formats



Version 2.0 New Features

Desktop Imager Version 2.0 boasts a wide palette of image retouching tools, a new visual image file management interface called Gallery, full support for Kodak Photo CD images, color separation capabilities and improved integration with Windows-compatible applications, including Object Linking and Embedding (OLE) compliance and drag-and-drop support.

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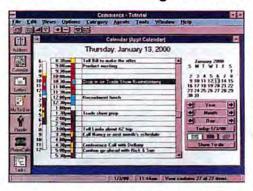
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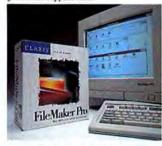
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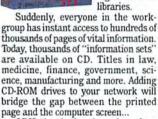
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nating bumps, bruises and jaggies from your scans. The Tray saves hours of tedious rescanning and image clean-up. It fits virtually all popular hand scanner



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BDF4603 The Tray \$39.95

CONSUMER WATCH

The Compiler That Wasn't

purchased Microrim's R:BASE for DOS compiler in August 1989. In fewer than six months, Microrim released an updated version of R:BASE for DOS 3.0, which was a major improvement, but the compiler was not compatible and was therefore of no value to me. I immediately contacted Microrim and asked what their plans were for a new compiler that would run with the updated database. I was told that the new

compiler would be out in six months to a year. After waiting well over a year for the new compiler, I gave up and asked Microrim for a refund. I was told I would receive it if I could show proof of purchase.

I obtained my copy of the original order, only to be told by Microrim that I couldn't get a refund unless I had a written statement by Microrim indicating that it was planning an update to the compiler.

Robert Kruppa, Cary, North Carolina

Editor's note: Microrim agreed to honor Kruppa's refund request. He received a check for \$540 for the purchase price of the compiler. According to Dennis Comfort, vice president of development and techni-



Some Quicken 6.0 and CheckFree users may find themselves unable to transmit their bank transactions because of an upgrade error between Quicken 6.0 and Ouicken 5.0.

Affected users include those who. prior to upgrading Quicken, completed year-end processing or changed their bank account number. In such cases CheckFree will simply reject the transaction and forward the user's name to Intuit, which will send a patch disk to the user.

Intuit has sent a fix disk to every registered Quicken owner.

Intuit

800/624-8724 (customer service)

After Dark for Windows 2.0

After Dark for Windows 2.0, the popular screen-saver utility, will not operate in DOS mode with the IBM 8514, the ATI Graphics Ultra, and other coprocessed video accelerators when using special drivers for DOS applications.

When drivers for such DOS applications as 1-2-3. WordPerfect, or Auto-CAD are loaded, video is switched to "coprocessor" mode, and AD-DOS .-COM, the DOS screen saver in After Dark, is unable to access the display.

Windows applications are unaffected by this problem.

Berkeley Systems is aware of the glitch, but no fix is currently available. **Berkeley Systems** 510/540-5535

-Richard Melville

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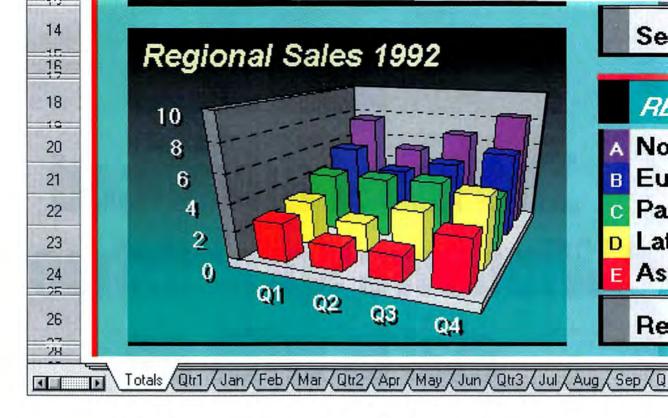
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The most advanced Windows spreadsheet starts with an elementary concept



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BORLAND



...Spreadsheet

Quattro Pro for Windows is the most usable spreadsheet ever made. Built with Borland's renowned object-oriented technology, Quattro Pro for Windows* is packed with hot new features you won't find in any other spreadsheet.

NEW! Spreadsheet Notebooks* with customizable Tabs are nothing less than a revolution in spreadsheet ease of use. Now you can intuitively organize and manage your spreadsheet data.

NEW! Object Inspector™ menus end the hassle of searching through menus. They're simpler than 1-2-3. Just click the *right* mouse button anywhere on the screen to get a list of what you can change and change it right there.

NEW! Database Desktop is the easiest way to incorporate dBASE® and Paradox® data into your spreadsheet. Just what you'd expect from Borland, the leader in database technology.

NEW! SpeedFill™ and **SpeedFormat™** slash setup time by automatically filling in spreadsheet headings and formats.

NEW! SpeedBars[™] are contextsensitive and customizable. SpeedBar icons give you pushbutton access to your most frequently used commands.

NEW! Presentation Graphics and drawing tools that rival those of Freelance and Harvard Graphics are built-in. You don't need to buy a separate graphics package.

YES! Compatible with Lotus 1-2-3 files, macros, and publishing styles and with Excel .XLS files.

Find your spreadsheet information in a flash!

From everyday tasks to complex projects, Spreadsheet Notebooks are the easiest way to work with your spreadsheets. By incorporating multiple spreadsheet pages in a single file (one notebook can handle



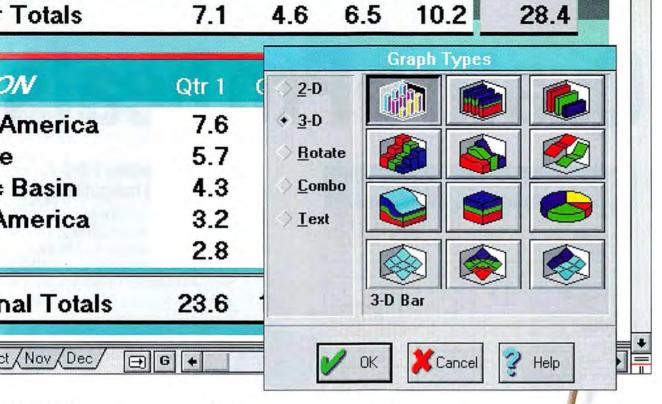
up to 256 spreadsheet pages), you can break any complex spreadsheet into easy-tomanage pieces. Assign meaningful

names to your notebook tabs and finding information is as easy as flipping through a notebook.

Notebooks are the smart way to do 3-D spreadsheets! You can present data in flip-chart style and format pages in a group, like chapters. Because you navigate easily, it's simple to build multi-page models.



Object Inspector



Notebooks

You may never open the manual

Ouattro Pro for Windows is the most usable spreadsheet ever. With Quattro Pro for Windows' object-oriented user interface, every action



you take is easier and faster.

Object Inspector menus let you make one-step changes to any object on your screen with just a click of the right mouse button-no more searching through layers of pull-down menus.

Context-sensitive, customizable SpeedBars™ give you pushbutton access to your frequently used commands. Drag and Drop lets you move or copy data instantly with the mouse.

Built-in graphics rival standalone packages

Quattro Pro for Windows gives you extraordinarily powerful graphics tools built-in. You'll never have to learn a separate graphics package.

Get 35 2-D and 3-D graph typeswith thousands of variations. Then enhance your graphs by adding text, lines, arrows, and built-in clip art.

Use the Slide Show and Light Table to create incredible electronic presentations. Arrange and rearrange slide shows in seconds and customize them with dazzling transition effects.

You can create 35mm slides and overheads, too. No other spreadsheet gives you all this presentation power.

*Quattro Pro for Windows and Spreadsheet Notebooks have patents pending.

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Quattro Pro beats

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Office 2h	Gausilee	io uuii t	Cumparc

FEATURE	QPW	EXCEL 4.0	1-2-3/W R1.1	1-2-3 R2.4	1-2-3 R3.1
ORGANIZATION					
Spreadsheet Notebooks	Y	N	N	N	N
Nameable Tabs	Y	N	N	N	N
Group Formatting on Selected Pages	Y	Υ	N	N	N
True 3-D Consolidation	Y	N	Υ	N	Y
EASE OF USE					
Right Mouse Button Formatting	Y	Υ	N	N	N
Object Inspectors	Y	N	N	N	N
Context-sensitive SpeedBars	Y	Y	Y	N	N
SpeedFill and SpeedFormat	Y	Y	A.	N	N
Drag and Drop	Y	Y	N	N	N
GRAPHICS AND PRESENTATIONS					
3-D Graphs	Υ	Y	N	N	N
Slide Show with Light Table	Y	N	N	N	N
Live Linked Graph Types and Formatting in Slide Shows	Y	N	N	N	N
DATABASE ACCESS					
Live View of Networked Database Tables	Y	N	N	N	N
Database Desktop	Y	N	N	N	N
CUSTOMIZATION					
Macro Buttons on Spreadsheet	Y	Y	N	N	N
Visual User Interface Builder	Y	N	N	N	N
COMPATIBILITY					
Reads Quattro Pro, Excel, 1-2-3 Files and Styles (including Allways & Impress)	Y	N	N	N	N
Runs Your QPro & 1-2-3 Macrost	Y	N	N	N	N
ANALYSIS					
Optimizer	Υ	Υ	Y	N	Y

*Requires add-in

†Some 1-2-3 macros may

GRAPH1



Only Quattro Pro for Windows gives > you a Light Table to arrange your electronic slide shows in seconds.

Outstanding 1-2-3 and Excel compatibility

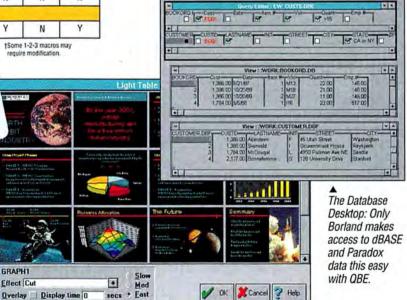
Ouattro Pro for Windows is the nextgeneration Windows spreadsheet. It is the only spreadsheet that gives you both innovation and compatibility with Lotus 1-2-3, Excel, and Quattro Pro. Quattro Pro for

Windows supports 1-2-3 files, macros, and publishing styles, including Allways, Impress, and WYSIWYG. It also supports Excel .XLS 3.0 and 4.0 files. What's more, Quattro Pro for Windows is much more compatible with 1-2-3 than Excel. For example,

unlike Excel, Quattro Pro formulas, ranges, and command actions (like moving blocks) work as 1-2-3 users would expect.

Fast database access to dBASE and Paradox

Only Quattro Pro for Windows gives you easy access to database information. Borland's unique Database Desktop™ lets you view, edit, and copy dBASE and Paradox tables directly from within Quattro Pro. And only Quattro Pro for



1-2-3 and Excel!

Windows has Query By Example, so you can ask questions about your data with point-and-click ease. Since it's from Borland, the database leader, you can count on it working right, even in network environments.

Create custom applications in minutes

Because of its object-oriented design, only Quattro Pro for Windows makes it easy to customize your spreadsheet. All the tools are there for you to create your own custom dialog boxes, powerful timesaving macros, and SpeedBars.

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Independent tests conducted by Usability Sciences Corporation find that two out of three Windows spreadsheet users tested preferred Quattro Pro for Windows. Don't settle for second best-get Borland's Quattro Pro for Windows today!

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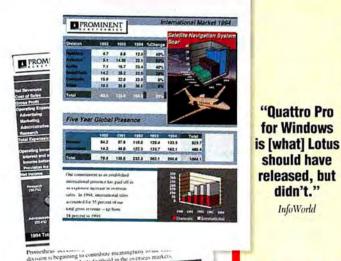
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InfoWorld

Software Craftsmanship

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CONSUMER WATCH

cal support, Microrim chose to move out of the compiler market and focus on enhancements to the R:BASE language.

No Questions Asked

As an attorney, I am far too accustomed to seeing companies take legal positions that, while strictly correct, completely ignore fairness and good business sense. AST Research is apparently not one of those companies.

Less than one month after the warranty on my AST Premium Exec 386SX/20 note-book expired, the monitor on my unit started having problems. The local service center told me the monitor was malfunctioning because of a small broken wire and that my only option was to replace the entire video screen, which would cost over \$600.

I called AST immediately, expecting to face arguments and excuses through several levels of management. I knew that AST was under no legal obligation to repair the unit or extend the warranty. On the other hand, what did I have to lose?

I explained my problem to an AST cus-

tomer service representative, who said he would have to discuss it with his supervisor. He returned in less than a minute to say the repair would be handled for free. No supervisors, no arguments, no threats of lawsuits.

In these price-competitive times, service and support will make the difference between winners and losers. If AST's overall business approach is the same as their response to my problem, I have no doubt they will end up in the winner's column. Steve Hearn, Tampa, Florida

It Sure Looks Like an Invoice

My wife serves as treasurer of our church and received an invoice from National PC Systems of Sherman Oaks, California, for an annual PC repair contract. Our church does not own a computer or related equipment, yet we have somehow gotten on their mailing list. I think this invoice-type form has been formulated to trick some unsuspecting treasurer into issuing a check for the "amount due."

Clair Wheeler, Dundee, New York

Editor's note: The "invoice" Wheeler

refers to is actually an application for service sent out by National PC Systems to solicit new business. According to general manager Debra Bryant, National PC Systems buys lists that are PC related as part of its direct-mail marketing efforts. "Nearly all our prospective clients have computers, but of course there is a small margin of error associated with any demographics or market research, "says Bryant. She added that the form Wheeler received says "Application, Nowhere on it does it say invoice."

Still, the form looks remarkably like an invoice—complete with a perforated section to be included with the customer's remittance. It's not hard to imagine how someone could mistake it for a bill.

Think you've gotten a raw deal—or a great one? Mail the details to Consumer Watch, PC World, 501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Consumer Watch; MCI Mail, PC World Editorial; CompuServe, 74055,412; or 415/442-1891 (fax). We'll investigate complaints and publish letters with the broadest interest.

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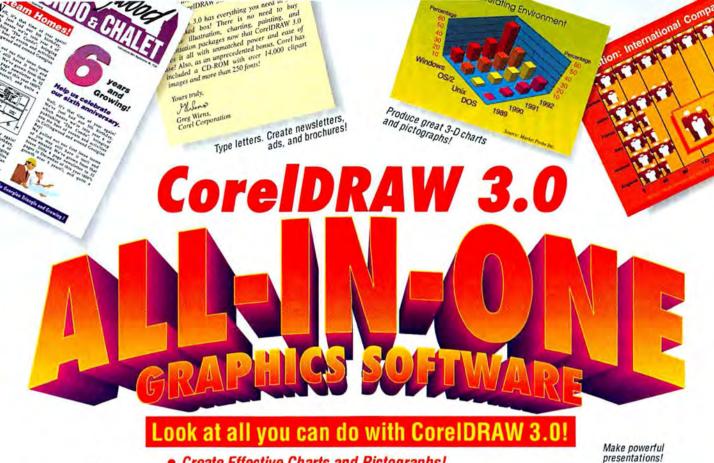
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How One Comm Software Company Can Give You The Best Of Both Worlds.

In a way, the folks who work in DOS and those who work in Windows™ are in different worlds, even though they're using the same basic systems. But when it comes to PC communications, there's one name that's world-renowned on both platforms: Crosstalk.*

World-Class. Times Two.

Crosstalk Mark 4
has been the top gun
in DOS comm programs for years. And
new Crosstalk for
Windows 2.0 has power
never before available
in any Windows comm
program—even Crosstalk.

You'll find an unsurpassed array of features in both programs. For instance, they're the only major comm software packages with FTTERM and IND\$FILE support for communication with IBM® mainframes-which comes in pretty handy when you're on a trip and you'd like your laptop to talk to your mainframe. Both support just about every protocol you could ever need, and terminal emulation for everything from. HP° to WYSE° to VT™320.

Crosstalk For Windows. On Top Of The World.

The original Crosstalk for Windows set the standard for Windows comm programs and was a recent PC Magazine Editors' Choice. And now, Crosstalk for Windows 2.0, completely redesigned and immensely improved, has jumped "far ahead of the last version" and advanced "the state of the art in modem software," according to PC World.

A new QuickBar™
tool menu turns common
tasks like initiating a file
transfer into a simple matter
of clicking on an icon. Our new
object QuickPad™ feature gives
even non-programmers an easy way
to design custom controls with objects
such as buttons, icons and pictures. Then
you can embed a text string or an entire
script into each object.

You can have multiple sessions running simultaneously. You can share modems on LANs. And you



QuickPads, a QuickBar and an intuitive user interface make Crosstalk for Windows downright fun to use.

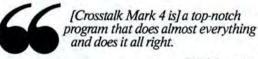
can remap your keyboard by simply moving keys on a graphical keyboard layout. Just drag and drop.

Crosstalk Mark 4. Superpower In The DOS World.

For the DOS power user who needs unmatched functionality, Crosstalk Mark 4 is the ideal choice. It supports multiple sessions, modern sharing on LANs, synchronous hardware and data transmission rates up to 115,200 bps.

Like Crosstalk for Windows, it has received a *PC Magazine* Editors' Choice Award. And *Lotus* magazine called it "the hands-down Big Daddy of DOS communications packages."





—PC Magazine, April 1991



Crosstalk for Windows sets the performance bar even higher for competitors in the Windows communications market.



mainframe on the road, with

FTTERM and IND\$FILE support Crosstalk products.

-PC World, October 1992

An Out-Of-This-World Combination.

In a mixed environment, with users running both Windows and DOS, Crosstalk can provide a perfect way to manage your communications. As we said before, both programs now offer unparalleled power. And they both share our CASL™ scripting language. So you can write scripts for your organization in Crosstalk Mark 4 that will also run in Crosstalk for Windows.

Bringing all your communications software together under one roof can simplify support, too. Because that roof covers a company whose excellence in support has been noted by reviewers and users throughout the PC world.

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It's a big world out there. But you can keep up with it, by using the best comm software on the planet. For a limited time, registered users of Crosstalk products can upgrade to Crosstalk Mark 4 for only \$75, or Crosstalk for

And corporate locations can purchase a single-user demo copy of either for the same prices.*

Windows 2.0 for only \$49.

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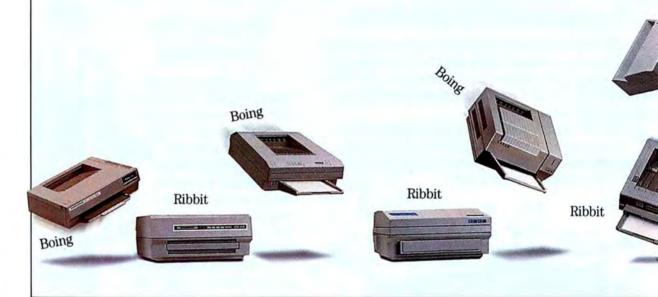














Of course, luck won't get them far. Because the new HP LaserJet 4 printer sets such high standards for performance, value and ease of use that no other laser printer comes close.

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With the HP LaserJet 4, HP has moved the standard for print quality from 300 dpi to Four times the dots for better resolu 600 dpi. That's

600 dpi

twice the old resolution, but at less than the old 300 dpi price.

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You can dress them up with 45 scalable typefaces built right in. No matter what kind of document True 600 dpi creates rich, full-dimensional you're producing, your needs are covered. You'll also find it is easier and cheaper to use. You don't

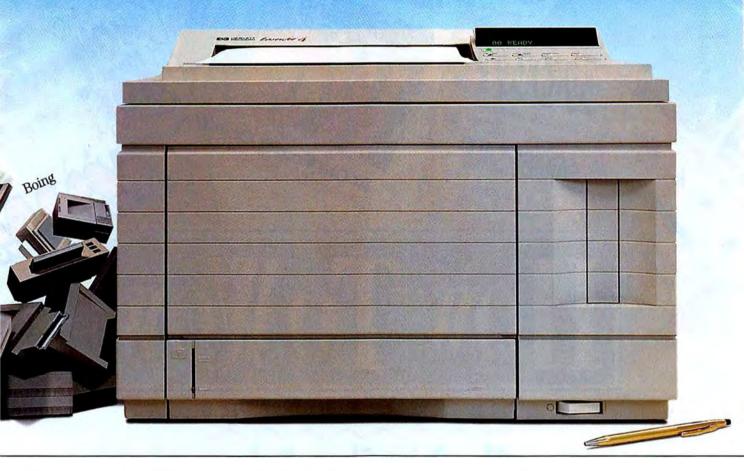
> have to hassle with downloading fonts or buying accessory typefaces.

More speed, trays, and flexibility. Thanks to a highspeed RISC processor, the HPLaserJet4 also sets new standards

for speed. It prints many complex documents at rated engine speed, and many 600 dpi graphics print at a true 8 pages per minute. It's faster on networks, too. And has 2 MB built-in memory and new memory management.



Introducing the HP LaserJet 4. Good luck, fellas!



It also makes you more efficient. Two standard paper trays give you a 350-sheet capacity. And there's an optional 500-sheet tray. So you can just keep on printing, instead of stopping to reload different sizes and types of paper.

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Faster Windows. True WYSIWYG.

Windows printing, for both text and graphics, is much faster with the LaserJet 4. We use fast vector graphics and we built Windows 3.1 TrueType fonts right into the printer. This means documents print faster and What You See Is *really* What You Get. It's one simple, seamless operation. All you do is sit back and watch your screen document appear quickly,

easily and accurately on paper.

You can't beat the LaserJet 4 printer for compatibility, either. It works with a wide variety of LANs and computers, as well as HP's PCL 5 printer language and



HP's optional PostScript Level 2 software from Adobe. And automatically switches between these languages.

And, of course, it offers complete document and software compatibility with the HP LaserJet III printer.

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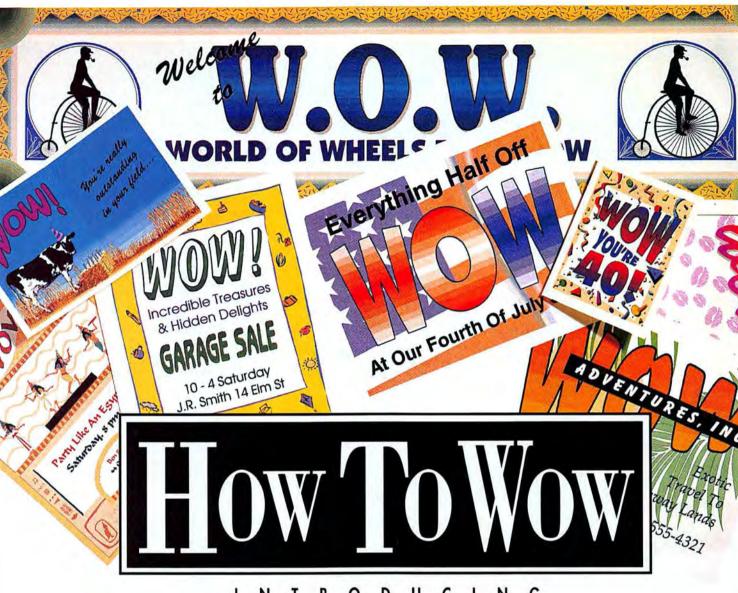
nearest authorized HP LaserJet dealer[†] Also ask for a print sample so you can see for yourself how great the output really looks.**



If it isn't a LaserJet, it's only a laser printer.



^{*}Suggested U.S. list price. †In Canada call 1-800-387-3867, Ext. 7132.** To have a LaserJet 4 printer data sheet sent immediately to you via fax machine, call 1-800-964-1291 from your touch-tone phone. Windows 3.1 is a product of Microsoft Corp. Adobe and PostScript are trademarks of Adobe Systems Incorporated which may be registered in certain jurisdictions.



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When Bad Things Happen to Good PCs

his month our quest to learn how real people address everyday technology management issues leads us to Andrew Z. Adkins III, consultant to law firms in Gainesville, Florida. Adkins, computer design engineer and publisher of *The Law Office Automator*; a newsletter for law offices, shares with us his formula for solving unexpected, unexplained hardware and software problems. His firm, Adkins Computer Engineering Services, specializes in helping law firms implement new technology. —Ed.

Here Comes Trouble

Don't expect your computing environment to be trouble free; even the most reliable applications and hardware can do bizarre things when you put them together. Incompatibilities, crashes, and other quirky foul-ups are inevitable, so I've come up with a step-by-step methodology for rooting out the causes. Whether the problem is in hardware or software, on a stand-alone PC or on a network, the troubleshooting process is basically the same.

If the solution to a problem isn't immediately obvious, I usually advise my clients to call the vendors, who keep extensive logs and bug reports. But as one of my clients discovered, this method is not foolproof. Whenever this client ran a networked legal program called *Perfect Practice* and wanted to shell out to load the *WordPerfect Office* calendar, *Perfect Practice* locked up. None of the vendors offered any help.

That's when I was called in to find a solution, which in this case was relatively simple to do. I checked the WordPerfect Office calendar manual and found that calendar alarms remain in memory once they're set; that is, setting alarms uses a TSR (memory-resident program). Knowing that loading a TSR in a program's shell will lock up the system (the very symptom the client was experiencing), I put a command into

AUTOEXEC.BAT that loads the alarm's TSR before any programs are running. Now when the client shells out of *Perfect Practice* to set an alarm, the TSR is already available and doesn't get loaded in the shell.

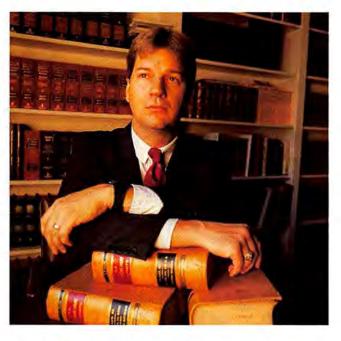
Unraveling that problem took a mere hour and a half. It was an easy one because my clients were able to duplicate it precisely. That's one of the first things I ask people to do, since I've found that if you can trigger the problem, you've got 80

percent of the solution. But if you can't do that, take extensive notes when the problem occurs. Note the type of computer, the application, and what sequence of commands you used within them. Find out how many people the problem affects and what they're doing when it occurs. I also urge system administrators to keep a log of any new hardware and software installed on their networks and on individual PCs. You can trace many problems to an installation or an upgrade.

Have Tools, Will Travel

My method for isolating a problem varies according to the situation, but I have a couple of tried-and-true tricks. After interviewing the people concerned and trying to duplicate the problem, I fill out an extensive checklist on the type of PC, how much hard disk space and memory are available, and what kind of software is being used. Then I print AUTOEXEC.BAT and CONFIG.SYS files so all the system information is gathered in one place.

I also bring in an arsenal of diagnostic software. I use TouchStone Software's



Check-It extensively to evaluate the hard disk, memory, modem connections, and video. Other helpful tools include some custom software that gives me a layout of the hard disk and size of

Andrew Z. Adkins III
of Adkins Computer
Engineering
Services

the directories, and *Memory Map*, a public domain utility found on CompuServe that lists what's installed in upper and lower memory. *Norton Utilities*' System Information tells me about the processor, coprocessor, and how much RAM and disk space the PC has.

These tools help determine whether hardware or software is causing the glitch. Say a user has installed a modem and the communications software doesn't work. A utility like *Check-It* can point out that the same hardware interrupt is accidentally being used for both the modem and the mouse.

If diagnostic software doesn't point you in the right direction, isolate each component systematically. In one particularly trying case, a client who was running a seven-node Novell network called me in because one Compaq

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workstation kept crashing. We replaced the workstation itself twice, and things worked fine for a while, but then the crashes started again. We decided to isolate the workstation by adding a network segment that connected it directly to the repeater. Still no luck—but that eliminated the PC and the cable as suspects.

Was it black magic, voodoo, or network goblins? We ruled out those possibilities and replaced the network card three times. As a last resort, we installed a network card made by a different manufacturer, and bingo—that solved the problem for good. We still don't know exactly what caused the crashes, but maybe the old network card was especially susceptible to electromagnetic interference from local CB dispatchers. To find out for sure would have required a network sniffer, which was too expensive.

Software problems can be tracked down in a similar manner. In the case of incompatibilities, first segregate the program you think is causing the problem. Just make backup copies of the AUTOEXEC.BAT and CONFIG.SYS files, pare down the originals so they refer only to the program in question, and then see if the problem recurs with a single application installed. If not, add the other applications one at a time until you hit on the troublemaker.

If I can't track down a problem myself, I spread the word about it. I talk to the vendors and post the problem on as many relevant BBS forums as I can think of. And when I find a solution, I share the knowledge by notifying all concerned parties, including software and hardware companies, clients, remote office sites, and BBS's. If we all contribute to building up the repository of technical knowledge, we'll all be able to track down solutions a lot faster.

If you use PCs to manage people and other resources in a business environment, we want to hear from you. Send your article idea—including a brief outline of your company, job, problem, and solution as well as your name, address, and phone number—to Real Problems, Real Solutions, PC World, 501 Second St. #600, San Francisco, CA 94107; or send it electronically to PC World Online, Real Problems, Real Solutions; or 415/442-1891 (fax); or call us at 415/978-3224. We pay \$300 per published column. Sorry, we cannot acknowledge unpublished materials.





No one else gives you so much upgradability in your computer.

Notice the extra row of pins in the CPU socket? Now you can upgrade from any i486 all the way to the 1993 super OverDrive processor based on Intel's Pentium' architecture. And the ZIF (Zero Insertion Force) socket makes it so easy!



The on-board SCSI option lets you add SCSI I or II devices anytime. SCSI hard drives, opticals, tape backups and more are easy to add FREE software. In addition to DOS and Windows, you now get the Lotus Organizer-the Personal Information Manager highly recommended by PC Magazine. Plus you get your choice of an additional popular Windows ular Windows

n additional popular Windows application fron Lotus. With all the free softwan you get with your ZEOS, you save hundreds of dollars.

ZEOS Gives You More.



You simply get more. For less. When everyone else began cutting prices by giving less, ZEOS had a better idea—use the very latest technology to design an entirely new line of high-performance upgradables that allow us to charge less while giving more. We did it and you'll love it!

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ZEOS was one of the first to offer truly high performance upgradable PCs. Now using the latest in high integration technology, we've made a good thing even better!

Start with the CPU of your choice. Select between the 486SX-25 or 33, the 486DX-33, the 486DX2-50 or 486DX2-66. Next year, if you choose, you can upgrade all the way to the new super OverDrive processor based

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Consider the Vertical Option. We can build your new upgradable system in our eight-bay vertical case. It comes complete with our high-capacity power supply and two cooling fans. Add only \$95.

CPU UPGRADABILITY IS ONLY PART OF THE STORY.

In their haste to cut features, the others seem to have forgotten about your future. That's why ZEOS provides eight expansion slots, high-capacity power supplies with built-in surge suppression, and six drive

> bays in our SpaceSaver desktop cases.

These are the features that will make the difference in your satisfaction down the road. And only ZEOS gives them all to you.

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ZEOS systems feature award-winning reliability and support. Details like builtin surge suppression and twin cooling fans make the difference. Awarded PC Magazine's Editors' Choice nine times!

features than ever before. Features like two VESA-standard local bus slots and a local bus video card for lightning-fast performance. Flash BIOS for easy BIOS upgrades via disk or modem. Optional secondary cache and on-board SCSI. And much, much more.

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Such as the two cooling fans you'll find in every ZEOS system. While ZEOS systems run cooler than most with one fan, we still give you two whisper-quiet ones. The cooler your system runs the longer it will last. We also include a built-in surge suppressor in every system. Of course every ZEOS system carries the Underwriters Laboratories listing as well. These are extra features the others can't or won't offer you. But you deserve them, and from ZEOS they're yours. No additional charge.

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And now, when you purchase any new ZEOS Windows-based system. you get DOS, Windows, and the new Lotus Organizer—the Personal Information Manager highly recommended by PC Magazine. You also get your choice of either Lotus 1-2-3 for Windows, Ami Pro, or Freelance Graphics. You'd pay hundreds of dollars for this software alone. And we're giving it to you absolutely free. Now that's ZEOS value.

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Ordering your new ZEOS upgradable system is easy. Simply give us a call. A friendly and knowledgeable ZEOS Systems Consultant is ready to answer any questions you may have. So take a closer look. You're going to love your new ZEOS system. We guarantee it!

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Want your computer now? Many of our most popular configurations are available for same-day shipping. Call for details!

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The only notebook with a tilt & swivel display. Great for sharing data or keeping it private. Easily adjusts for perfect viewing.



This fine Italian leather carrying case is an additional option.
Loaded with pockets and features everyone will appreciate.





Digital brightness and contrast buttons make screen adjustment so easy.

ZEOS® Freestyle/SL. More features at a lower cost than any other notebook.

To try and compare the new ZEOS
Freestyle/SL to any other notebook is next
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Features and price. It would seem the new
ZEOS Freestyle/SL is the best of all worlds. It is.

DESIGNED BY USERS. JUST LIKE YOU!

We asked our customers what it is they want in the perfect notebook. The first thing they told us is that most notebooks look like a cigar box with a lid. They told us they wanted not only good looks, but things like great power and great battery life. Lightweight too, like five pounds and change. And the keyboard should be effortless to use. The entire product had to be extremely durable. And that was just for starters.

SL POWER. SL BATTERY LIFE. 64K CACHE!

We listened well.

Then we got down to work. For the chipset and CPU we selected the Intel 25MHz SL. We then built in a high-speed 64K SRAM cache as standard. We know this system might well replace a desktop for many users.

And power to your ZEOS Freestyle/SL system is provided by our advanced battery system. The fully enclosed lightweight battery packs easily snap in and out and can be quick-charged when the system is not being used or tricklecharged when in use. So what happens when the power is on?

GREAT VIDEO TOO.

You get great video! Because for video control, we chose the amazing new Cirrus Logic VGA controller. It not only consumes less power, it also produces the fast crisp images you're looking for. And with a business machine like this you'll also appreciate our dual display capabilities. You can connect an external VGA color monitor for simultaneous co-display. And that's not all.

A NOTEBOOK KEYBOARD YOU'RE GOING TO LOVE.

We re-designed and re-sculpted every key from scratch. Even the key-switch mechanism was invented anew. And we added the mouse key for easy cursor control. It is the

absolute perfect notebook keyboard. What else?

Lots else! Like the best display system of any notebook available anywhere. We listened here too. The screen is big and easy to read. Plus, it's high contrast and it's fast. It's also very easy to adjust. People said contrast and brightness knobs were hard to use. So we replaced them with soft touch buttons that *electronically* adjust screen settings at your command. Then we really got creative.

THE ONLY NOTEBOOK WITH A TILT & SWIVEL DISPLAY.

Can you imagine your desktop PC without a tilt and swivel display? Neither

could we. So why not incorporate that feature into a notebook. With the ZEOS Freestyle/SL notebook you can adjust the screen left and right as well as tilt it up and down. Now you can truly adjust your notebook screen to the perfect viewing angle.

IT FLOATS TOO.

And then there is the "floating" screen. When you're facing your new ZEOS Freestyle/SL, the screen actually appears to "float" in the air in front of you. It's the only notebook that can really be used sitting on your lap!

EXTRA, EXTRA, EXTRAS. READ ALL ABOUT 'EM!

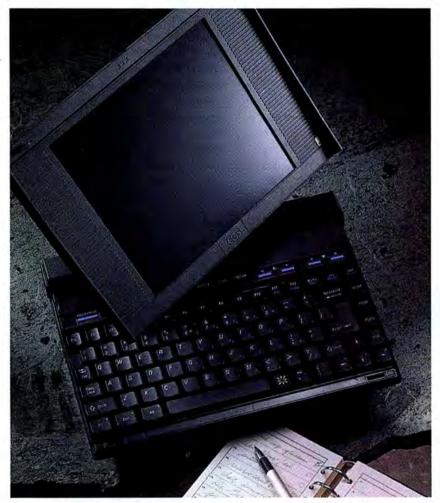
We've made more options available than ever before. Like our modem with send/receive fax. And memory up to 20MB, hard drives to 180MB, even an optional Italian leather carrying case! Extra batteries and a charging stand are available too. Call 800-423-5891 for all the details.

Built-in mouse key provides easy cursor control. Leave those bulky mice behind!



This sliding port door won't break off or come loose. Saves your fingers too.





ZEOS. #1 RATED NOTEBOOKS, SERVICE & SUPPORT!

PC Magazine recently surveyed notebook users for their Service and Reliability issue. Their findings? "Only ZEOS portable PCs achieved significantly higherthan-average ratings in all four categories." The categories were reliability, future purchase plans, repair service satisfaction and technical support. And remember, ZEOS technical support is 24 hours a day, 365 days a year, toll free. And we back your new ZEOS Freestyle with our 30-Day Absolute Satisfaction Money-Back Guarantee, One Year Limited Warranty and more.

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- Intel 25MHZ 386SL, 64K cache!
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- Snap-in and -out battery packs provide for a real 3-4 hours of typical operation or even longer depending on your applications.
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- in soft carrying handle.

 81-key keyboard with built-in full-size inverted "T" arrow keys.

 Serial, parallel and VGA ports
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Top of the News

THE WHOLE WORLD IN

Bill Gates's vision of Windows in every office and every home begins to come together with the shipment of Windows for Workgroups.

y many measures, Microsoft dominates the software industry. Its earnings are almost double the combined earnings of its next ten largest competitors. Its DOS operating system and *Windows* environment are standard on virtually every brand-name PC you can buy today. And *Windows* is moving into new markets as fast as they are conceived: Versions are available or under development for pen com-

puters, home entertainment

systems, video and sound,

multimedia, work group computing, and mobile computers. In the last year, Microsoft has pushed into a series of application areas—personal finance, low-end desktop publishing, accounting, and data management. As the ultimate testament to Microsoft's success, its founder and chairman, William Gates, is now a household name and the richest man in America.

But from the vantage point of Microsoft headquarters in Redmond, Washington, the world is fraught with com-

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ILLUSTRATION: JEFF BERLIN; BILL GATES PHOTO: MATTHEW MCVAY/SABA

Edited by Russell Glitman

HIS WINDOWS

petitive peril. IBM's OS/2 offers many functions Microsoft can only promise to deliver in its next-generation Windows NT. Novell's NetWare LAN operating system continues to dominate corporate networks, despite Microsoft's best efforts to promote LAN Manager: And while Microsoft has an offering in almost every field, it dominates no single application area. Looming over all this is the long arm of the Federal Trade Commission, which for the last two years has been investigating allegations of unfair trade practices by Microsoft.

Despite the FTC probe, Microsoft continues to compete aggressively, its current strategy driven by a single goal: to make Windows the interface to all digital information and devices. Toward that end, Microsoft has pushed to subsume within the operating system common functions now found in applications and network operating systems, such as fonts and print controls today and audio and video in the future.

So there was more than a little excitement last fall when Microsoft unveiled the core technology that will drive the next round of growth: Windows for Workgroups. In a lavish \$1 million production in New York's Gershwin Theatre, Gates himself demonstrated how this latest version of Windows working in conjunction with the new Access database will attain his goal to provide "Information at Your Fingertips."

Windows for Workgroups is a peer-topeer network that provides a way to extend existing applications into work groups rather than forcing people to learn a new way of working. It offers cross-application E-mail, group scheduling, and file and peripheral sharing using

Microsoft Mail and Schedule+, Microsoft's group scheduler.

Microsoft has already shipped a groupware version of *Excel*, and dozens of developers are lining up with versions of their products for *Windows for Workgroups*. In development at Microsoft are interim work group releases of current apps and add-ons such as a collaborative document creator, a form router, and a document manager.

The World Is My Work Group

To users, the work group versions of *Windows* applications will seem the same, with the important addition of mail-enabled features that let you retrieve data across a network without leaving the comfort of your favorite application. This capability is en-



News Monitor

WINDOWS-TO-MAC COMPUTING: With

Farallon Computing's Timbuktu for Windows 1.0 and Timbuktu for Macintosh 5.0, you can create a cross-platform peer-to-peer network of Macs and Windows PCs so users can share printers, exchange files, even remotely control each other's systems. Timbuktu works in conjunction with Novell Net-Ware, Microsoft LAN Manager, and Windows for Workgroups. It's \$199 per user (group discounts are available), and Farallon claims it supports most major ethernet, token ring, and Apple LocalTalk network adapter boards.

YOU SAY ODBC, I SAY IDAPI: Borland's proposed standard for universal data access is getting strong support from WordPerfect, Novell, and IBM-but not Microsoft. The company's Integrated **Database Application Programming** Interface-or IDAPI-would let users access various remote databases. Microsoft is pushing its Windows-based **ODBC** (Open Database Connectivity) technology as a way to accomplish the same feat. Products supporting IDAPI should start arriving in the first half of '93, vendors say, and will include WordPerfect 6.0 and InForms, Word-Perfect's new forms package. Future versions of OS/2 and Borland's Windows products will also support IDAPI.

DOS 6.0 ALTERNATIVE: So who needs 6.0 anyway? IBM is bundling fullfledged data compression and memory management software with each copy (continued on page 45)



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hanced by Microsoft's Access database and Object Database Connectivity (ODBC), a specification that enables users to perform data queries from Windows applications to gather information residing on a PC, Mac, or mainframe.

These system-level communications enable data and feature mobility across applications. The connections will be further extended with new versions of Dynamic Data Exchange and Object Linking and Embedding and the introduction of a common macro language, and will expand further as *Windows* programs and languages become more object-oriented. With the arrival later this year of Windows NT, the new capabilities will be extended to non-Intel systems.

With such products at hand, the days of stand-alone applications will effectively end. "The work group is a growing phenomenon that will drive the use of PCs," asserts Gates, adding, "All [future] Microsoft applications will be work group applications, [and WFW is] a way for that to come true before we get to their next revisions." As common application services are drawn into the operating system, users will benefit

from more consistent operation and interface, just as on the Macintosh.

Users React

Users watch the drama with mixed reactions. Bill Lodge, project manager at \$3 billion Turner Corporation and an early champion of Windows, feels "a little uncomfortable having all my eggs in one basket" and is now considering competing products too.

Howard Sobel, executive director of the 4000-member WUGNET (Windows User Group Network), has greater misgivings. "With Microsoft applications everywhere, what happens to those companies that can't find shelf space?" he asks. "If there is no diversity, it will stifle imagination and software growth in the long run."

How far does Microsoft's strategy to put Windows everywhere extend? Microsoft's Modular Windows is aimed at the much



WINDOWS IN THE FIELD: Turner Corporation's Bill Lodge, once a Windows champion, now considers competitive alternatives.

larger world of consumer electronics. It will do for copiers, faxes, TVs, and toasters what Windows 3.1 does for PC applications, promises Executive Vice President for Products Mike Maples—tie different digital devices together. Says Maples of Microsoft's strategy: "It is the whole idea of human beings knowing a small set of fundamental commands that allow them to operate a large set of seemingly disparate things."

-Mike Hogan

Microsoft's Financial Clout

Fall quarter revenues and profits for business software leaders (in millions)

Company	Revenues	Profits
Microsoft	\$818	\$209
Others	\$1026.70	\$95.41
Novell ²	\$243	\$66
Lotus	\$207	\$7.33
WordPerfect	\$154	n/a
Borland	\$128	\$5.4
Autodesk ⁴	\$85.5	\$10.6
Adobe	\$63	\$6.7
Symantec	\$43.7	-\$5.9
Aldus	\$45.3	\$1
Software Publishing	\$35.1	\$0.7
Artisoft	\$22.1	\$3.6

¹Not including WordPerfect profits. ²Quarter ended August 1. ³Without sale of Sybase stock. ⁴Quarter ended July 31.

Source: Software Industry Bulletin, companies

Let the Good Times Roll in Redmond

Times are tough all over, except in Redmond, Washington, where Microsoft continues to reap nothing but sales and profits. Its 41 percent increase in revenue to \$818 million during the fall quarter and a 45 percent rise in net income to \$209 million is typical for Microsoft these days. Its revenue is almost as large as the combined revenues of the next ten largest software developers, and its profit is almost twice as large, even though it doesn't dominate a single software category (see chart).

While DOS software sales sputter, U.S. sales of *Windows* apps zoom: 181 percent to \$526 million in second quarter 1992—and more than 70 percent of the boxes sold (\$379 million for the quarter) had Microsoft's logo on them, reports the Software Publishers Association.

How does Gates do it? Anticompetitive channel practices? Secret application calls to the operating system? That's for the FTC to decide. More likely, say analysts, Gates is just cleaning up on *Windows*, the environment he pushed alone for years until it finally took hold in May 1990.

One key to Microsoft's success is its ability to attract other vendors to develop Windows applications, points out Sanford Bernstein research analyst Michael Kwatinetz. Another strength is Microsoft's ability to guide the direction of operating systems and be three to six months ahead with applications, adds Jesse Berst, editor and publisher of Windows Watcher.

Video Hits the Desktop

TEST DRIVE

Constant improvements in system price/perfor-

mance could make digital video a desktop standard within a few years, and Microsoft has signaled its intent to dominate the nascent field with its \$199 Video for Winvideo using VCR-like controls, edit and compress it, and save it as an Audio/ Video Interleave (AVI) file. A new version of the Windows Media Player rolls the results. Video for Windows has simple editors for bit maps (to touch up individual frames,

> for example), wave form audio clips, and image color palettes, as well as a CD ROM of sample AVI files and a handy media browser program.

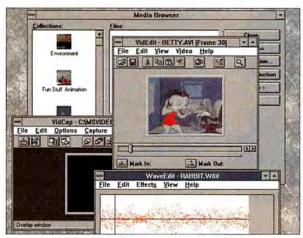
Installing Video for Windows is quick and painless. Learning how to capture and compress video for simple functions, such as creating a Windows Cardfile directory containing a low-resolution clip of all employees, isn't too tough. Creating a dazzling sales presentation by captur-

ing video of your company's product in action, then merging it with CD-quality audio, narration, animated graphics, and titles using a sophisticated program such as Adobe's Premier can be quite a bit more challenging. And learning to use VidEdit's wide range of controls for optimizing playback takes plenty of trial and error as well.

AVI drivers for Windows and the updated Media Player should be available on CompuServe as you read this, making every Windows machine a potential AVI video player. AVI movie moguls can distribute their works on disk or over LANs and can embed movies in documents using OLE.

All that media will require unprecedented hardware, however, Video-laced documents will chew up memory, and unless you're equipped with accelerated hardware, you're unlikely to get the full effect of AVI playback, particularly the base resolution-an 8bit, business-card-size display running at a jerky 15 frames per second.

-Scott Spanbauer



VIDEO FOR WINDOWS bundles several miniapplications that let you capture and tweak video files and their sound tracks.

dows digital capture and playback program.

Video for Windows' stand-alone utilities include VidCap, which uses digital video and audio capture hardware such as Creative Labs' Video Blaster and Sound Blaster to grab VCR, camcorder, or laser disk output. VidEdit lets you preview captured

Video for Windows

Capture, edit, and play full-motion video under Windows.

Key Features

- VidCap capture program
- VidEdit editing and compression utility
- Bit map, audio, and palette editors
- Sample file CD ROM and browser

Availability

November 1992

Pricing

Microsoft Corp., 206/882-8080

Reader service no. 750



News Monitor

(continued from page 43)

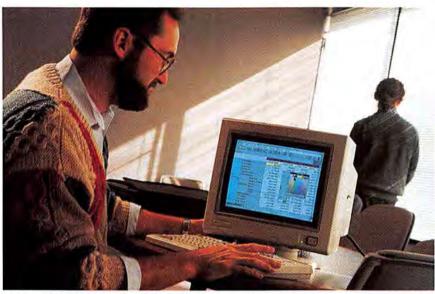
of DOS 5.0 it sells. The \$135 package (\$74 for competitive upgrades) includes Stac Electronic's Stacker 2.0 for data compression and 386Max version 6, a memory manager from Qualitas. IBM's DOS 5.0 bundle, which includes a \$49.95 offer to upgrade to Stacker 3.0, is designed to match many of the features expected in Microsoft's upcoming DOS 6.0.

CYRIX CPU: Cyrix rolled out its first 486SX pin-compatible processor, the Cx486S2-50. Equipped with a writeback cache and larger write buffers than those on Intel processors, the chip will outperform Intel's 486SX-33, Cyrix claims.

HIDDEN PC COSTS: Despite declining hardware prices, hidden support costs are rising and can inflate the annual tab for buying, networking, and maintaining a PC to \$20,000 per year per system, according to a personal computing study by Nolan, Norton & Company, a Boston consulting division of KPMG Peat Marwick. The Itemized annual bill breaks out as follows: \$2000 to \$6500 for PC products and support staff, and an eye-popping \$6000 to \$15,000 for the often-overlooked time spent by savvy PC users helping other PC users. Those costs can only go up as companies install increasingly complex PC networks and reduce in-house support staff. "Management needs to budget for the cost of support-if it's not being provided by

Top of the News

Improv: A Financial Modeling Tool



IMPROV WILL HELP USERS understand the purpose and logic of sophisticated financial models, says Improv group product manager Jeffrey Anderholm.

otus Development's Improv for Windows 2.0 is a powerful financial modeling tool that promises to bring a new dimension to spreadsheets and make them more useful for a variety of managers. That's because Improv makes it easier for different users to view the same model and receive information specific to their needs, says Improv group product manager Jeffrey Anderholm. For instance, managers with different responsibilities can select how the same data is displayed. This allows a sales manager to see sales by region while a production manager can view sales by product category.

According to Anderholm, *Improv's* power lies in its ability to employ user-defined categories, such as time period, department, territory, or account code, to construct models for multifaceted business units. *Improv* targets organizations where expert users create and maintain spreadsheets (or groups of related spreadsheets) for use by several analysts or managers within the organization. Lotus found that spreadsheet sharing was a unique work style that demanded a distinctive new spreadsheet application.

"Users told us that conventional spreadsheets made it too difficult for other users in the organization to understand the purpose and logic of sophisticated models," Anderholm said, "so we made the product selfdocumenting." With *Improv*, you define your data categories and their relationships within the spreadsheet, and all cell formulas are expressed in terms of category names. (Categories are roughly equivalent to dimensions.) If the manager of quality assurance wants to look for trends in vendor

The Edit Create Wartsheet Tools Window Help

Diversified Holdings

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IMPROV GENERAL FORMULAS are self-documenting, ensuring reusability and easy maintenance.

performance in a large spreadsheet created by someone in cost accounting, she can quickly zero in on the relevant figures by dragging category icons around. Another bonus: Because you don't have to manually copy cells ad infinitum—a notoriously tedious and error-prone process—*Improv* should enhance efficiency and accuracy.

Improv can handle 12 categories in one spreadsheet and display three dimensions using the row/column/page structure of 1-2-3 for Windows. Each data category can contain eight grouping levels. (For instance, if the category is based on geographical divisions, territories might be grouped into districts and districts into regions.) You can drill down to successively lower levels of detail by double-clicking. Improv will let you link and save as many as 100 worksheets and create up to 16 views of each worksheet. Though Improv will read and write 1-2-3, Excel, and ASCII files, 2.0 will not access external databases.

Despite *Improv's* sophistication, Anderholm promises a very intuitive interface. Though its menu structure will not resemble that of 1-2-3 for Windows, it will reflect the evolving Lotus "common tools" standard for Windows applications by including a tool bar, context-sensitive menus, and hooks to E-mail and Lotus Notes.

Due to ship in the first quarter of 1993 and retail for \$495, *Improv* promises to

empower users with a flexible financial tool that lets everyone view the same data from their own perspective. Says John Donovan of WorkGroup Technologies, a market research firm in Hampton, New Hampshire, "Improv is really an analytical product, a tool for gaining insight," he says. "It's almost as if you can stick your hands into the data and knead it into whatever shape you want."

-Ralph Soucie
Reader service no. 751

Buyers Face Local Bus Choices

ven as the first wave of VESA local bus (VL-bus) computers reach the market, Intel's competing local-bus standard, the Peripheral Component Interconnect (PCI), is nearing completion. By summer, VL-bus systems will no longer be the only solution to computing bottlenecks, but they will likely remain the least costly.

VL-bus and PCI both use the processor's local bus instead of the system's I/O bus (whether ISA, EISA, or MCA) to pump data quickly between the CPU and peripherals. Yet the two standards diverge in both design and philosophy, forcing buyers to consider their future computing needs



FOR WUGNET DIRECTOR RAY ELSETH, installing a local-bus card is easier than choosing a local-bus standard.

when weighing local-bus options.

VL-bus is an inexpensive, immediate way to speed video and one or two other components. The simple design directly connects the processor to peripherals but can induce performance-sapping wait states above 33 MHz. Most 486 VL-bus systems now sell for between \$1900 and \$3300, close to the existing ISA price point.

"Today's issue is, will it run, will it crash, will it run software without revision?" says Ray Elseth, director of on-line operations for WUGNET (Windows User Group Network). "Tomorrow's issue is, will three peripherals bring VL-bus to its knees?"

PCI uncouples peripherals from the processor, with a managing layer that monitors and routes data. The design allows efficient, high-speed transfers called bursts, which move large chunks of data between components and alleviate wait states. This complex, signal-buffered design delivers greater expandability and a more certain path to future 64-bit processors, making it ideal for desktop video and fiber-optic networking.

"PCI will have an advantage because it will be perceived as a more robust system," says Erik Blom, a senior analyst at market research firm International Data Corp. in Framingham, Massachusetts. "But you've got the VL-bus stuff ratified and on the market now 8 to 12 months before PCI."

With the finishing touches still being put to PCI, the VL-bus is emerging as the early leader. Companies like Gateway 2000, Hyundai Computer, Austin Computer, Zeos Int'l, and Tri-Star are shipping VL-bus computers. And others will follow as peripheral and motherboard designs are completed.

But without optimized cards, a VL-bus PC is like a sprinter in hiking boots. ATI was first to enable VL-bus video with its Ultra Pro accelerator card, and boards from Diamond Computer, Hercules, STB,

Orchid, and Artist Graphics are on the way.

PCI systems are still a ways off, though companies such as Compaq, IBM, NEC, and NCR are solidly committed to the standard. And peripherals makers are now entering the fray. Though PCI systems may not compete with VL-bus machines on price, PCI's comprehensive design and feature set may make it a better long-term solution, according to market analysts.

Regardless of how the standards fare, the competition will eventually deliver more solutions to those looking to improve computing performance. Says Elseth, "Once again, it's a generic search for speed. And local bus is just one answer."

-Michael Desmond



News Monitor

(continued from page 45)
the [information systems department],
it's being provided by other users,"
said Brian Pappas, senior manager at
Nolan, Norton. This study examined ten
large U.S. organizations, including
Xerox, Ford Motor Company, and Harvard University.

TECHNOLOGY PRESIDENT: If the Clinton administration can convert campaign rhetoric into political reality, PC users stand to benefit in numerous ways:

- Proposed infrastructure improvements, such as a high-speed, high-capacity communications network, could provide a national BBS. Potential business uses include on-line bidding and procurement services and the transmission of full-motion video for training and teleconferencing.
- Easing government regulatory pressures could expedite the reallocation of the radio spectrum by the FCC. This could pave the way for nationwide wireless data services—you could receive a fax or E-mail over the airwaves, anywhere, anytime. Another wireless service, known as Personal Communications Services, which operates almost like a cordless telephone, would let you easily network PCs or hand-held devices.

On the downside, Clinton's protectionist policies could backfire, leading to trade wars, tariffs, and escalating PC prices. Stay tuned.

> -Jeff Bertolucci, Mike Hogan, Randy Ross

High Quality From a Small Printer

Small, light, quiet, cheap, and fast: The new BJ-200 bubble jet has just about everything you could ask for in a low-volume personal or home-office printer. That includes laser-quality text and graphics at about half the cost of the cheapest laser printer. In fact, the BJ-200 is priced only a tad higher

than many dot matrix printers.

The standout in the new line of PCs and printers that is being launched this fall by the newly created Canon Computer Systems, the BJ-200 is only about half the size and weight of the average printer. At 13.7 inches wide, 6.8 inches deep, 7.6 inches high, and 6.6 pounds, it's hard to distinguish from Canon's earlier BJ-20 portable bubble jet, and it's certainly more schleppable than its main com-

Canon BJ-200

A combination of speed and laser-quality imaging at a dot matrix price.

Key Features

- 360 dpi
- 4-ppm speed
- 6.6 pounds
- Bread-box size

Availability

Immediate

Pricing

\$549 (\$350 to \$380 on the street); BC-02 printhead/ink cartridge \$22 each; LBP-8sx \$2395 (about \$1400 street); LBP-4sx \$1595 (street \$900)

Canon Computer Systems, Inc. 800/848-4123, 714/438-3000 Reader service no. 745 petition, the 14-pound Hewlett-Packard DeskJet 500. Unlike other Canon portables, the BJ-200 uses batteries and has built in input and output trays.

The Minilaser

You'll have to devote a remarkably small portion of your desktop to get 360-dpi text and graphics, which print at the pace of an entry-level personal laser—about 4 pages per minute. The BJ-200 picks up speed from its 16-bit controller and a new 64-nozzle printhead that drops ink twice as fast as other Canon models. (The head speeds up while crossing blank sections of the page.)

The printer uses quick-drying ink, so the printhead moves closer to the paper for higher resolution, particularly along the curves in letters and graphics. The BJ-200 offers a combination of ten fixed fonts (including Prestige and Courier in three modes—draft, IBM Proprinter X24E, and Epson LQ-510). And this printer is whisper quiet, averaging between 40 dB and 42 dB.

The BJ-200's built-in sheet feeder handles 100 sheets of 17-to 28-pound paper—from regular copier paper to high-cotton bond—with a straight paper path that reduces jamming, bending, and curling. You can also load ten business-size envelopes. Each BC-02 printhead prints approximately 500 pages and costs about \$22.

The BJ-200 lists for \$549, but you should be able to find it for \$350 to \$380, a tad cheaper than the street price of either the HP



or Canon's similar

BJ-20 portable, whose modularity and battery-driven operation add a small price premium. In fact, the BJ-200's street price is about the same as that of Epson's new 9-pin dot-matrix FX-870 and half that of most personal lasers.

Lasers Too

Canon has also put its own label on laser printers for the first time. The \$1595 4-ppm LBP-4sx and the \$2395 8-ppm LBP-8sx use Canon engines and come with HP LaserJet PCL5 emulation, resolution enhancement, and 1MB of RAM.

CANON'S BJ-200 DESKTOP INK JET—laser quality output

Both printers automatically sense and switch between PCL5, Epson FX-850, IBM Proprinter, and Diablo 630 emulations and between serial and parallel ports on a FIFO basis. The LBP-8sx, which is more appropriate for small work groups, also has two HP-compatible font cartridge slots.

All in all, Canon's new entries are rich with features and competitively priced—definitely a good first effort.

-Mike Hogan

Coordinated housing ar dents. Supervised a staf n changing a 78-year-old ng pets in dormitories. S Host Cat" and "Host Dog th dormitory adopted a f eet residents.

hanged among production testing purposes. Yield ponse to better soil prepa development of improved ies. Crop rotation systems er crops. The rice plant re ecially nitrogen.

PRINT QUALITY of Canon's 360-dpi bubble jet (left) falls short of the HP LaserJet 4's 600 dpi (right), but it's about a fifth the price.

Has been greatly exaggerated

DOS is still the preferred operating system on over 80% of the PCs in Fortune 1,000 companies, according to recent studies.

Bring Windowing Advantages to DOS.

Many Fortune 1,000 companies are using DESQview™ as the best solution for keeping the dependability and familiarity of DOS programs and adding multitasking, windowing productivity. DESQview users give up nothing—since it actually runs MS Windows better

should users wish to run Windows programs.

As you may know, DESQview 386 has been around for years, evolving into a highly efficient multitasking, windowing environment that extends the power of DOS, giving you increased productivity while conserving precious memory and disk space. In fact, the vast majority of 386 and 486 PCs need no additional memory or disk space to run DESQview.

DESQview 386 gives you pre-emptive multitasking like OS/2, but with 1/2 th of the disk space and 1/2 th of the memory requirements. It gives you windowing like MS Windows, but with greater speed and efficiency and fewer 'crashes.' And DESQview lets you use a mouse or stick to the keyboard.

You Create the Standards; We Follow.

We've never been confused about our role. We believe software companies exist to make your job easier and your working day more productive. When publishers step out of that mold and begin to tell you what hardware you need and that you should throw out



somebody else's perfectly good software—well, they simply are not operating in your best interest.

Software publishers don't create standards. You do. And whatever standard you choose, we support it.

If you like a program that only runs in MS Windows, like Wordperfect for Windows, DESQview 386 supports your choice. If you prefer a spreadsheet that runs in DOS, Lotus 1-2-3 Release 3, for example, we support that too. In fact, DESQview 386 lets you run

your favorite DOS and Windows programs side-by-side.

Have Your Cake and Eat It, Too.

DESQview 386 comes with QEMM-386, the number one memory management utility, and Quarterdeck Manifest, the award-winning memory analysis and monitoring program. Between them, they assure you every last 'K' of memory is put to use* In many cases, QEMM can mean the difference between running the TSRs you want and not having enough memory.

And DESQview is an open doorway to the future, too. Our next step up, DESQview/X, opens your PC to a network full of possibilities, including graphic workstation standards—X Window System software—all while retaining the compatibility of DESQview.

If you're as committed to DOS as we are, and feeling left out by the so-called industry leaders, take heart. There's no reason to leave DOS. If more productivity is what you need, we can provide it.

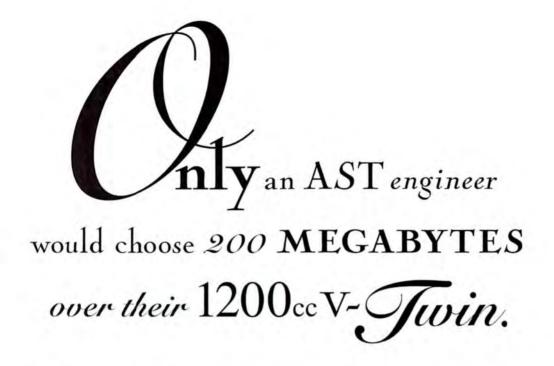
Quarterdeck helps you get the most out of the hardware and software you own today.



Quarterdeck Office Systems, 150 Pico Boulevard, Santa Monica, CA 90405 (310) 392-9851 Fax (310) 314-4219 Quarterdeck International Ltd., B.I.M. House, Crofton Terrace, Dun Laoghaire Co. Dublin, Ireland Tel. (353) (1) 284-1444 Fax: (353) (1) 284-4380

* DESQview makes multitasking and windowing available to users of 286-class machines with similar memory efficiencies through QEMM-50/60 for IBMTM PS/@ 50 and 60 users and QRAM for other 286 users.

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As you can see, our employees are a passionate lot. Who else would give up (voluntarily, mind you) a day on the open road to spend it, instead, glued to a new systemboard design? And the results of this passion? Look no further than the AST PowerExec." A notebook that actually adapts to the work habits of the user-powering down selected functions between keystrokes and other periods of system

inactivity. The power saved can then be used to upgrade the PowerExec in ways previously only seen in desktops. We call it Intelligent Power Management, and it's just one of the breakthroughs that's made us a *Fortune 500* firm with sales over \$1 billion. Proof that when you'd rather hover over a keyboard than a set of handlebars, anything can happen.

Discover how our obsession can meet your PC needs. Call 800-876-4AST.

AST. COMPUTER

The Product Of Our Obsession.



POWEREXEC

SMART

Intel 386SL/25 or 486SL/25 microprocessor, with AST Intelligent Power Management.

> POWERFUL 4MB of RAM, 64KB cache.

> > FLEXIBLE

Flash BIOS, Removable Hard Drive, Docking Stations, Security Locks.

VERSATILE

Two credit-card-sized, industrystandard PCMCIA slots for simultaneous connectivity to networks, modems, faxes and other peripherals.

UPGRADABLE

To Intel 486SL (32-bit, 3.3-volt) processor. Removable Hard Drives to 200MB, RAM expansion to 20MB, optional passive and active color displays.

RESPONSIVE

To learn more, call 800-876-4AST (4278). We'll answer your questions right away.

FAST

1958 Harley Davidson Duo-Glide Panhead. 1200cc V-Twin with swingarm frame. Optional, of course.



WordPerfect Enters Groupware

o category of software is harder to define than groupware. Is it peer-to-peer networking? Form routing? E-mail, scheduling, and calendaring software in one package? Depending on who you talk to, you'll get a different answer.

Products such as WordPerfect
Office 4.0 and Microsoft's Windows for Workgroups have
jumped onto the groupware
bandwagon, joining dozens of
E-mail, calendaring, and information-sharing programs such
as Futurus Corporation's Futurus Team WAN, Reach Software's WorkMan, and Powercore's Network Scheduler 3.

The latest entrant, WordPerfect Office 4.0, is scheduled to ship in early 1993. An integrated E-mail, calendaring, and scheduling program, it will run on Macintosh, DOS, and Windows PCs initially, with support for OS/2, UNIX, and VAX/VMS platforms under development, according to WordPerfect officials. Office 4.0 includes the client side of InForms, a formdesign program for filling in and routing electronic forms across local or wide area networks. Users can send forms via E-mail



WORDPERFECT OFFICE 4.0 combines E-mail, calendar, and scheduling software into one application.

using WordPerfect Office 3.1 or 4.0, cc:Mail, or Microsoft Mail and write reports directly to databases in formats such as dBASE, Paradox, and ASCII.

Corporate PC buyers are impressed. John Miller, a computer systems specialist at a Fortune 500 aerospace firm in Dallas, Texas, plans to install Office 4.0 on 40 percent of his company's 10,000 PCs. Word-Perfect is marketing Office 4.0 as a powerful alternative to Windows for Workgroups, Microsoft's new peer-to-peer networking environment. While WFW provides only limited Email and network access to DOS clients, Office 4.0 offers the same features to DOS, Mac,

and Windows users alike, Word-Perfect says.

Another potential groupware competitor is Lotus's Notes, which currently requires an OS/2 server to run. However, Lotus officials see considerable differences between the two products. "WordPerfect Office has very specific application capabilities like electronic mail and calendaring," says Cindy Lavoie, Lotus product marketing manager in Seattle, Washington. "There's a greater flexibility with Notes. It allows you to build your own applications, like information sharing, routing, and tracking."

That sounds a lot like the next version of WordPerfect Office. Indeed, Lotus might be feeling the heat from Microsoft and WordPerfect entering the groupware market. The company recently started selling a tenpack version of Notes with ready-to-run sample applications "to give people an idea of the types of things [Notes] can do," says Lavoie. The company is developing versions of Notes for Novell NetWare as well, scheduled for release in 1993.

-Jeff Bertolucci

The CD ROM as Printing Press

Philips' CD ROM recorder is a digital press that lets you "publish" your own CD ROMs so your company can digitally distribute or archive data from financial databases to catalogs to software.

The power of the press doesn't come cheap. The CDD521CW CD Recorder lists for \$7995—and you'll also need a big, fast hard disk if you plan on mastering huge databases to CD ROM. Note too, that unlike with a hard disk, you can write to it, but you can't erase data. Still, blank write-once 600MB CD ROMs from Philips and other suppliers cost about \$40, or under 7 cents a megabyte.

Installing the recorder isn't for amateurs. You need to hook up a SCSI adapter, install drivers, modify your CON-FIG.SYS and AUTOEXEC.BAT, and run initialization programs. You also need at the least a 25-MHz 386 and a 19ms hard disk. But if you need to digitize your data distribution and archiving, this is the first CD ROM press for under \$10,000. CD Philips CDD521CW CD Recorder, **Philips Consumer Electronics,** 800/835-3506.

Reader service no. 746

-Robert Luhn

Groupware: A Wide Range of Options

Need: Electronic mail

Examples: Lotus cc:Mail, Futurus Lite Mail, Microsoft Windows for Workgroups, WordPerfect Office 4.0

Need: Calendaring/Scheduling

Examples: Powercore Network Scheduler 3, Campbell Services OnTime for Windows, Microsoft Windows for Workgroups, WordPerfect Office 4.0

Need: Platform for developing client-server applications across wide area networks

Examples: Lotus Notes, NCR Cooperation, DEC Teamlinks

GROUPWARE RANGES WIDELY from simple electronic messaging to complex form routing.

The Philips CD ROM Recorder

PC MAGAZINE NAMES MICROGRAFX WINDOWS DRAW BEST BUSINESS ILLUSTRATION SOFTWARE!

"Picking a winner from among these business illustration packages was an unusually easy task.

"Only one of the products we reviewed, Micrografx's Windows Draw 3.0 plus OLE (\$149.95) offers both

October 27, 1992

• the functionality and user-friendliness that business users and other nonartists require.

"Windows Draw's interface is so slick Windows Draw 3.0 plus OLE and unpretentious that

	Basic Illustration	Type Handeling	Color Handeling	Business Presentations	Price
Windows Draw 3.0, plus OLE!	Excellent	Good	Excellent	Excellent	\$149.95
Arts & Letters Apprentice	Good	Excellent	Good	Fair	\$169.00
Computer Easy draw	Fair	Fair	Good	Poor	\$149.00
Key Draw! Plus	Good	Fair	Good	Good	\$79.95
Key Draw! Plus for Windows	Fair	Poor	Fair	Fair	\$79.95

it is easy to overlook the power under the hood. The program has virtually everything you need in a business illustration package."

> PC Magazine Editors' Choice October 27, 1992

Get Windows Draw! 1-800-653-1720

GRAF M

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PC Tools 8.0 Offers the Ultimate DOS Tool Kit

TEST DRIVE

PC Tools 8.0 bulges with

8.9MB worth of utilities for everything from managing your files and hard disk to launching programs, safeguarding data, recovering from disk disasters, and improving your system's performance.

This upgrade to one of the most popular utility programs

PC Tools 8.0

The popular DOS utility adds a memory manager, virus protection, and drag and drop.

Key Features

- Improved DOS Shell
- New memory utility
- Central Point Anti-Virus

Pricing

\$179, upgrades \$69.95 Availability

Immediate

Central Point Software 800/445-4208, 503/690-8090 Reader service no. 747 offers RAMBoost, a new memory manager utility for 386 and higher CPUs that works with EMM386, QEMM, 386MAX, and Netroom.

Used with EMM386, the memory manager that comes with DOS 5.0 and Windows 3.0 and 3.1, RAMBoost automatically configures upper memory to maximize the conventional memory available for DOS programs. Used with any memory manager, it automatically configures upper memory each time you make changes to your AUTOEXEC.BAT or CONFIG.SYS files.

PC Tools 8.0 includes Central Point Anti-Virus. You can detect and remove more than 1300 viruses. The telecommunications module now has ZMO-DEM support, though it still lacks a dialing directory.

In the DOS shell, you can launch a program by dragging an associated data file onto a program item in the applications menu. You can also drag



PC TOOLS 8.0'S HEX EDITOR is one of many sophisticated tools for enhancing your system's performance and safeguarding your data.

files to the viewer or editor, to Anti-Virus, or to Backup.

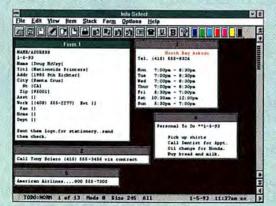
Central Point lets you keep your 7.1, 7.0, and 6.0 menus and configurations and is almost infinitely customizable. You can choose a graphical or text interface, select long or short menus, or create menus.

The program includes a sector editor, a low-level reformatter, a parallel file transfer utility, file encryption, task switching, fax support, remote computing capabilities, and specialized repair tools for the data files of specific applications.

PC Tools 8.0 lists for \$179; upgrades are \$69.95. If you plan on sticking with DOS, it's a great program. If you're running Windows, you may do better with Norton Desktop for Windows or with the forthcoming PC Tools for Windows.

-Reid Goldsborough

Info Select: The Swiss Army Knife of Information Managers: Micro Logic's Info Select for Windows is a powerful, free-form personal information manager (PIM) that lets you organize and keep track of random pieces of information—the kind that you scribble on slips of paper, the back of someone's business card, or maybe an old ATM slip.



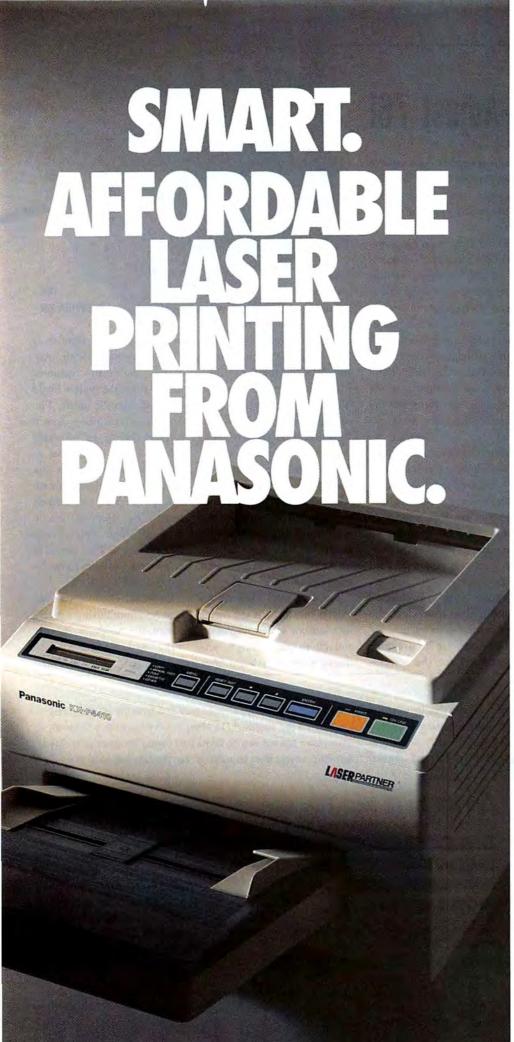
INFO SELECT places random information in variable windows that you can easily retrieve.

You record information in windows that pop up with a mouse click and are automatically filed in a stack along with other miscellaneous information. You can create up to 64,000 information windows in each stack, and each window can contain up to 32,000 characters. A keystroke gives you a list of stacks, and with a mouse click you can search a selected stack for a single word or perform Boolean searches. Info Select also lets you import and export data as either ASCII text or comma-delimited databases.

InfoSelect has a phone dialer, time and date stamping, a tickler that opens any information window at the time and date you choose, an address capture utility, and 20 fill-in-the-blank form templates. You can create your own or modify the existing ones.

If your desktop is covered with paper clutter, notes, and to-do lists, Info Select will help bring order to that chaos. It's \$149.95; a five-user LAN pack is \$599.95. Micro Logic Corp., 800/342-5930, 201/342-6518.

Reader service no. 748



You may have noticed most personal laser printers are pretty much the same.

So although you'd like a personal laser to adapt to your way of working, it's mostly the other way around.

So, besides lots of fonts, speed, and paper capacity, we gave our KX-P4410 personal laser printer two features you'll find intelligent indeed. One lets you proof the first copy of a multiple printout, before outputting the remainder. The other is automatic shutdown, for those of you who use delayed printing. Together, they help you print intelligently. And complement the PCL 4-compatible 4410's full range of features that give you the look you want.

Like 28 internal fonts, sideloading font card. 512K standard memory, expandable to 4.5 megabytes. And flexible paper handling, with a 200-sheet multi-purpose cassette, accommodating letter and legal sized sheets plus envelopes without changing cassettes. All this and a true 5 pages-perminute print speed!

You'll find these same features on our PCL 5-compatible KX-P4430...and more! For example, 8 outline and 28 bit-mapped fonts; 1 MB RAM expandable to 5 MB; and our SatinPrint™ resolution enhancement.



Panasonic* personal laser printers. Performance by design. For the Panasonic dealer nearest you, call us toll-free at 1-800-742-8086.



Printers, Computers, Peripherals, Copiers, Typewriters and Facsimiles.

LPC-PCD

Circle 232 on reader service card

Acer's Easy-to-Adjust 76i

TEST DRIVE

Acer's Acer-View 76i is

the most easily adjustable monitor ever built. The 17-inch, microprocessor-controlled flat-panel display has a street price of just \$999 and delivers sharp large-screen graphics and loads of advanced features. But its key feature is on-screen control. Instead of tweaking tiny

knobs or negotiating a maze of push buttons hidden behind a trapdoor, you make video adjustments by clicking pop-up icons.

Three buttons on the monitor's front panel give you access to all the on-screen overlay icons you need to make adjustments. Push one button, and up pops the first icon bar. Subsequent presses step you through a tree of related icon groups. When you reach the icons you want, a second button on the front panel lets you select the desired adjustment, while the third lets you increase or decrease its value. A bar graph shows where you are on a scale of 1 to 100 for brightness, contrast, and so on. No more guessing about which direction to go or how far. The AcerView 76i automatically removes the overlay from the screen a short while after you've finished adjusting. If you're in a hurry, a fourth button can clear the overlay settings instantly.

The AcerView 76i has three adjustments for the screen's

ind a video pp-up noni-

color tem-

perature-

a feature

normally found only in more expensive monitors such as Mitsubishi's Diamond Pro 17 and NEC's MultiSync 5FG. Like the tint control on your TV, this function lets you change the image's hues-great for matching on-screen colors to those your printer produces. And unlike Mitsubishi's and NEC's temperature adjustment schemes-which have you hold a template in one hand and the user manual in the other-the AcerView 76i's color adjustments are done from the screen using one button.

The AcerView also has an overlay that displays the monitor's current screen resolution and refresh rate—handy for setting up a new video board. Shift

in image size and position is a common problem with largescreen multiscan monitors: Every time the video mode shifts, so does the image. The AcerView remembers screen settings for up to 32 video modes-about three times as many as most multiscans can. Unlike most multiscan monitors, the AcerView uses a gentle fade-in to eliminate screen breakup when you change video modes. The range of video modes extends to noninterlaced 1280 by 1024.

If cost or lack of features has kept you from buying a bigger screen, the AcerView 76i may make you do a double take.

-TJ Byers

THE

ACERVIEW 76i

Acer AcerView 76i

Acer's easy-to-use 17-inch monitor gives more for less. Key Features

- Street price under \$1000
- On-screen menus simplify use
- Has features usually found only in costlier monitors
- Flat screen

Availability

Immediate Pricing

\$1249

Acer America 800/733-2237, 408/432-6200 (fax)

Reader service no. 749

Cyrix Offers 386DX Upgrade: Intel's OverDrive chips offered a path to speedier performance, unless you were one of the thousands of people with an older 386DX-16, -20, or -25 whose only CPU upgrade options were a speedup board, a new motherboard,

or a new system. Now Cyrix's 486DRu and 486DRu² offer an economical solution.

Cyrix's 486-pin-compatible replacement modules feature a 1K on-chip cache. The 486DRu modules come in 16-, 20-, and 25-MHz speeds. The 486DRu² modules with OverDrive-like clock-doubling technology have internal processor clock speeds of 32, 40, and 50 MHz.

Cyrix CPU Upgrade Boosts Performance

SYSmark performance of 486DRu² vs. Intel chips



Source: PC World Test Center, SYSmark is a performance index derived from scripts run in 11 popular applications

We upgraded a Compaq Intel-based 386-16 in the PC World Test Center with the 486DRu² (16 MHz) and ran the BAPCo SYSmark benchmark and our own PC World Test Center *Windows* suite. The 486DRu² scores were impressive, but they are not up to conven-

tional 486 performance levels. The 486DRu² SYSmark was 43 percent faster than the i386-16 but still 45 percent slower than the average SYSmark of ten Intel-based 486SX-25s.

Cyrix will initially market the \$300 486DRu and 486DRu² to corporations with minimum orders of 500 units. By next summer, it should be available on retail shelves.

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- support for 64 grey shades; and simultaneous video support

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- **Ethernet-compatible high-speed communication port for LAN connectivity **82-key keyboard with 12 full-size function

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ing device. Others offer a tiny control that seems designed for Lilliputians.

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 3 5" I 44MB internal floppy disk drive

- S open 16-bit ISA slots
 One 5.25" accessible drive bay
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ZENITH DATA SYSTEMS

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Zeos and Gateway VL-Bus PCs Offer Speed and Performance for Windows



THE ZEOS UPGRADABLE 486DX2-66, available in a range of processor flavors, offers a high-speed VESA local bus for optimal Windows performance.

Two popular mail-order firms, Zeos and Gateway 2000, are among the first to deliver with systems supporting VL-Bus, the Video Electronics Standards Association (VESA) local-bus standard. Gateway's 4DX2-66V and the Zeos Upgradables feature the wide 32-bit VL data pathway, so instructions for today's graphical applications can zip between CPU and subsystems at processor speed instead of having to squeeze through the outdated AT bus.

With the Zeos Upgradables you have a choice of 486SX-25, 486SX-33, 486DX-33, 486DX2-50, and 486DX2-66 processors,

while Gateway offers only Intel's 486DX2-66 in the VL configuration-but at a rockbottom price. The standard 4DX2-66V includes 8MB of RAM, a 340MB hard drive, and a 15-inch monitor for \$2995. while a comparably configured Zeos is \$3430.

Colorful Resolution

Backed by a full megabyte of VRAM, these systems' SVGA controllers for the VL-Bus send and receive data from CPU and memory at up to 32MB per second, making your Windows screen redraws snap to attention-even for large spread-

sheets or high-definition CAD/CAM drawings. Gateway not only gets fast response, it also gets more colors from its ATI-designed video subsystem-up to 65,536 at 640 by 480 and 800 by 600 resolutions, or 256 from a palette of 262,144 at 1024 by 768 and 1280 by 1024. The Zeos VL-compatible video card also goes to 1280 by 1024 resolution, but it maxes out at 256 colors from a palette of 262,144 at the lower resolutions. Each system has a second 32bit VL slot for a LAN adapter or other heavytraffic peripheral.

The Zeos monitor actually tops out at 1024 by 768, but Gateway's Crystal Scan 1572FS goes all the way up to 1280 by 1024 and has a non-

glare flat screen, which reduces distortion in the corners to give the kind of edge-to-edge display that resolution demands.

All the Fixin's

Both companies also include local-bus IDE connectors on their motherboards. The Micronics motherboard in the Gateway 4DX2-66V has two such connectors to accommodate up to four IDE hard drives. On the other hand, the Zeos motherboard accepts two IDE drives and adds a socket for a \$49 SCSI adapter option. Both also include six open 8/16bit AT slots as well as the stan-

dard 1.44MB and 1.2MB floppy drives. The Gateway system comes with a 64K external RAM cache, while the Zeos offers a 128K option for \$149 and 256K for \$298.

Both Gateway and Zeos bundle DOS 5.0, Windows 3.1, a Microsoft mouse, and other software choices. With Gateway, you can pick one of seven major applications that include Microsoft's Excel 4.0, Word 2.0, Powerpoint, Office; and Borland's Paradox. Zeos throws in two from among Lotus's 1-2-3 for Windows, Ami Pro 3.0, and Freelance for Windows.

As if to put cherries atop these desktop sundaes, both systems include a 238-pin upgrade socket on the motherboard that will accommodate the as-yet-unannounced Intel Pentium-based OverDrive processor. With either unit, you'll have one of the fastest, most upgradable PCs on a desktop.

-Mike Hogan

Gateway 4DX2-66V

A hot local-bus system at a rock-bottom price.

Gateway 2000 800/523-2000, 605/232-2000 List price: \$2995 Reader service no. 601

Zeos Upgradable 486DX2-66

A local-bus speedster that's built for upgrades.

Zeos Int'l Ltd. 800/423-5891, 612/633-1325 (fax) List price: \$3430 Reader service no. 602



THE LEXMARK IBM COLOR JETPRINTER PS 4079 offers sharp ink jet output, PostScript, and a conveniently small footprint.

Business users looking for a color printer have faced a dilemma: Color ink jets were affordable, but their quality was poor; thermal transfer printers produced great output but were prohibitively expensive. Two recently announced products, however, may put an end to this impasse.

The new Lexmark IBM Color Jetprinter PS 4079 is Lexmark's first foray into the color market, and the company's not fooling around: Its stated goal is to dethrone the king of the color ink jets, Hewlett-Packard's PaintJet XL300.

The two machines are strikingly similar. Both list for \$3495. Both use four color inks (eyan, magenta, vellow, and black), so you get true blacks. Finally, both handle a variety of paper sizes, from envelopes to 11-by-17-inch ledger.

So how does Lexmark intend to distinguish the Jetprinter from HP's Paintlet? First, the Jetprinter prints at 360 dpi, compared with the PaintJet's more typical 300 dpi. Higher resolution can make a big difference in color output quality,

because finer dots can mean smoother transitions between hues and better color mixing. The Jetprinter samples we've seen look sharp, with bright colors, fine lines, and little of the bleeding inks common in ink jet printing. Second, the Lexmark is significantly smaller than the HP. At just 16 inches deep by 20.5 inches wide, it

takes up roughly 45 percent less desk space than the PaintJet. Third, the Jetprinter comes with PostScript, while you pay extra for it on the PaintJet.

Fargo is a dominant player in the field of industrial-strength bar-code printers, and the Primera marks the company's first attempt to enter the mainstream PC market. It's an impressive debut. The Primera is a thermal transfer printer, which means it uses thin sheets of wax-based ink that melt directly onto the page for sharp, bright output. Previously, the cheapest printer in this class was a \$3999 unit from Seiko. The Primera's price: \$995.

How did Fargo do it? For one thing, it omitted PostScript, which virtually every other thermal transfer printer uses. The Primera also lacks a network interface, and it's limited to letter- or European-size paper.

These limitations aside, the Primera is very impressive. Its

Lexmark IBM Color Jetprinter PS 4079

A color printer with 360 dpl and true blacks.

Lexmark Int'l Inc. 800/358-5835 List price: \$3495 Reader service no. 603

Fargo Primera

This incredibly low-priced thermal transfer printer lacks PostScript but matches ink jet quality.

Fargo Electronics, Inc. 800/321-2233. 612/941-7836 (fax) List price: \$995 Reader service no. 604

output is not as striking as that of more expensive thermal transfers printers, but it easily equals samples from ink jets costing hundreds more.

-Dan Miller

Double-Speed CD ROM Drives From Texel

Texel's newest pair of CD ROM drives boasts some of the fastest performance times we've seen: a speedy 265-millisecond average access time, which is useful for grabbing scattered information off text databases, and a 300-kilobit-per-second sustained transfer rate, ideal for multimedia applications.

Designed for applications like animation, 3-D modeling, and video that demand high-speed transfer of huge data files from the CD ROM to the PC, Texel's new drives are nonetheless affordably priced: \$499 for the internal DM-3024 model,

\$599 for the external DM-5024.

Both drives comply with the Multimedia PC (MPC) and CD ROM XA specifications. CD ROM XA allows audio and data to be synchronized. You can play audio CDs on either drive.

Texel has made several enhancements to keep its new drives clean. The lens mechanism is self-cleaning; a plastic film encloses the chassis; the input/output connectors extend outside the chassis; and after you drop a disk into the caddy, a door covers the slot automatically-all to keep dust at bay.

Texel sells the DM-3024 and

DM-5024 separately as well as in a variety of software/hardware combinations.

-Jeff Bertolucci

Texel DM-3024, DM-5024

Two high-speed CD ROM drives from Texel designed for multimedia applications.

Texel 800/886-3935, 408/980-1840 (fax) List price: DM-3024 \$499, DM-5024 \$599, Multimedia Pro Bundle \$1499 Reader service no. 605





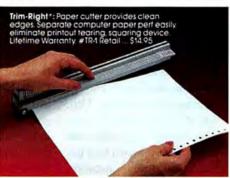












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Hewlett-Packard Launches Network-Ready Vectra 486N Line



HEWLETT-PACKARD'S NEW CPU-UPGRADABLE VECTRA 486N features a proprietary local bus for faster graphics action.

Hewlett-Packard is taking solid aim at the network crowd with its new line of Vectra 486N PCs starting at a list price of \$1599. Priced to compete with low-cost offerings from Compaq, Dell, and AST, the latest HP Vectra systems feature upgradable 486 processors, accelerated local-bus video, and flexible, networkready configurations.

HP has divided its new line into four processor-based families. The entry level 486/25N systems feature a 25-MHz 486SX processor and sell for \$1599 with an 80MB hard disk. The 486/33N follows with a 33-MHz DX chip and a \$1999 price tag. At the high end are the 486/50N and 486/66N—clock-doubled 50-MHz and 66-MHz systems with roomy 170MB hard drives; they list for \$2499 and \$3099, respectively.

All these PCs are designed and sold with networking in mind. The 25N and 33N systems are available with a preinstalled token ring or HP Ether-Twist adapter and include full technical service and support from Hewlett-Packard. HP markets network node configurations that ship sans hard drive—cutting at least \$450 from units with permanent disks—as well as full-function systems outfitted with 85MB and 170MB IDE drives.

And look fast—HP is bringing speedy graphics to its network systems, equipping them with a 32-bit local-bus graphics

Hewlett-Packard Vectra 486N Series

A 486 family of network ready PCs offers easy upgradability and local-bus graphics.

Hewlett-Packard Co. 800/752-0900 List price: \$1599 to \$3099 Reader service no. 607 adapter to run your video at system processor speed. While the local-bus subsystem does not comply with the VESA VL-bus standard, it accelerates graphics at resolutions as high as 1024 by 768 pixels.

While the systems come ready to upgrade, with RAM expandable to 48MB from a 4MB base, the 486N PCs have

limited board expansion. With just three ISA expansion slots on the motherboard, a system with a preinstalled network adapter will accept just two additional boards. On the processor side, you can boost performance in the 486/25N and the 33N PCs by installing Intel's clock doubler chips.

-Jim Forbes

OCEAN Offers MO for Your Dollar

A Best Buy in the September 1992 review of rewritable magneto-optical (MO) drives, the OCEAN Microsystems Vista 128 received praise for fast performance and excellent design. Now OCEAN introduces a higher-capacity Vista with twice the storage and all the speed of the Vista 128 for just a few hundred dollars more.

The new Vista V256 can store 254MB of data on a single-sided-only cartridge that's about the size of a 3½-inch floppy disk, only twice as thick. As with a floppy, a sliding metal shield protects the optical media, and you can remove the cartridges from the front of the drive by pressing a button.

You wouldn't buy a magnetooptical drive to replace your
hard drive. MO drive access
times are roughly two to three
times those of a good Winchester; for example, the Vista
boasts a 35-millisecond access
time, compared to the 12ms to
18ms times of today's hard
drives. However, magnetooptical drives' durability and
compact, removable media
make them ideal for graphical
applications (where storing
huge desktop publishing or pre-

Vista V256

OCEAN Microsystems' new magneto-optical drive doubles the storage capacity of its earlier drive.

OCEAN Microsystems Inc. 800/944-6232, 714/891-8484 (fax) List prices: \$1724 internal, \$1774 external Reader service no. 606

sentation files is a must), for sound and video files, and for large databases.

OCEAN Microsystems sells 128MB cartridges for \$69; the 256MB cartridges cost \$89—twice the storage for an extra \$20. And since the Vista V256 reads, writes, and formats Vista's 128MB cartridges, you can upgrade without losing your valuable data—or your investment.

When purchased directly from OCEAN Microsystems, the Vista V256 costs \$1724 for the internal unit and \$1774 for the external—about \$300 more than the Vista 128. All of the Vista units come with a connecting cable, formatting software, and a cartridge.

-Jeff Bertolucci

1992 Awards Presented to Freelance Graphics for Windows



April 1992
"...outperforms the competition."



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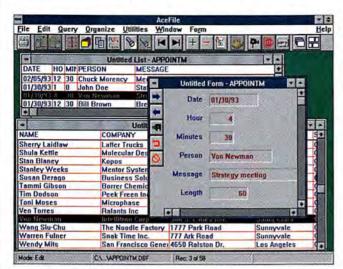
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Lotus

Freelance Graphics for Windows

Take Your Pick From Three Personal Windows Databases



ACEFILE 2.0'S IMPROVED INTERFACE features a collection of colorful icons, and the program gives you more flexibility when linking files.

The Windows database market is finally getting interesting, and not only at the high end. If you would rather not sacrifice the money and hard disk space that the new breed of applications such as Paradox for Windows and Microsoft Access requires and if you don't plan to be hand-coding full-fledged applications, then read on.

AceFile 2.0

AceFile's reputation is built on easy, immediate, spreadsheet-like access to dBASE data, with few perks beyond mail merge, cross-tabs, and graphs. With version 2.0, Ace Software has made AceFile even easier. Joining the current trend in Windows interfaces, AceFile has function icons, some of which are task specific. Pressing <F1> brings up a help screen specific to the feature you're working with.

Joining the rest of Windows databases, AceFile lets you add graphics to your reports, and the phone dialer can now dial a local or long-distance number directly or through a PBX. Three new commands give you

more flexibility when linking files, although you're still limited to one-to-one relationships. Six ready-made templates let you use *AceFile* as a checkbook or personal organizer right out of the box. The least expensive program of this group, *AceFile* 2.0 is \$199; upgrades are \$49.

Approach 2.0 for Windows

The original Approach was a major commercial success, surpassing even Paradox in sales. Hoping to maintain its lead as the market grows, Approach Software expects to ship version 2.0 only six months after the original. Approach 2.0 supports more data types, including SQL

Pite Les New Brossesson | Page | Page

APPROACH 2.0 FOR WINDOWS' OLE support lets you store an Excel worksheet as a record.

Server and DB2, and can treat a SQL query statement like a simple data file, giving users transparent access to MIS-defined data. Approach 2.0 supports FoxPro's variation of the dBASE data format, so you can share data seamlessly between Approach and FoxPro.

Going after Q&A's and Ace-File's audiences, Approach now has a text editor and mail merge, so you can write and print form letters directly from your database. Another major addition: You can set up a field with a pick list based on another table, to build, for instance, an order form with a drop-down list of customers.

Like Paradox for Windows, Approach 2.0 lets you store OLE (Object Linking and Embedding) objects as data. That means that you can store and retrieve information in its original format from any program that supports OLE as a server, such as Excel, Ami Pro, or Corel Draw, and edit this data in the program you created it in.

Approach Software claims the new *Approach* is considerably faster than the old one. It will list for \$399, with upgrades available for \$49.

DataEase Express for Windows

DataEase International, a long-

established resident of the DOS database world, has now bounded into the Windows arena with DataEase Express for Windows, a low-cost, nonprogrammable, personal data manager. Like Approach 2.0 for Windows, DataEase Express makes a

AceFile 2.0, Approach 2.0 for Windows, DataEase Express for Windows

choices than ever for personal data management in Windows.

Ace Software 408/451-0100, 408/437-1018 (fax) List price: \$199 Reader service no. 609

Approach Software Corp. 800/277-7622, 415/368-5182 (fax) List price: \$399 Reader service no. 610

DataEase Int'l, Inc. 800/243-5123, 203/365-2317 (fax) List price: \$395 Reader service no. 611

virtue out of the number of data formats that it can access.

While DataEase Express does not offer an OLE data format, it combines OLE and DDE (Dynamic Data Exchange) to let you send data out and get a visual display of that data. A new feature enables you to see all the data that's connected to your query results; if you're looking at, for example, a product name in an inventory list, you can easily bring up vendor or customer data without redesigning the query.

Menus and tool bars abound (when you set a relationship, a dialog box explains your options visually), and you can use style sheets to define colors, fonts, and other visual aspects uniformly. DataEase Express for Windows lists for \$395.

-Lincoln Spector

The new PacificPage® PE/XL. Switching to PostScript® has never been easier.



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We want to make your life easier. To do it, we've added autosensing and switching to our latest release of PacificPage PE/XL for the LaserJet® IIP, IIP Plus, III, IIID, and IIIP. What it does is eliminate the inconvenience associated with manual switching between PostScript and PCL languages. It's especially useful to users of networked LaserJet printers or individuals who send both PostScript and PCL files to their printer. No special software, drivers, PC boards or special cables are required.

PacificPage PE/XL is easy to use, but it's also fast. The accelerator board utilizes an Intel i960 processor for output up to 8 times faster than any other cartridge. And our new automatic interface switching feature allows users to simultaneously use all interface ports.

PacificPage PE/XL includes 35 fully scalable typestyles and is compatible with all Windows and DOS software programs that support PostScript. All you need to do is slip the cartridge and accelerator board into the printer, select the standard PostScript driver, and you're ready to print!

Pacific Data Products offers a full lifetime warranty, free technical support, convenient upgrade programs, and of course, our 60 day money-back guarantee of satisfaction.

Getting all the benefits of PostScript on your LaserJet has never been easier. For more information, call us at (619) 625-3582 or fax (619) 552-0889.

Typestyles

Courier Swiss 721 (Helv) Swiss 721 Narrow (Helv Narrow)
Dutch 801 (Tms Rmn) Zapf Calligraphic 801 (Palatino)
IIC Avant Garde* ITC Bookman* Century Schoolbook
ITC Zapf Chancery* ITC Zapf Dingbats**

Symbol αβχδ

Each typestyle comes in normal, bold, italic and bold italic treatments except for Chancery, Zapf Dingbats, and Symbol.

PACIFIC DATA

Windows Navigator Plots Your Route; Helps Select Hotels, Restaurants

Your first business trip to New York City. At the start of the day, you look over your appointments and plan a schedule. At 2 p.m., the client you're meeting for dinner nixes chicken Kiev at the Russian Tea Room, suggesting barbecue instead.

The problem: How do you navigate around Gotham and get reliable information on an appropriate restaurant?

The solution: the Zagat-Axxis CityGuide, a new Windows application from Axxis Software and the Zagat Travel and Restaurant Survey. CityGuide gives mobile professionals and travelers of all stripes the information they need to get around unfamiliar cities and to make informed decisions about where to stay and eat.

Lost in the City

CityGuide marries database information on hotels, restaurants, and landmarks with electronic mapping and other technologies. The program's horizontal command bar allows users to load and unload city database information, browse through previously stored map views, and display them in a variety of ways including horizontal and

Zagat-Axxis CityGuide

companion for on-the-go executives who want routing, accommodation, and restaurant information for major cities.

Axxis Software, Inc. 800/394-3549, 215/896-0584 (fax) List price: \$99 per city, \$249 for three cities Reader service no. 608 vertical splits. City-Guide's hotel and restaurant databases (compiled by Zagat Survey) can be searched according to user definable parameters such as price, facilities, and other features, including Zagat Survey ratings.

You will always know the shortest distance between two points: The nifty route-finder tool seeks the most direct path to an address, using only major streets if you wish. Map views are scalable, and City-Guide tells you ex-

actly how far you'll travel. Need to bypass a traffic jam? Just select the affected area on the map, and CityGuide will offer the best detour. Need a map for a party invitation? Route maps and directions are easily printed. You can also let serendipity play a role in determing your destination. Just click on the tool bar's ID button to see the names of restaurants, hotels, and landmarks as you drag the cursor across the map.

A drawing palette for customizing maps allows you to add shaded and colored straight lines, boxes, and other elements. The program supports *Windows'* Clipboard facility.

Finders Keepers

CityGuide should be of special interest to hotel managers and mobile professionals. In settings where customers often ask for directions or restaurant recommendations, computers outfit-



THE ZAGAT-AXXIS CITYGUIDE includes information on hotels, restaurants, and landmarks. Choose a restaurant based on price, location, or cuisine.

ted with Windows and copies of CityGuide could play an important role by providing guests with detailed maps and written directions to local attractions, says Chris LeTocq, a senior software analyst with InfoCorp in Santa Clara, California.

Axxis's new application could provide similar benefits for mobile professionals facing overnight stays in strange cities, the analyst notes. "In this type of setting, it can help professionals optimize their travel plans by letting them select routes and lodging appropriate to their needs," LeTocq adds.

Currently available for only New York City, Chicago, and Los Angeles, CityGuide costs \$99 per city, or \$249 for a package with all three modules. The New York City module requires about 9MB of storage; Chicago requires 13.6MB, and Los Angeles about 22MB. To conserve hard disk space, you can easily off-load and reload the city guides as needed.

City Modules

Versions of *CityGuide* for other locations will be released at the rate of about one a month. Forthcoming releases include maps and databases for Washington, D.C., San Francisco, and other cities.

CityGuide isn't the first microcomputer program to link text files to maps-a 1985 version of FileVision from Telos Software in Southern California has that distinction. It is the first, however, to link comprehensive libraries of data on hotels, restaurants, and other institutions with precise map locations. "CityGuide has put the fun back in traveling for me," says J. Paul Grayson, chair of Micrografx Incorporated, who likes the program so much that he invested in Axxis Software.

-Jim Forbes



They've done it again . . . And so have we . . . Introducing a 1200-dpi PostScript™ upgrade for your HP® LaserJet® 4

and it has everything they promised. ewlett-Packard's new LaserJet 4 is here, But like all good things, there's room for improvement. That's why we've introduced the WinJet 1200, the perfect complement to the LaserJet 4.

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The WinJet 1200 increases the resolution of your HP LaserJet 4 to 1200 dpi, so everyone on your network can produce camera-ready copy on plain paper.



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Nothing matches the printing speed of the WinJet 1200's direct Windows driver. Our direct driver uses GDI commands to rasterize the page in the host computer before sending it to the printer via our high-speed video

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No matter how much money you spend adding additional memory and accelerator boards to your printer, you can't match the speed and power of your '386DX or '486 computer. That's why the WinJet 1200 utilizes the unused power of your computer to process your Windows print jobs as a background task right in your CPU. Best of all, this host-based architecture means that your printer will get faster every time you upgrade your computer.

50 TrueType[™] **Fonts.** The WinJet 1200 ships with 50

TrueType fonts that automatically install into your Windows environment for expanded typographic flexibility.

The Affordable Printer Upgrade.

The WinJet 1200 is the most complete, most inexpensive way to increase the speed. resolution, and flexibility of your HP LaserJet 4. Call LaserMaster today for more information about the WinJet 1200 and for a free

WINDOWS

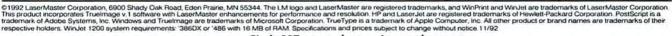
sample of 1200-dpi, camera-ready output. We think you'll agree, it's another feather in our hat.

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PC-Kwik: Still Faster Disk Caching

By the time you read this, PC-Kwik Corporation (formerly Multisoft) should be shipping a new version of its disk cache software, *Super PC-Kwik 5.0*, as

Super PC-Kwik 5.0, PC-Kwik Power Pak 3.0

smarter caching, plus a disk optimizer in the Power Pak.

PC-Kwik Corp. 800/759-5945, 503/646-8207 (fax) List price: PC-Kwik \$79.95, Power Pak \$129.95 Reader service no. 614 well as the utilities bundle *PC-Kwik Power Pak 3.0*. The new cache program promises greater performance and extended memory support; in addition, *Power Pak* will include a new version of the *Power Disk* defragmenter and a program for multiple boot options.

What's new in Super PC-Kwik 5.0? The cache now gives you a delayed-write option, a choice that will reduce disk access and speed up your system but in rare cases may lose data (which is why it's only an option). The cache also can now tell if an application is using extended memory (either the VCPI or

DPMI standards) and lend it some RAM if necessary.

Last summer the PC-Kwik Power Pak, which includes PC-Kwik and a few small utilities, grew a lot more interesting when PC-Kwik added its disk optimizer. Power Disk, to the mix. While Power Disk has a very good reputation as a defragger (it received 3½ stars out of 4 when reviewed last July), its user interface has never been its best asset. So for PC-Kwik Power Pak 3.0, Power Disk has a whole new look, with pulldown menus and other modern accoutrements. Inside it's the same old Power Disk 1.1, and PC-Kwik has no plans to release the new interface in the stand-alone version.

Other new features include a program for setting up and choosing among 26 boot configurations. If you want different CONFIG.SYS options for DOS and Windows, or networked DOS and non-networked Windows, you can use Power Pak to set them all up, and choose which you want at boot time.

Super PC-Kwik 5.0 lists for \$79.95; upgrades are \$19.95. Power Pak 3.0 is \$129.95, with upgrades \$39.95 from an earlier Power Pak or Super PC-Kwik.

-Lincoln Spector

AnyTime Proves to Be an Easy Organizer for Anyone



THE PERSONAL SCHEDULER ANYTIME displays easy-to-read information about an appointment when you click on that item.

Best known for its computer training applications, Individual Software is entering the personal scheduling market with Any-Time, a \$59.95 DOS-based organizational program that tracks your daily tasks and time commitments. Feature rich yet easy to use, the program has a simple interface with drop-down menus and helpful prompts. It

can print to a wide variety of formats, including those of popular paper organizers.

When you launch AnyTime, the appointments and to-do's for that day appear. You can also switch to a week, month, or year start-up view or the main menu. Once you've begun using AnyTime, the information is easy to access. You can move

easily around the calendar, and from any calendar view you can quickly find, view, or revise the details of a selected item.

AnyTime allows several levels of detail for each appointment. You can show a simple line of description or enter more information in a Details box. Another dialog box lets you set recurring meetings. For further mind-jogging, you can attach a short memo field to the item. A Quick-Glance feature gives you a weekly overview of your commitments for up to a year.

Other AnyTime features help you stay organized as entries accumulate. In Appointments you can classify items as business, personal, or other customizable categories and sort the items you want to see by those definitions. To find items pertaining to a specific subject, you can do a text search through all your appointments and to-do's. You can also create

multiple files to separate your information by projects, people, or other categories.

In the to-do list, you can prioritize tasks into nine levels. Tasks appear on the day you plan to do them, but you can roll them over to the next day.

AnyTime has full mouse support and WYSIWYG preview of printouts. An optional TSR feature allows quick access while you're working in other applications. The program comes with its own icon and PIF file.

-Melissa R. Riofrio

AnyTime

A DOS-based program for scheduling appointments and organizing tasks.

Individual Software, Inc. 800/822-3522, 510/734-8337 (fax) List price: \$59.95 Reader service no. 615

Fast Windows Printing at Your Fingertips

he future of Windows printing is here, and it's already sitting on your desk.

LaserMaster's WinPrint™ products use the power of your computer to provide the fastest, most advanced Windows printing features available today.

Revolutionary host-based design.

Unlike ordinary laser printers that require expensive processors and lots of extra



memory to print your Windows pages, WinPrint products utilize the unused power of your '386 or '486 computer to process your Windows print jobs right in your CPU. This host-based architecture is faster than older printer

designs, eliminates the need to download fonts, and makes adding new printing features as easy as loading new software.

The fastest Windows printing.

No other laser printer or printer upgrade can match the speed of our WinPrint products. Other printers have to translate Windows' GDI commands to a page description language before transmitting the print job to the printer via the slow parallel port. Our direct Windows driver uses GDI commands to rasterize the page in the host computer before sending it to the printer via our high-speed video cable. Ordinary printers make you wait minutes; we print in just seconds.







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So don't sink your money into a laser printer that's destined to become obsolete. LaserMaster's WinPrint products are the fastest, most versatile, most affordable way to print from Windows. Call LaserMaster today to learn more about the WinPrint advantage and to see how easy it is to put your hands on the WinPrint product that's right for you.

HP Printer Upgrades	Resolution	Maximum Paper Size	Fonts Included	Price
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WinJet 800**	800 dpi	81/5" x 14"	50 TrueType	\$795
WinJet 3005i***	300 dpi	81/2" x 14"	50 TrueType	\$995
WinJet 300**	300 dpi	81/2" x 14"	50 TrueType	\$495
Windows Printers	Resolution	Maximum Paper Size	Fonts Included	Price
WinPrinter 800	800 dpi	81/2" x 14"	50 TrueType	\$1,595
WinPrinter 600XL	600 dpi	11° x 17° (A3)	50 TrueType	\$3,695
WinPrinter 360XLS	360 dpi	17" x 22" (A2)	50 TrueType	\$1,795

^{*}Upgrades an HP LaserJet 4. **Upgrades an HP LaserJet II, IID, III, and IIID.
***Upgrades an HP LaserJet IIISi.

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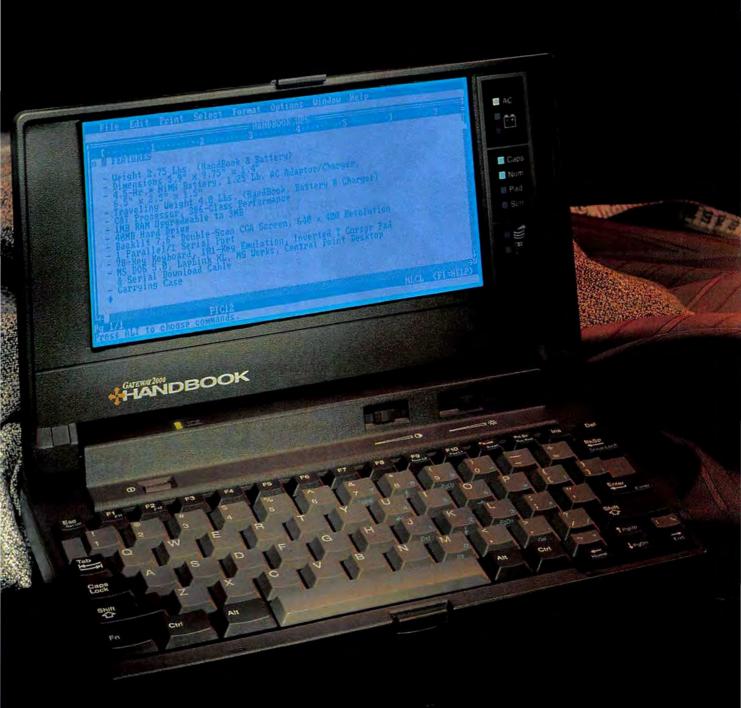


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You can't fully appreciate the amazing little HandBook¹⁵⁶ from Gateway 2000 until you've tried one on for size!

Notice the HandBook's keyboard printed here. We've tailored it for comfortable touch typing, even though the HandBook measures less than 6 x 10 inches.

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The HandBook is a one-of-a-kind portable PC – a true designer original that's causing real excitement in the PC industry. In fact, Popular Science recently named the HandBook one of the year's top 100 "Best of What's New" achievements!

Do we have you on pins and needles? Then call Gateway 2000 today to try one on for size. It's definitely dressing for success!

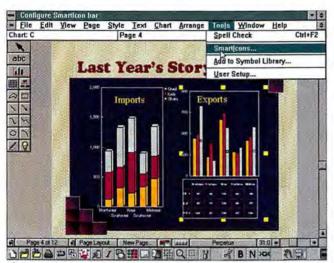
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HandBook options include 2400 bps data 9600 bps send-and-receive fax modern, portable printer, extra AC adapter, extra 2.3Ah battery, RAM upgrade to 3MB, combo unit (1.44MB external floppy drive with one parallel and one serial port) and extended VIP warranty.



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Freelance Graphics for Windows Smooths the Learning Curve



THE UPPER LEFT CORNER OF THE TITLE BAR explains the icon or menu entry you've selected in Freelance Graphics for Windows.

There's bad news for the competition: Freelance Graphics for Windows 2.0 is even better than its predecessor. This program is about as straightforward and easy to use as they come.

Lotus hasn't tampered with its basic philosophy of creating a presentation: Select a look, then fill in the blanks. When you begin a new presentation, a dialog box with miniature previews offers you a selection of templates called SmartMaster sets. Pick one, and a second dialog box comes up listing 11 variations on each template—from a basic title chart, to a variety of bullet charts to a text table. Again, these are shown thumb-

Freelance Graphics for Windows 2.0

state of the art in ease of use among presentation graphics software.

Lotus Development Corp. 800/343-5414 List price: \$495 Reader service no. 613 nail size. Make your choice, and page one appears with a notation to 'click here to type page title', 'click here to add symbol', and so on. When you've finished a page, click the New Page button, pick your chart variation as before, and begin typing. When you're done, you can see your presentation in the slide sorter view, dragging and dropping the pages to reorder them as appropriate.

These steps are similar in version 1.0. Version 2.0 just makes it even harder to go wrong. For instance, when you select a menu option and hold down the left mouse button, detailed explanations for each menu choice appear in the title bar. Hold down the right mouse button, and the icons will be explained. Choose a 'Click Here' spot, and a text entry box appears, along with a Tips button. Equally handy, doubleclick on any existing text, and you can edit right on screen. And if you want to see what a proposed change will look like, hold down the preview button to see the reconfigured page, which you can then accept.

Though the focus here is clearly on ease of use, the \$495 Freelance hasn't forgotten to dress up its features list. Freelance is now an OLE client and server and supports sound and animation during screen shows.

Among other enhancements, you'll find organization charts, speaker notes, *Excel* worksheet support, and Hyperdoodle, a feature that lets you draw on screen during a slide show. In addition, *Freelance* offers tight integration with the Lotus applications *Ami Pro 3.0, 1-2-3 for Windows*, and *Notes*.

When you've got the best product going, you can afford to relax. In this case, Lotus didn't. Freelance is a winner.

-Steve Fox

TrueType Font Scaling Moves Over to DOS

True Type font scaling technology, which delivers excellent fonts in a wide range of sizes on screen and in print, is one of the hottest tools in *Windows 3.1*. Envious DOS users have had to resort to other font tools—until now. MicroLogic Software's new *True Type for DOS* lets users of *WordPerfect S.x, Letter-Perfect, PlanPerfect, Word 5.1*, and *Microsoft Works* incorporate True Type fonts transparently into their documents.

The program supports all Hewlett-Packard-compatible laser printers, Canon laser and Bubble Jet printers, and all Epson-compatible dot matrix printers.

The \$99.95 package comes with 36 True Type fonts, rang-

ing from Times Roman and Helvetica equivalents in several weights to decorative and dingbat fonts. The *TrueType for DOS* engine runs in the background when you start your application with a start-up file created by that program. You then select and size fonts in the application, using its normal formatting commands. *TrueType for DOS* can scale fonts from 2 to 999 points, with full hinting for quality at any size.

If you use more than one of the supported applications, you can create installations for each of them. You can also add any other TrueType font, including those shipped with Windows, additional MicroLogic fonts, or any of hundreds of free and

TrueType for DOS

Use all your TrueType fonts in DOS applications for fast, high-quality printing.

MicroLogic Software 800/888-9078, 510/652-7079 (fax) List price: \$99.95 Reader service no. 612

shareware fonts. Your Windows applications can also use the program's font outlines.

The TrueType for DOS installer can add shading, outlines, dropped shadows, and background patterns to fonts. You can't save modified fonts as TrueType outlines for Windows.

-George Campbell

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 - Ask about PowerChute® UPS monitoring software and Novell compatible UPS monitoring boards
 - ■230V models available





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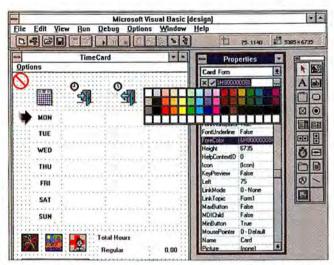
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Model	Application	List	New List
Back-UPS 250	LAN nodes, 386SX, 286, internet hardware, POS	\$189	\$139
Back-UPS 400	Desktop 386, 486 systems, 286 servers	\$249	\$229
Back-UPS 450	Tower 386, 486 systems, servers	\$329	\$279
Back-UPS 600	Heavily configured systems, CAD/CAM workstations	\$449	\$399
Back-UPS 900	Multiple systems, longer runtime applications		\$599
Back-UPS 1250	Multiple systems, LAN hubs, small minis, telecom equipment		\$799

NEV

Visual Basic 2.0 Offers Improved Performance, New Features



VISUAL BASIC 2.0'S PROPERTIES WINDOW speeds interface design; other additions offer new control types and faster program execution.

Version 1.0 of Microsoft Visual Basic for Windows was a revolution in Windows programming. Its easy-to-use interface design tools and event-oriented programming in familiar BASIC syntax let even inexperienced programmers jump into the Windows environment. Version

2.0 continues the revolution by adding powerful new features and fixes for some of the earlier version's problems.

The \$199 Standard Edition of VB 2.0 adds 256-color capability, improves speed, creates smaller executable files, and eliminates program size restric-

tions. New graphics controls let developers add images to their applications without tying up excessive Windows resources. The new Properties window makes setting options for objects much easier during development, and an icon tool bar offers command shortcuts. Improved debugging options, including watch and break expressions and an Instant Watch feature, speed problem solving.

VB 2.0 Standard Edition developers also get the muchdemanded huge-array feature, which eliminates the old 64K array-size restriction. Multiple Document Interface (MDI) support, tools for creating automated installation programs, plus OLE (Object Linking and Embedding) support and the grid control from the earlier version's Professional Toolkit help make the Standard Edition a complete tool.

Programmers who opt for the

\$495 Professional Edition get all the tools from *I.O*'s Professional Toolkit, plus several new tools, a full-fledged communications control, and a better help compiler. Support for Microsoft's messaging applications programming interface (MAPI) allows development of E-mail and work-group applications.

-George Campbell

Microsoft Visual Basic for Windows 2.0

enhancements to this Windows development environment make it even more suitable for developers.

Microsoft Corp. 800/426-9400, 206/936-7329 (fax) List price: Standard Edition \$199, Professional Edition \$495

Reader service no. 617

Making Desktop Publishing Easier With Ventura 4.1

Ventura has been showing its age lately, and with the introduction of powerhouse Frame-Maker last year, its position as desktop publishing's long-document king was suddenly challenged. The manufacturer's response may not be as aggressive as hoped for, but Ventura Publisher 4.1 for Windows does fill in some big gaps. Most obvious, the interface, which in the past ignored many Windows conventions, has been redesigned, with customizable button bars to speed access to all menu functions. The mouse, formerly a part-time player, now has a starring role: In Ventura 4.1, you

can use it to make selections from pick lists or to set tabs, margins, indents, and outdents from the ruler.

Power has been a Ventura hallmark; this upgrade makes that power easier to access. For instance, you can use style tags to define a frame's size, color, fill, margins, and so on. Apply the frame tags, and you can propagate formatting changes throughout the document.

Another welcome change: Ventura's unwieldy paragraph and text modes, while not banished, are converging. Insert your cursor into a paragraph, and you're automatically in paragraph mode; swipe, and you're in text mode. That means you can perform most operations without having to switch manually between the two. And for easier editing, version 4.1 has customizable zooms and additional import filters.

With the \$795 Ventura 4.1, you get Ventura Scan and Ventura Separator, once sold separately. These two packages let you scan images to a file or into your document and create and color-correct page separations with all elements in place.

Ventura still lacks full incremental rotation of text and images, the capability to create multiple master pages, precise text-wrap capabilities, and hypertext links, but it's taken a big step in the right direction.

-Steve Fox

Ventura Publisher 4.1 for Windows

structured-document leader revamps its stodgy interface and adds color separation.

Ventura Software Inc. 800/822-8221, 619/673-0172 List price: \$795 Reader service no. 618

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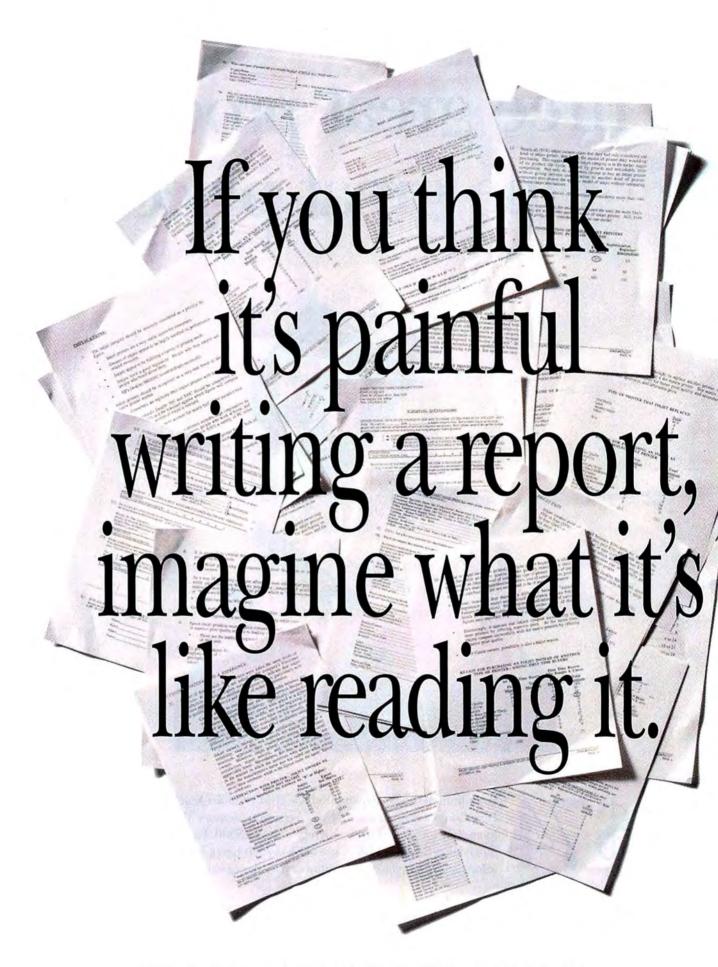


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For a limited time, you can purchase IBM DOS 5.0, Stacker® Version 2.0 Disk Compression and 386MAX® Version 6 Memory Manager for an incredibly low \$74* That's a savings of up to \$200. Time is limited, so don't delay. Because at \$74, it will be hard to find a better deal. For more information, see your IBM authorized dealer or call 1 800 426-2968.

*\$74 for upgrade from any DOS, \$135 for base operating system. Offer expires March 31, 1993. IBM reserves the right to withdraw or modify this offer at any time. Stacker Version 2.0 and 386MAX Version 6 packaged with limited documentation. Full documentation available through respective companies. IBM makes no representations or warranties regarding Stacker or 386MAX. Stacker is a registered trademark of Stac Electronics. 386MAX and Qualitas are registered trademarks of Qualitas Corporation. (BM is a registered trademark of International Business Machines Corporation. © 1992 IBM Corp.





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A tool that easily could've been named the Epson "Add A Picture and Some Interest To Your Documents" Machine.

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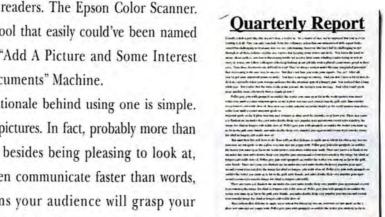
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What

you should

know about

scanning











An Office on an Add-in Card

Anyone who works at home or in a small office can benefit from a modem, fax, and voice mail. So why not get them all in one? Now you can with Prometheus's Home Office. Prometheus packs a 2400-bps modem, 9600-bps send-receive fax,

cally detects whether an incoming call is a voice message or a fax and stores the file on disk. Be warned: Voice files eat up disk space quickly—a 1-minute message takes up about half a megabyte. MaxFax does allow you to limit the length of in-

functionality. You can set up multiple voice mailboxes, either public or private, each with its own individual customized message. This feature is handy for businesses that want to give callers options to get more information about services or prod-

ucts (for example, "press 1 for information about this month's special"). Or you can set up private mailboxes for different users, each of them protected by a touchtone password.

As you might expect, you record your messages by using your standard telephone, which must be plugged into the Home Of-

fice's phone jack. The onscreen graphical interface makes it possible for you to use a control panel that looks a great deal like the one that you would find on a cassette recorder, complete with stop, record, and play buttons.

MaxFax for Windows 2 Idle Delete Hold Open Resend Info Subject Status To / From Time Date 12:21 PM 01/28/93 Main mailbox Played Main mailbox 11:31 AM 01/28/93 Played Main mailbox 11:30 AM 01/28/93 Played Main mailbox 11:28 AM 01/28/93 Played Main mailbox 09:19 AM 01/28/93 Recv'd Main mailbox 09:16 AM 01/28/93 Recv'd 63 603-555-3636 09.35 PM 01/27/93 Recv'd 69 603-555-3636 09:31 PM 01/27/93 Recv'd Recv'd Fax 603-555-3636 09:12 PM 01/27/93 Recv'd Recv'd Fax Main mailbox 10:31 AM 01/25/93 Played Main mailbox 10:24 AM 01/25/93 Played

HOME OFFICE'S MAXFAX WINDOWS SOFTWARE controls the 2400-bps modem, 14,400-bps send/receive fax, and voice mail integrated on the single add-in card.

and voice mail in a single PC add-in board, ties this bundle together with well-designed Windows software, and prices it all at \$299.

Installing the board is relatively simple. It requires a standard 8-bit add-in slot, and if your PC doesn't have too many add-ins, you can probably plug and play. But if your system is loaded, you'll need to deal with a DIP switch on the board.

Fax and Voice

You access the fax and voicemail capabilities of the Home Office through a Windows utility called MaxFax. Setting up the program is simple, with separate fill-in-the-blanks menus for fax and voice.

The Home Office's voicemail capabilities deliver more than an answering machine but less than a full-fledged voicemail system. MaxFax automaticoming messages and even specify the maximum amount of hard disk space that can be used for voice mail.

Hayes Compatible

On the modem side, the Home Office's data communications capabilities are based on a 2400-bps modem with the added frosting of MNP 5 and V.42bis capabilities for error correction and data compression. With standard Hayes compatibility, the modem works with any off-the-shelf communications software, either DOS or Windows. Prometheus doesn't ship communications software with the Home Office.

Setting up and using the Home Office's voice-mail capabilities are a bit more complicated than with your garden-variety "push and play" telephone answering machine, but that's the price you pay for increased

Fax Functions

Like most of today's fax boards, the Home Office enables you to send a fax directly from your current application (word processor, spreadsheet, and so on) by "printing" it directly to the fax board. MaxFax intercepts the print output and sends it down the line. You can set up a default cover page, complete with logo if you desire. MaxFax also includes a phone book for keeping track of commonly called numbers.

The Home Office also receives faxes. Because the board has its own processor, it can receive in the background while you're working with another application without slowing your system to a crawl. Received faxes are stored in a modified 'TIFF format, although MaxFax's own compression program cuts down on storage requirements. You can view or print a received fax or resend to another fax machine.

Multiple Mailboxes

Like any capable answering machine, MaxFax lets you retrieve messages, and you can even change your outgoing message remotely. However, MaxFax lacks some of the voice-mail features that are now available in competing products, such as The Complete PC's Complete Communicator. For example, callers are not able to review, rerecord, or delete messages they leave.

The Home Office is not able to do everything that a full-fledged fax and voice-mail system can do, but it comes reasonably close for a magnitude less money. For those who want higher speeds, the Ultima Home Office replaces the 2400-bps modem with a 14,400-bps model, raising the price to \$539.

-Stan Miastkowski

Home Office

Combining modem, fax, and voice mail in a single PC add-in card, this tool is almost essential for at-home workers and small offices.

Prometheus Products, Inc. 800/477-3473, 503/691-1101 (fax) List price: \$299 Reader service no. 619

Expand Your View Town Radiotion Program Mana Options Window CoreIDRAW! - BIRDS.CDR Edit Iransform Effects Arrange 94A 44.4 62.0 ViewSonic 6FS

Yes, it's definitely time you expanded your view to the non-interlaced 15" ViewSonic 6FS monitor.

For one thing, you get 36-percent more viewing space than with a standard 14" monitor. And, since you can display more information on the screen with the larger 15" flat square screen, this is an ideal monitor for Windows, Graphical User Interface (GUI) and desktop publishing environments.

Thanks to the ultra high 72Hz refresh rate with resolution up to 1,024 x 768, the ViewSonic 6FS produces the most vivid and precise **flicker-free** image anywhere. In addition, the non-glare screen reduces irritating reflections.

The monitor, compatible with all standard resolutions, features 32 programmable modes with digital controls to store and customize

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Visualize Your Time With Network Scheduler

If your organizational skills consist of scribbling notes and pasting them on your monitor, then scheduling staff meetings, next month's travel plans, and client appointments may seem like a labor of Hercules. Powercore's Network Scheduler 3 eliminates the clutter with a LAN-based time management system.

Each copy of Network Scheduler 3 includes both DOS and Windows versions that use the same keystroke commands and share the same features and functions. You can view time graphically in either daily, weekly, monthly, or six-month segments and have your to-do list on screen simultaneously.

Network Scheduler 3 has several powerful features to help you arrange meetings with your colleagues. Use the menu-driven interface (icon-driven in the Windows version) to schedule a time and day. If you're not sure when your associates are available, Network Scheduler's search feature can review everyone's schedule and pinpoint the best time via the program's autosearch tool, which reviews users' schedules and recommends available meeting times.

Another scheduling godsend is the RSVP function. After you've chosen a meeting time, *Network Scheduler 3* notifies the potential attendees with an on-

screen 'RSVP' flag and asks them to confirm or decline. While your colleagues are deciding, you (and your invitees) can pull up the proposed meeting schedule to see who's accepted and who hasn't.

Network Scheduler 3 has some handy features for remote users, including those who use the Sharp Wizard palmtop. Let's say you're traveling and have scheduled some new appointments. You can modem into the office, log on to Network Scheduler, and upload the appointments you've made during the day. The program will check your office schedule and notify you of any potential conflicts.

Network Scheduler 3 costs \$395 for the 5-user version and \$1195 for the 25-user version. The single-user version, called TimeVision, costs \$199.

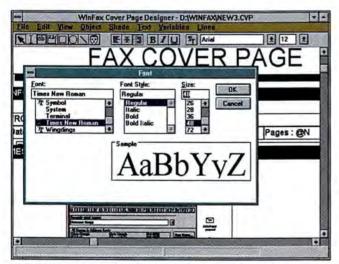
-Jeff Bertolucci

Network Scheduler 3

based time management system.

Powercore, Inc. 800/237-4754, 815/468-3867 (fax) List price: TimeVision (1 user) \$199, 5 users \$395, 25 users \$1195 Reader service no. 620

WinFax Pro 3.0: Sophisticated Fax Software



WINFAX PRO 3.0, A WYSIWYG PROGRAM, supports all font managers under Windows, including Adobe Type Manager and TrueType.

No longer a simple faxing utility for your PC, WinFax Pro 3.0, with its new image editing, optical character recognition (OCR), and form design tools, is a sophisticated platform for creating and sending faxes to business associates, clients, and remote office sites. This isn't to say WinFax Pro 3.0 is for everyone. Neophytes may prefer the simplicity of WinFax Lite or another no-frills package.

WinFax Pro is a major Windows application for power faxers who want to manipulate their faxes in just about every way possible. However, learning WinFax Pro's basics remains simple. The new version retains its predecessor's big button bar; simply click on the appropriate button to send, receive, or view a fax or perform other fundamentals.

WinFax Pro 3.0's enhanced phone book includes separate fields for first and last names, business name, country code, area code, extensions, and billing code. The last helps when you want to pay for a fax call with your credit card. And since version 3.0 can read data stored in dBASE, PackRat, CAS (Intel's fax software format), and ASCII as well as Win-Fax and DosFax file formats. you can import your existing databases of contacts and fax numbers.

WinFax Pro 3.0 incorporates Caere's AnyFax OCR technology as a menu item to convert received faxes into editable text. And should you choose to write comments over your faxes before sending them out, WinFax Pro has tools to add boxes, circles, lines, arrows, and of course, text in all Windows fonts.

If you need a full-featured fax program that does a lot more than just send and receive, Win-Fax Pro 3.0 may be the answer.

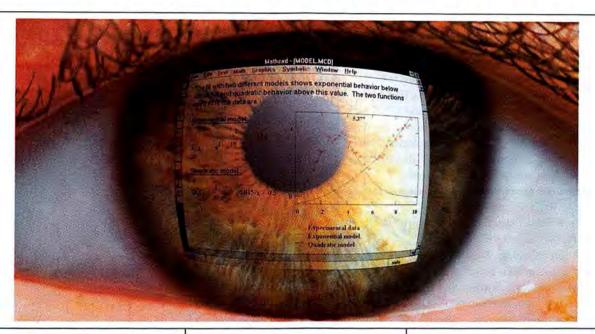
-Jeff Bertolucci

WinFax Pro 3.0

PARTY This featurepacked upgrade of the leading Windows fax program includes a new forms designer, OCR, and image editing.

Delrina Technology, Inc. 800/268-6082, 408/363-2340 (fax) List price: \$129 Reader service no. 621

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BeckerTools 4.0

-WINDOWS ▼ One of the oldest and most fully featured File Manager replacements, Abacus's BeckerTools keeps adding capabilities to its extensive mix. With version 4.0, the Becker-Tools Shell program delivers a few more tricks and several new utilities. The main program now offers a command line prompt, systemwide password protection, and the ability to start Windows after system errors. In addition, Abacus has augmented the Shell with a launch program you can access through any Windows application's Control menu. Other utilities graphically display which directories are hogging your hard disk, let you quickly copy floppy disks (even when the media doesn't match), and find files based on name, directory, contents, and other criteria. A new archiving utility lets you compress files into a single archive and still copy files to and from it. Becker Tools 4.0 lists for \$129.95; upgrades from earlier versions are \$29.95, from competing products \$59.95. Abacus, 800/451-4319; 616/698-0325 (fax).

Reader service no. 622

TimeOut Lite

-WINDOWS ▼ TimeOut Lite is a LAN-based sign-out system that lets everyone on the network know where his or her colleagues are-who's in the office, who's on the road, who's working at home. Designed to help secretaries, switchboard operators, department managers, and other office personnel track staff, TimeOut Lite includes both DOS and Windows versions in one program. Users can post their whereabouts from any workstation on the network

without having to enter a password. DOS users hit a hot key to load TimeOut Lite; Windows users click on an icon. You then enter the date and time and your location into the events dialog box. TimeOut Lite shows you a list of all LAN users and their current locations. The

package costs \$269 for 15 users, \$495 for 25 users, \$895 for 50 users, and \$1295 for 100 users. Nordra Technologies, 201/ 786-6878, 201/786-5868 (fax).

Reader service no. 625

WatchIt-TV

Watching TV on your computer monitor might not seem like the most productive use of your time, but it's crucial for many users who need to keep track of financial program-

ming or who want to capture images from videotape. New Media Graphics' new WatchIt-TV puts that capability on a low-cost expansion board. The WatchIt-TV board accepts input from a variety of common television sources (TV antenna, cable, VCR, or video camera). It connects by cable to your VGA adapter, displaying video images in a window on your monitor. The board comes with DOS and Windows software, which can size this window (to full, 14, 14, or 1/6 screen) as well as control volume and adjust image quality. In addition, the software lets you capture still frames and save them to PCX or BMP files. List price for the board is \$349. New Media Graphics, 800/288-2207, 508/ 663-6678 (fax).

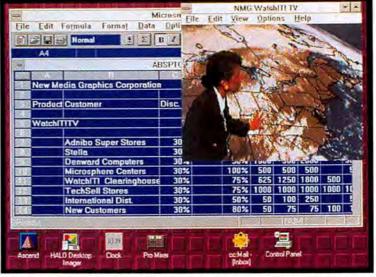
Reader service no. 628

Fractal Design Sketcher

-WINDOWS - Anyone who has ogled Fractal Design Painter but balked at the \$399 price tag will want to plop down \$149 for the gray-scale version. Fractal Design Sketcher has all the brushes, crayons, calligraphy

other Windows applications.

PackRat 4.1 increases its automation capabilities by tripling the number of SmartButtonsuser-definable macros-to 24 from the previous version's 8. In addition to the dozens of Smart-Button icons already available in PackRat, you can now import



THE WATCHIT-TV PC VIDEO BOARD, priced at only \$349, enables you to watch television in a window while you're in Windows or DOS.

pens, and textured papers that make Painter a unique paint program. It can even give you van Gogh or Seurat brush strokes. Among the slew of new features is the ability to tear off the tools you use most often and put them on your drawing so they are close at hand. Sketcher is able to distort, skew, and rotate, making it a very useful image-editing program. Fractal Design Corp., 408/688-8800, 408/688-8836 (fax).

Reader service no. 632

Polaris PackRat 4.1

-WINDOWS PackRat 4.1, the latest version of Polaris Software's hefty PIM program, introduces a few new scheduling/to-do features plus an extensive list of new macros to automate tasks in PackRat and

your own bit-mapped icons as well. Two new action buttons, whose functions are predefined, will search for all items in a PackRat facility (such as the Appointment Calendar or Project Manager) or print a detailed report on any item.

New drag-and-drop functions let you move appointments or add a name to your contact list by dragging the name from your PackRat phone book to the calendar. A new Tri-fold report type prints your to-do list, contact list, and calendar in a portable format. The PackRat Integration Library is also improved with macros that insert themselves seamlessly into their designated application and allow you to bring data from PackRat into the application, or vice versa. New links to Delrina's WinFax Pro mean you can THESE TOUGH TIMES, WE WANT YOU ON OUR PAYROLL!

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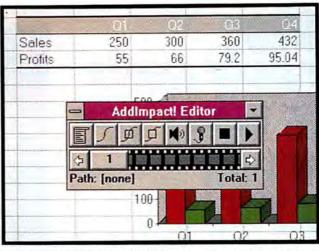
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Quick Takes



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use *PackRat* to fax a document from a supported word processor. Other new Library macros will transform messages from Da Vinci's *Da Vinci eMail* into to-do items in PackRat, and forum messages from Compu-Serve will turn into *PackRat* Index Cards for easy searching. *PackRat 4.1* lists for \$395; upgrades from version 4.0 are \$49.95; owners of earlier versions may call for upgrade information. Polaris Software, 800/722-5728, 619/674-7316 (fax).

Reader service no. 629

Visio

-WINDOWS ▼ This compilation of drawing stencils lets anyone produce computer graphics without having to master a complex drawing program. If you don't have the time or interest to learn a draw program for those rare occasions when you need computer art, Visio provides an alternative to prefabricated clip art. Visio offers readymade, job-specific "stencils" that you drag onto a drawing. To make an office diagram, for instance, simply drag pictures of furniture from the stencil palette onto a page and arrange, resize, and alter them as needed. If you

feel inspired, you can create your own stencils and palettes. Despite its simplicity, *Visio* has some sophisticated features, such as the ability to glue or connect shapes. List price is \$299. Shapeware Corp., 800/446-3335, 303/695-0555 (fax).

Reader service no. 630

AddImpact, VideoDirector

-WINDOWS Two new products bring multimedia to the desktop without demanding any new hardware. For only \$149.95, AddImpact uses Windows 3.1's Object Linking and Embedding to let you add animation and sound easily to any document. For example, you could have a dog cavort through your Excel chart and bark as it leapt off the sales goals bar. You can even send animated documents over a LAN. Recipients needn't have AddImpact to enjoy the show. Use VideoDirector, a complete video editing system, to edit the mistakes and dull bits out of in-house videos. This \$199.95 Windows program comes with the SmartCable interface, a serial VCR/camcorder controller cable that lets you start, stop, and mark scenes played by your source VCR or



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to use. I'd recommend it to anyone." — Water Sport Marine and Ski

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Quick Takes

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Reader service no. 634

FastLynx 2.0

-WINDOWS▼ Rupp Technology has released version 2.0 of its FastLynx file transfer program, with the emphasis on speed. The program comes with a specially designed, extrafast parallel cable (and a serial cable inside, as well), built-in file compression, and Rupp's own Windows VxD device drivers, which allow Windows users on 386 or 486 systems to bypass DOS's slower file access. The result, according to Rupp, is transfer speeds of up to 8MB a minute. In addition, the program comes with device drivers that let two computers share resources such as hard disks or printers. You can even use the program to transfer files between two NetWare workstations. FastLynx 2.0 has a list price of \$169.95; software upgrades cost \$39.95, plus \$19.95 for the improved parallel cable. Rupp Technology, 800/852-7877, 602/224-0898 (fax).

Reader service no. 623

Traveler, MiCC 14400PM Pocket Fax-Modem

These two pocket-size fax-modems from Best Data Products and Micro Integrated Communications Corporation are priced to appeal to opposite ends of the portable computing market. Best Data's \$199 Traveler is a 2400-bps data modem that offers 9600/4800-bps send-receive fax. The Traveler supports the V.42bis protocol for 4-to-1 data

compression and comes with either QuickLink II, a DOS fax/ data communications program, or WinFax Lite for Windowsbased faxing. For users who prefer top speed to big savings, MiCC's \$799 14400PM sends and receives faxes and data at -14.4 Kbps, and includes V.42bis data compression. A fax-modem this fast can come in handy when you're downloading large files from on-line services or sending and receiving multipage faxes. Best Data Products, Inc., 800/632-2378, 818/773-9619 (fax).

Reader service no. 626

Micro Integrated Communications Corp., 408/980-9565, 408/ 980-9568 (fax).

Reader service no. 627

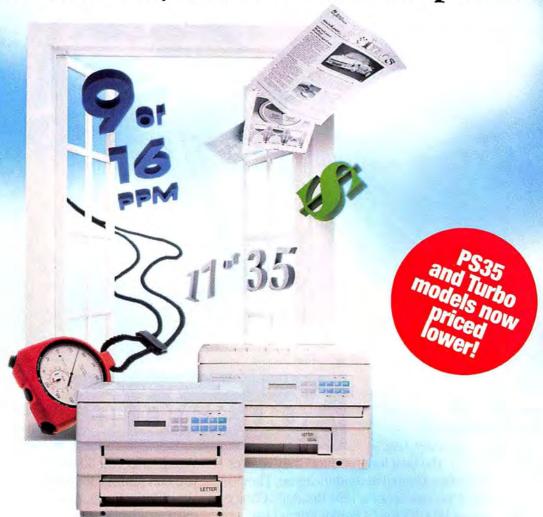
PhotoFinish 2.0

■WINDOWS ZSoft is shipping a new version of its popular image-editing program, PhotoFinish 2.0. Among its many new features is an image viewer that shows you thumbnail views of your images without your having to open them. You can rename, delete, and move images from within the viewer. For the novice scanner, PhotoFinish can automatically crop, straighten, and enhance when scanning images; it has a library of 200 photo-realistic images (50 are in the box, 150 sent when you register) and JPEG compression. This Windows 3.1 version takes full advantage of Object Linking and Embedding. List price is \$199; registered users can upgrade for only \$69. ZSoft Corp., 800/444-4780, 404/427-1150 (fax).

Reader service no. 631

For more information about any product, contact the manufacturer or circle the number on the reader service card.

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documents in a hurry. Plus PostScript
means what you see on your screen is
what you get on paper. You can even turbocharge your microLaser with a RISC
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printer, you want it to print. And print. And print. That's just what the microLaser does.

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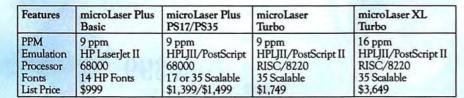
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1-800-527-3500.

The microLaser PS17 has earned the 1990 PC World Best Buy award; microLaser PS35 has earned the 1990 InfoWorld Excellent Value award and 4½ mice from MacUser, October 1990.





^{*}Based on estimated typical usage. **For more information on service upgrade options, call 1-800-847-5757 in the U.S. and 1-800-268-6314 in Canada. †Suggested retail price — dealer prices may vary. ‡Based on suggested retail price of consumables and approximate page coverage rating for each consumable at 4% black (more, developer and OPC), microLaser is a trademark of Teosa Instruments Incorporated. Microsoft and DOS are registered molemarks, and Windows is a trademark of Microsoft Corporation. Adobe, PostScript and the PostScript logo are registered trademarks of Adobe Systems Incorporated which may be registered in certain jurisdictions. LaserJet is a registered trademark of Hewlett Packard, Inc. Apple and Macintosh are registered trademark of ATS.T. ©1992 TI 76539



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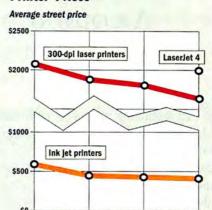
Marketplace

A Monthly Survey of Prices on Popular Models

Over the Counter 🦵	Configuratio	1 11111	11	National —	-\
What you pay at retail stores for popular PCs		MB) d	ard lisk (MB)	list	Average
386SX/SLC-based desktop PCs		\			
AST Power Premium 3/25s	1386SX-25	2	80	\$1845	\$1594
Compaq ProLinea 3/25zs	1386SX-25	2	84	\$999	\$923
Dell System 325SX	i386SX-25	2	52	\$820	\$820
Gateway 2000 25MHz 386SX	1386SX-25	4	80	\$945	\$945
IBM PS/2 Model 56 SLC	386SLC-20	4	80	\$1475	\$129
IBM PS/2 Model 57 SLC	386SLC-20	4	80	\$1675	\$145
NEC PowerMate SX/25i	1386SX-25	2	60	\$1299	\$112
				1	
386DX-based desktop PCs					
AST Power Premium 3/33	i386DX-33	4	210	\$3095	\$265
Compaq Deskpro 3/33i	1386DX-33	4	120	\$1979	\$184
Compaq Deskpro 386/33M	i386DX-33	4	120	\$2569	\$231
Dell System 333P	i386DX-33	4	230	\$1600	\$160
Hyundal CS-386/40	Am386DX-40	4	120	\$1730	\$173
186SX-based desktop PCs					
AST Power Premium 4/25s	1486SX-25	4	210	\$2995	\$260
Compaq Deskpro 486s/25M	1486SX-25	4	120	\$2569	\$230
1 10 May 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1486SX-25	4	245	\$1849	\$1849
DEC DECpc 425sx LP	1486SX-25	4	200	\$1920	\$192
Dell System 486D/25	i486SX-33	4	120	\$1799	\$1799
Hyundai 433SP	i486SX-25	8	170	\$1799	\$1849
IBM PS/ValuePoint 425SX	14003/-25	•	170	\$1045	9104
186DX-based desktop PCs					
AST Power Premium 486/33	1486DX-33	4	210	\$3495	\$307
Compaq Deskpro 486/33M	i486DX-33	4	340	\$3869	\$348
Compaq Deskpro 50M	i486DX2-50	8	340	\$4469	\$401
Dell 486D/66	i486DX2-66	8	230	\$2850	\$2850
DEC DECpc 466d2 LP	1486DX2-66	4	120	\$2199	\$2199
Gateway 2000 4DX2-66V	1486DX2-66	8	340	\$2995	\$299
IBM PS/ValuePoint 433DX	1486DX-33	8	212	\$2199	\$2199
IBM PS/2 Model 90 XP-OLF	i486DX2-50	8	400	\$5020	\$439
NEC PowerMate 486/50I	i486DX2-50	4	240	\$2949	\$254
Postoble BOo					
Portable PCs	139661 35		60	£220E	\$212
AST PowerExec 3/25SL	i386SL-25	4	60	\$2395	\$213
Dell 320SLi	1386SL-20	2	80	\$2169	\$2169
Compaq LTE Lite/20	1386SL-20	2	60	\$2499	\$2339
Compaq Portable 486c	1486DX-33	4	120	\$8699	\$7770
Dell Dimension NL25	1386SL-25	2	80	\$1849	\$1849
Gateway 2000 Nomad 420SXL	1486SX-20	4	80	\$2495	\$249
Hyundai Courier Spectra	486SLC-25	4	120	\$2999	\$2999
IBM PS/2 Model N51 SLC	386SLC-16	2	80	\$2265	\$2020
NEC UltraLite SL/20	1386SL-20	2	80	\$2199	\$1900
TI TravelMate 4000WinDX	1486DX-25	4	120	\$3299	\$2930
Toshiba T3300SL	1386SL-25	2	80	\$2899 \$3399	\$255
Toshiba T4400SX ZDS Z-Note 325Lc	1486SX-25	2	80	\$3399	\$4794

From a national survey of more than 180 dealers by International Data Corporation. Figures are based on at least four price quotes for each machine. Prices are based on manufacturer's standard configuration without monitor.

LaserJet 4 May Herald Lower Printer Prices



Hewlett-Packard retains its lead in the printer market, as the LaserJet 4 brings 600-dpi resolution to the 300-dpi laser printer price range. And 300-dpi resolution becomes more affordable than ever as laser and ink jet printer prices continue to drop across the board.

1993

*Projected

Source: InfoCorp

VL-Bus Systems: Priced to Move

Street prices of similarly configured ISA-bus PCs with and without VL-bus from major vendors

Austin 486DX	
ISA bus only	\$2890
With VL-bus	\$2995
Gateway 486	
ISA bus only	\$2495
With VL-bus	\$2995
Northgate 486	
ISA bus only	\$3149
With VL-bus	\$3149
Zeos 486DX2	
ISA bus only	\$339
With VL-bus	\$3095

Systems with both ISA and high-performance VESA local-bus slots command little, if any, premium over those with just ISA. Eager to grab market against fierce competition, vendors are forgoing profits to move the new systems. But don't expect to get something for nothing—upgrading your system with faster, 32-bit VL-bus cards will cost more than using their ISA counterparts.

Source: Company list prices

Introducing CONNEXPERTS'. NET Solution.

A comprehensive network solution for non-technical businesspeople.

Our NET Solution is a family of networking products that includes all the elements needed for most networking applications. Based on a breakthrough networking technology called ACTLAN™, the NET Solution makes networking accessible to the average businessperson without compromising performance or compatibility with industry standards.

Consider first our 12 Megabits-per-second Intelligent Network transmission speed. Connection Card, pictured here. Installation of this card does NOT Up to involve selecting 255 interrupts, I/O ports, users shared memory locations or any of the other technical details one must tackle with all other network cards. Yet, despite the no-brainer installation, this card is more powerful and capable than any other network card available. Sounds like hyperbole; but as you read

on you'll agree. For example: these cards form a peer-topeer network capable of providing printer sharing, E-Mail and PC-to-PC file transfer services WITHOUT

requiring a network operating system. Just plug them in and you've got a network.

That's for starters. The NET Solution employs a building-block approach to networking. If you want "file sharing"-where everyone can access a shared database or run programs from a central server-add our NET Solution Network Operating System. It is a complete NetBIOS-based peer-to-

peer network operating system (NOS), featuring DOS and Windows® interfaces. Being 100% Microsoft Network Compatible, it dovetails with Windows seamlessly.

Or, if you prefer to use another NOS—for example: any Novell Netware®, or Windows for Workgroups®—our optional driver software makes it possible. This is the

beauty of our NET Solution Network Connection Card: 77,000 cps print server built-in you can begin your network

using the cards alone,

No NOS required, but can be used with most popular NOS's with the option of moving up to peer-to-peer or client/server networking by just adding software.

Other NET Solution addons include network tape backup, CD ROM sharing, modem sharing, and FAX sharing. The NET Solution is all its name implies.

Network Co-processor relieves host PC of

most network "work".

And speaking of names, we're the CONNEXPERTS... as in "connectivity experts". We've been inventing and manufac-

turing connectivity products for over ten years, and everything we've learned is embodied in the NET Solution. If you are interested in a solid solution to your networking needs, connect with the experts. Call 800-433-5373 or FAX 214-239-6490.





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the first CAD programs were very
slow and extremely
difficult to use, not
to mention the
expense of
buying them.



AGAZINE DITORS' CHOICE



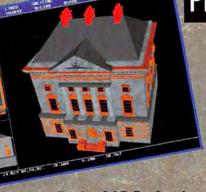
Now step into the 21st Century...







Professional Version





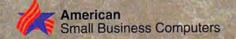


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The World's Best S2500 Windows PCs

Who's got the hottest Windows hardware? No less than 24 top system vendors answered that question by sending us their best Windows machine for \$2500 or less. Here's how this wild mix of PCs stacks up.

> ver the years most of our system reviews have started with a very specific processor platform: 33-MHz 486DXs, say, or 40-MHz 386DXs. This time we started the way you would, with an application-and a price.

The fact is, most computer buyers couldn't care less about which processor is lurking under a PC's hood. Smart PC shoppers know that the real questions are: What will I be using the computer for? What features will make those tasks go faster? And how much will I have to pay to get these features?

For Windows users, the questions come down to this: What makes a PC a great Windows machine? How much memory is best? What kind of video system is ideal? Does an external cache matter, and how big is big enough? To find out, we turned to the real experts: We sent letters to the top system vendors, asking them to choose their best Windows machine. We told them we'd be running a suite of Windows-based performance tests, we set a target street price of \$2500, and we left it to them to choose a configuration and make their own trade-offs between

price, performance, and ergonomic features.

It turned out to be a fascinating exercise. Everyone sent us some kind of 486, but otherwise it was every vendor for itself. We received systems running five different processors-from 486-SX-25s to a cutting-edge 486-DX2-66. Some machines had 4MB of RAM; some had 8MB. External memory caches ranged from 0K to 256K. Some video systems counted on Windows accelerator chips for top speed, others went for local-bus video, and one chose vanilla SVGA. Hard disks ranged from 81MB

by Rex Farrance and Michael Goodwin





WINDOWS SPECIAL SYSTEMS

to 234MB. There were EISA buses, ISA buses, towers, and compacts. And the final street prices range from \$2100 to \$3195.

Life on the Bottom Line

We worked up a brand-new Windows-based test suite for this roundup—and the results were not always what we expected. The 66-MHz Acer took the top performance slot, but we found that CPU speed was only one factor among many—including cache size, RAM complement, and the presence of a Windows accelerator.

When we factored in price, performance, design, and service, we ended up with a total of five Best Buys: two DX-50s, two DX2-50s, and one DX-33. Our pick hit for top value in the roundup is the Wyse Decision 486si, which boasts great performance, a low \$2182 estimated street price, and outstanding expandability. The number two winner in overall value is also the second fastest machine we tested: The ATronics Int'l ATI-486-50. This scorching 50-MHz 486DX comes with fine service and support, and its full tower case gives you plenty of room to grow.

Next in overall value comes the Micro Express ME 486-Local Bus/DX2/50. This machine is fairly fast and relatively cheap, and its charms include dual floppy drives, a handy zero insertion force (ZIF) socket for easy CPU upgrades, and a two-year warranty. TriStar's \$2495 Tri-WIN 486DX/50 ISA is another top value—it's a tower model with plenty of growing room and good tech support, and it ran fourth in overall performance. Rounding out the top five, the compact Leading Edge D4/DX2-50 gives you an evenly balanced package, with a \$2499 price, good service, solid performance, and superior expandability.

Models from Touche, Acer, Swan, Eltech, and Tangent jammed close behind the Best Buys. Some of these close-but-no-cigar winners are fine values. For more details, see the reviews.

Do the Right Thing-Whatever It Is

Apart from a reasonable price, what are the musts for any good *Windows* machine? *PC World* and the vendor-experts agree on the importance of strong performance, but we often disagree on how to achieve it. Issues of processor speed, memory, external memory cache, and fast video came up time and again in letters from the vendors—but with wide variation in emphasis.

Our benchmarks simulated a typical Windows workday, including tests with Excel, Word for Windows, Freelance for Windows, and

Best Buys



"Best" is a relative term when you're moving in these fast circles. When we added up the scores for price, performance, expandability, upgradability, and service and support, these five *Windows* systems emerged as the top overall values. All came in at

or under our \$2500 price point, and all placed at the higher end of the performance spectrum. Just a hair behind the top five and clumped too tightly to call were the Touche 486DX/50, the Acer Acer Power 486eDX/66 Model 5657, the Swan 486/33DB, and the Eltech Model 4330.

- 1. Wyse Decision 486si (page 116)
- 2. ATronics Int'l ATI-486-50 (page 104)
- 3. Micro Express ME 486-Local Bus/DX2/50 (page 110)
- 4. TriStar Tri-WIN 486DX/50 ISA (page 113)
- 5. Leading Edge D4/DX2-50 (page 110)



You can't tell your value by CPU alone. Here are two 50-MHz 486DXs, two 50-MHz 486DX2s, and a 33-MHz 486DX. Three different processors—and all are Best Buys.

Paradox running in a DOS window. We weighted the Excel test the most heavily, to match the importance of spreadsheet use in most businesses, but all the tests had a significant impact on the result. And differences in performance were significant: The slowest machine, Packard Bell's 33-MHz 486DX (with a low 4MB of RAM, no external RAM cache, and no graphics accelerator) took more than six times as long overall to complete our benchmarks as the speed-demon 66-MHz 486DX2 Acer.

Our tests show that plenty of memory is crucial to speedy Windows execution. No company supplied a machine with less than 4MB of RAM, and more than half the machines came with 8MB. The 8MB systems showed a noticeable speed advantage. Control tests indicate that, on average, a machine with 8MB of memory will run our *Windows* tests over 10 percent faster than the same PC with 4MB of RAM. Task switching also goes much faster with 8MB of RAM on board. With only 4MB of RAM, you may notice an annoying pause between applications while *Windows* goes to the swap file on your hard disk. So despite some vendors' implication that 4MB is plenty, we strongly recommend 8MB.

An external RAM cache also makes a big difference in a *Windows* machine. Every Intel 486 includes a highly efficient 8K internal cache. Our tests clearly show, however, that an external memory cache can boost the speed of a 486DX system up to 9 percent over a system without an external cache. A basic 64K cache makes a big performance difference; our tests show that moving up from a 64K cache to 256K provides only a slight additional speedup. However, we expect that cutting-edge operating systems like OS/2 and Windows NT will take better advantage of the bigger caches. Only eight machines came without an external RAM cache; you'll find most of them on the lower half of the performance chart, many clustered near the bottom.

Not too many applications take advantage of a math coprocessor—but if you do a lot of financial modeling with your spreadsheet or use CAD in your business, a coprocessor can be a big advantage. If that's for you, be sure to pick a system with a 486DX or 486DX2 processor—both of which boast a built-in floating-point math coprocessor (FPU). The 486SX doesn't include the FPU.

What About Upgradability?

As new, faster CPUs pour off the production lines, upgradability is increasingly important to savvy PC purchasers. You have quite a few options. All 25-MHz 486SXs offer an upgrade path to 50 MHz via Intel's user-installable 25/50 OverDrive CPU. Presumably, most DX-33s will support an OverDrive upgrade to 66 MHz—but until the chips are released by Intel, it's a bit of a crapshoot, since not every DX-33 system will be able to use the OverDrive.

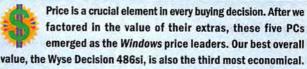
Some systems, like the PCs from ALR, AST, and Everex, are built around a backplane motherboard that lets engineers put the CPU and the system clock on a replaceable processor card. This design widens your upgrade options, but you can't install a processor board that your system's vendor doesn't make—and CPU board upgrades can be pricey. Finally, some systems come with adjustable-speed clocks that let you jack up the speed and simply drop in a faster CPU. Every system here offers at least one upgrade path; look for the one that best suits your pocketbook and your upgrade plans.

Storage, Storage, Storage

Everyone agrees that you'll need plenty of disk storage in a *Windows* PC, but how much is enough? Arche and Zenith Data Systems provided dinky 81MB hard disks. In our opinion, these disks would leave most *Windows* users in immediate need of a hard disk upgrade. On the other hand, almost half the vendors provided 200MB or larger hard disks, a move we applaud. These larger hard disks will give most *Windows* users plenty of room to grow.

Half the vendors provided two standard floppy drives with their systems; the rest chose either a 1.2MB or 1.44MB model. If you

Best Price



value, the Wyse Decision 486si, is also the third most economical That goes to show that a low price can translate to top-notch value.

- 1. Mitac D4125 (page 111)
- 2. Blackship BLK 486/33 (page 104)
- 3. Wyse Decision 486si (page 116)
- 4. Eltech Model 4330 (page 107)
- 5. Compaq Deskpro 4/25si Model 120/W (page 106)

Best Service and Support



A super price and great performance stats don't mean a thing without service and support. Intense competition is driving service and support to excellence. These top-scor-

ing machines all come with free or low-cost on-site service, toll-free technical support, and quick service turnaround policies.

- 1. ALR Flyer 32DT 4DX/33 (page 103)
- 2. NEC PowerMate 486/33i (page 111)
- 3. Touche 486DX/50 (page 113)
- 4. USA Flex 486SX/25 (page 116)
- 5. Blackship BLK 486/33 (page 104)

Best Performance



Wow—the 66-MHz 486DX2 Acer AcerPower 486e DX2/66 Model 5657 is hot! And the 50-MHz 486DX ATronics, Touche, and TriStar are also top performers.

When you wring out 24 PCs ranging from 25-MHz 486SX to 66-MHz 486DX2, you see a wider-than-usual range of speeds. But none of these top five performers will leave you drumming your fingers.

- 1. Acer AcerPower 486e DX2/66 Model 5657 (page 103)
- 2. ATronics Int'l ATI-486-50 (page 104)
- 3. Touche 486DX/50 (page 113)
- 4. TriStar Tri-WIN 486DX/50 ISA (page 113)
- 5. Wyse Decision 486si (page 116)

WINDOWS SPECIAL SYSTEMS

have ever needed to access the "wrong" type of floppy on a singlefloppy system, you'll agree that having just one floppy drive is a major hassle. We recommend insisting on both floppy drives.

In Search of Quicker Video

Windows, which moves a lot of information around the screen, has always suffered from slow screen writes. Fortunately, designers have responded quickly to remedy this with a new generation of video cards built around dedicated graphic accelerator chips. Every PC we received for this review, except the Packard Bell, incorporated some kind of accelerator. Take a look at the performance figures for these systems, and you'll see why we wouldn't consider buying a Windows machine without one. The new local-bus designs let the video subsystem run at processor speed rather than at the typical 8-MHz rate of the expansion bus. Acer, Hewlett-Packard, Micro Express, Swan, Wyse, and Zenith Data Systems provided systems with local-bus video.

We tested our PCs in 800 by 600 super-VGA mode, feeling that this is the best compromise between 1024 by 768—a resolution impractical for use with most monitors because of the tiny text display—and the standard 640 by 480 VGA mode used most common-

ly for business applications. Standard VGA mode does give an increase in speed and generally displays larger characters. However, some video adapters offer large screen fonts you can use in 800 by 600 resolution. These fonts can go a long way toward winning you over to this resolution, giving a big improvement in display quality without making you squint at small characters on a

standard-size screen. Of the computers reviewed here, Acer, Blackship, Compaq, Eltech, Micro Express, NEC, Touche, Twinhead, and Wyse all supply these larger fonts along with their systems.

Most vendors sent us 14-inch displays, which are more than adequate for business applications. Dell, Hewlett-Packard, NEC, Swan, Tangent, and Touche sent us 15-inch monitors, which are even nicer. Large-screen monitors can be a real plus when you're going for higher resolutions.

At Your Service

When all else fails, you must have solid service and support. We test tech support quality by placing anonymous calls to each vendor and asking a series of questions about problems customers typically encounter. We rate answers on the basis of responsiveness, courtesy, accuracy, and thoroughness. We also rate length of warranty, take off for any charges tacked on for on-site service, and look at the turnaround policy for repairing PCs that need to be sent off site.

All these systems come with at least a one-year warranty, but Micro Express, Swan, Touche, and TriStar double your protection period to two years. Over half the PCs here come with a year of free on-site service, and Swan provides a two-year policy. The remaining vendors will sell you a year of on-site service at rates varying from ALR's insignificant \$10 registration fee to ZDS's stiff \$220 charge.

Specialized Talents and Everyday Values

Not every system can hit the top of the charts, but some of these PCs offer special features that make them highly desirable for certain tasks. Take a look at the USA Flex 486SX/25 Windows dream machine. This machine comes with a multimedia upgrade that includes a Matsushita CD ROM drive, a soundboard, and a set of high-quality speakers. This makes a great value as a Windows multimedia system, although its relatively slow performance makes it a much less likely choice for mainstream business use. Or consider that Compaq's Deskpro 4/25si offers the new Compaq Business Audio feature, which enables you to record and embed voice messages in Windows 3.1 documents, spreadsheets, and the like.

The systems that climbed to the top of our overall-value ratings offer the best balance of qualities to typical Windows business users buying in our price range. To make sure that the dollar received its due, we weighted price more heavily than speed—the other top factor in our evaluation. We added bonuses for intelligent design decisions, such as adding a large hard disk with plenty of headroom for huge Windows applications. We also added bonuses for innovative approaches, such as USA Flex's addition of a bevy of multimedia equipment.

Service is nearly as important as performance—and you'll agree with us the first time you run into a system breakdown. We made sure that each of the top five vendors' service-and-support policies

The systems that climbed to the top of our overall value ratings offer the best balance of qualities to typical Windows business users buying in our specified price range. We added bonuses for intelligent design decisions and innovative approaches.

provide adequate protection—nobody wants to wind up fighting an intractable vendor over PC malfunctions. It's also essential to have room to add peripherals and drives, and each PC we recommend gives you plenty of room for expansion *and* the upgradability you need to keep obsolescence at bay.

Judging from all the systems we received and the PC World Test Center test results, performance remains a key factor in an effective Windows system, despite our emphasis on price and the bonuses we add for extra equipment and software. Our best recommendation for a good Windows system includes 8MB of RAM; at least 64K of external cache memory; a video accelerator, local-bus video, or both; and the very largest hard drive you can afford. Fortunately, most of these systems measure up to our standard.

Fifteen Ways to My Baby's Door

Tough times make great opportunities. As we found at the end of our treasure hunt, the wild profusion of competitive *Windows* machines adds up to a set of amazing values for the smart shopper—and guarantees that you'll be able to find a system that's precisely right for your business.

Rex Farrance is an assistant editor and Michael Goodwin a contributing editor for PC World. They can be reached on PC World Online (see page 8 for more information).

For more information about all products in this article, circle reader service no. 901.



VITAL STATISTICS

Street price: \$2916 PROS: Fastest PC here, EISA bus, local-bus video CONS: Expensive, only one floppy drive Contact: 800/733-2237, 408/432-6200, 408/432-6221 (fax) Reader service no. 641

AcerPower 486e DX2/66 Model 5657

Acer's 66-MHz 486DX2 EISA system is the first 66 we've had a chance to review—and as expected, it's amazingly fast. The AcerPower 486e DX2/66 Model 5657 is based on the latest incarnation of Intel's clock doubler OverDrive chip and is designed for motherboards with 33-MHz clocks. Once in place, the DX2-66 chip's processing speeds along at 66 MHz. That's a whale of a lot faster than the 25s, 33s, and 50s that make up the rest of the field in this roundup.

Needless to say, the Model 5657 took first place in every test. Aside from its high-speed CPU, it boasts all the right performance features, including 8MB of RAM, a 256K external memory cache, an EISA bus, and a video accelerator described by Acer's strategic planning manager L. Pablo Grodnitzky as "a proprietary local-bus graphics adapter using ATI's high-performance video chip and our own proprietary ASICs." You do have to pay a price premium for the hot processor and all the rest of this technology: At \$2916, the 5657 is the second most expensive system we looked at—coming in at more than \$400 over our target street price point of \$2500. That does include a roomy 170MB hard disk, but unfortunately, you get just one floppy drive.

Acer did a good job designing a system that fits effectively into its compact case; you'll note that it has room to add up to six drives. The system clock is adjustable, but until Intel releases a 50/100-MHz clock doubler (don't hold your breath), you won't have any use for this particular upgrade feature.

But when it comes to upgradability, Acer gives you some intriguing options you won't find on most machines—at least not yet. For one thing, the upgrade socket that holds the CPU is a new 238-pin model. That means it will not only accept any 486 processor (up to a 50-MHz 486DX) but will also be capable of accepting the next processor upgrade from Intel, which is expected to be based on the company's new Pentium technology. To enhance this system even more, Acer also gives you the benefit of four free EISA slots along with a single 16-bit ISA slot. Acer is the only vendor in this review to offer both local-bus video and a 32-bit expansion bus.

Acer's service-and-support packages in the past haven't been impressive. Just as we were going to press, however, Acer announced an upgraded package that includes end-user tech support. Although there was no time to evaluate its quality, if the support is as good as it sounds, the lightning-fast Model 5657 would probably have rated a Best Buy. Even now, despite its premium price, the AcerPower is such a good value that it falls only a hair short of making it into the top five.



VITAL STATISTICS

Street price: \$2374
PROS: Reasonable price,
SCSI port, great service
CONS: Poor expandability,
only one floppy drive
Contact: 800/444-4257,
714/581-6770, 714/5819240 (fax)
Reader service no. 642

ALR Flyer 32DT 4DX/33

ALR chose to go with a 33-MHz 486DX as its *Windows* machine. The Flyer 32DT 4DX/33 is a decent value—coming in around \$125 under the mark—and reasonably fast. It boasts 8MB of RAM and an integrated video accelerator but lacks an external memory cache, although it's an option, and one we'd expect to boost performance significantly.

The system has a capacious 202MB SCSI hard drive, and a builtin SCSI port will make it easy to install an external CD ROM drive as well. But there's no surfeit of drive bays, so you'll have to plan internal additions carefully. The compact case provides space for only three drive bays and two free slots—and two of the bays are already filled with the one floppy drive and the hard disk.

The CPU is on a replaceable board; you can swap up to a DX2-50 or even a DX2-66. Or keep the 33-MHz board you've already got in place, and drop in a 33/66 OverDrive chip, whenever it hits the market, to carry you up to 66 MHz the cheap way.

One of the most appealing features of the Flyer is its outstanding service-and-support package. On-site service is available for a nominal \$10 for the first year, there's a three-day turnaround policy on return repairs, and toll-free tech support is provided for the life of the system—along with full access to ALR's 24-hour BBS and technical fax-back lines. When we called, our questions were answered without delay, and the replies were accurate. While the Flyer is not one of the stars of the roundup, it's a solid value.



VITAL STATISTICS

Street price: \$2900
PROS: Caching disk
controller
CONS: Expensive, only one
floppy drive
Contact: 800/437-1688,
510/623-8100
Reader service no. 643

Arche Legacy-I 486-33

Arche elected to send us a 33-MHz 486DX system, the Legacy-I 486-33. This roomy minitower offers six bays, five free slots, and a price that's \$400 over the mark (you do get a copy of *Microsoft Works for Windows* in the bargain). What you *don't* get is blazing

speed: The Legacy-I is only a midrange performer, despite a Western Digital video accelerator, a 1MB caching disk controller, and a 64K external memory cache. One problem is undoubtedly the minimal 4MB complement of RAM; our Windows tests indicated that a system's performance could improve by 10 percent or more with an additional 4MB on board.

Although this is a relatively expensive system, the Legacy-I shows other signs of an attempt to save pennies. The hard drive is a dinky 81MB-barely adequate for a Windows box-and there's only one floppy drive. Despite a fast two-day turnaround, service and support is not that great: On-site service costs \$149 a year, and tech support requires a toll call and isn't available on weekends. Arche has painstakingly built up a reputation for providing fast machines at competitive prices. This is still a respectable system, but you can do a lot better.



VITAL STATISTICS

Street price: \$2648 PROS: Easy-open case, **EISA bus** CONS: Pricey, only one floppy drive Contact: 800/876-4278, 714/727-4141, 714/727-9355 (fax) Reader service no. 644

AST Power Premium 4/25s Model 213W

Confronted with our Windows challenge, AST went for an EISA system based on a 25-MHz 486SX: the Power Premium 4/25s Model 213W. At around \$150 over the mark, it turns out to be a bit expensive, but it's still a good value—even with only one floppy drive. Naturally, with 486DX rivals to the right and left, this 486SX system is in a tough performance contest, but thanks to 8MB of RAM and an integrated video accelerator, it placed squarely in the middle of the pack overall. (An external memory cache probably would have given it a significant performance boost, but the design doesn't allow for one.)

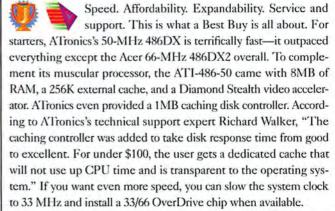
The easy-open compact case holds only three drive bays, but it also provides five free EISA slots (two accept either Cupid or EISA cards) and a 234MB hard disk. The backplane design gives you two shots at an upgrade: You can do a simple processor-board swap using one of the three total Cupid slots, or you can add a 25/50-MHz OverDrive to your existing CPU card. The latter choice is less expensive. If you're looking forward to the 32-bit Windows NT, you can use the two free Cupid slots to expand your RAM to an impressive 80MB. The service-and-support package has its ups (technical support works Saturdays) and downs (a painfully long seven-day turnaround policy). The bottom line is that while this system has a lot going for it, it isn't for everyone. The EISA bus and Cupid architecture are great in a server, but they don't pay off that well in a stand-alone Windows machine-which means most buyers will be paying for technology they can't use.



VITAL STATISTICS

Direct price: \$2500 PROS: Very fast, caching disk controller, very good service and support CONS: Bare-bones documentation Contact: 800/488-7776. 510/656-8560 (fax) Reader service no. 645

ATronics Int'l ATI-486-50



Even so, the price is right on the button. The ATI's tower case provides outstanding expansion capacity, with nine bays and five free slots. A 202MB hard drive is part of the package, too. With one exception (a \$99 yearly charge for on-site service), the service and support is fine: ATronics's policy is to turn around systems that need factory repairs within three days, tech support is toll free, and when we called, all the answers we got were accurate. ATronics put this machine together especially for this review, and the company will be glad to do the same for you. Is there any reason not to pick this peach? Go for it.



VITAL STATISTICS

Direct price: \$2145 PROS: Great price, fine service and support **CONS: Midrange** performance Contact: 800/531-7447, 408/432-7500, 408/432-1443 (fax) Reader service no. 646

Blackship BLK 486/33

Blackship's systems often finish near the top in our roundups-we cite them usually for low prices and often for high speed and overall value as well. This time, faced with our Windows challenge, Blackship sent us a 33-MHz 486DX. As you might expect from the fourth-most-powerful processor in our

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WINDOWS SPECIAL SYSTEMS

roundup, the BLK 486/33 is only a midrange performer in this multiplatform ballpark. But it's still a solid value. For one thing, it placed second on the Best Price list, coming in almost \$350 under our \$2500 limit. Better yet, that low price includes 8MB of RAM, a 64K external cache, an Orchid Fahrenheit 1280 video accelerator, two floppy drives, and a 124MB hard disk.

The case is a low-rise minitower that should fit on your desktop without taking up too much space. And this space-saving design still gives you plenty of room for drives in its six bays. The AMI motherboard boasts seven free slots, but two of them are blocked by the drive cage and won't handle full-length boards. Fortunately, thanks to advanced chip and circuit technology, it's becoming increasingly unusual to run into full-length expansion boards these days, and with seven positions available for adding peripherals, it's far from likely that you'll ever feel a pinch.

You'll be glad to know that the system will support Intel's future 33/66-MHz OverDrive chip—in case you wake up one morning to discover that 33 MHz isn't fast enough for you. Service and support is consistently first-rate: On-site service is free, there's a two-day turnaround policy, tech support is toll free, answers were mostly helpful, and we got through the call queue with virtually no delays. In short, if you can live without the latest enhancements in cutting-edge performance, we have no hesitation recommending this well-built, low-priced system.



Street price: \$2335 PROS: Good price, easyopen case, Business Audio included CONS: Slow, limited expandability Contact: 800/345-1518, 713/370-0670

Reader service no. 647

Compaq Deskpro 4/25si Model 120/W

Compaq is staking its fortunes (in this roundup, anyway) on a relatively low-powered 25-MHz 486SX system. While the Deskpro 4/25si is still a fair value, it won't win any speed medals. On the other hand, for once we don't have to slap Compaq's wrist for a high price: The 4/25si comes in more than \$150 under our price point—and it includes some appealing extras. Compaq's integrated QVision video accelerator, says spokesperson Hedy Baker, is "an exceptional graphics subsystem that frees up the 486SX processor to manage data, not Windows." You also get a feature called Business Audio, which allows you to record and embed voice messages anywhere in Windows 3.1 documents. You can add voice notes to a document for later reference or voice-annotate presentations and training programs. A microphone and a set of headphones come with the package.

Although the gravy is nice, the 4/25si skimps on the bread-andbutter basics: You get only 4MB of RAM and just one floppy drive. There's no external cache (although you can install 64K if you wish), and the 116MB hard disk could be bigger. The compact case is tight on bays and free slots; you get only three of each.

If you get to the point where the system's pedestrian performance is no longer bearable, you have some upgrade options: You can leave your adjustable clock set at 25 MHz and drop in one of Intel's 25/50-MHz OverDrive chips, or you can insert a 33/66-MHz OverDrive CPU when available and reset your speed jumpers to 33 MHz. These upgrade options cost money, of course—but you may have a little extra to spend, thanks to the system's low price, the free on-site service package, and the toll-free tech support line. In fact, the only major complaint we have about Compaq's service-and-support deal is the lack of a turnaround policy. Compaq's systems are always worth considering, and the Deskpro 4/25si is no exception—but it's not one of the better values here.



Direct price: \$2448 PROS: Fine service and support, 15-inch monitor CONS: Slow, limited expandability Contact: 800/426-5150, 512/338-4400, 800/727-8320 (fax) Reader service no. 648

Dell System 486P/33

Dell sent us a 33-MHz 486DX, but despite the more powerful processor, this system is all too similar to its rival Compaq's so-so 486SX-25. The Dell 486P/33 is right on the money for our target price point, but that's still over \$100 more expensive than the Compaq. And while the Dell is a bit faster, neither of these systems is an impressive performer.

Both offer an integrated accelerator and an adjustable-clock upgrade path that gives a 33-MHz top clock setting. That means you'll be able to use the future 33/66-MHz OverDrive. Both limit you to three bays and three free slots. Both have a minimal 4MB of RAM, a smallish 116MB hard drive, only one floppy drive, and no external cache—but while Compaq lets you add cache memory, Dell does not. To Dell's credit, the 486P/33 comes with a 15-inch monitor. The 1-inch difference between this display and all but a handful of others in this review may not sound like much—until you sit down and put the monitor to work. Then you'll appreciate the distinction. We only wish that Dell had thrown in large fonts to make using 800 by 600 resolution a more practical option. Another advantage Dell gives you over Compaq is Dell's justly famous service-and-support package. One point of contrast is that Dell gives you weekend support, while Compaq does not.

Dell and Compaq tend to face off against each other in their ads, and it's likely that a lot of business buyers will be choosing between these two systems. If we had to make that choice, well . . . we'd probably choose the Dell for its slightly faster speed and bigger monitor. Then again we might choose the Compaq for its Business Audio feature and slightly lower price. But frankly, we see no reason to choose between them at all, given so many superior alternatives in this roundup.



VITAL STATISTICS

Direct price: \$2249

PROS: Fast, inexpensive, fine service and support

CONS: Technical support responses a bit slow

Contact: 800/358-8330, 510/438-0990, 510/438-0963 (fax)

Reader service no. 649

Eltech Model 4330

The 33-MHz 486DX Eltech Model 4330 is an outstanding value—just a hair shy of Best Buy honors. For one thing, it placed in the top third overall for performance, and it boasts one of the lowest prices in the roundup—\$250 under our price point. Nor is this an underpowered "economy" configuration: You get two floppy drives, a roomy 203MB hard disk, and a copy of Microsoft Works for Windows in the bargain.

Three reasons for the fine performance numbers are 8MB of RAM, a 64K external cache (expandable to a whopping 1MB if you wish), and an ATI video accelerator. Despite a compact case, there's plenty of elbowroom for slots and bays: There's space for five drives, and the motherboard boasts six free slots (only one of which is limited to half-length boards). If you want to pour on even more speed, you can OverDrive this system to 66 MHz as soon as Intel lets this hot new CPU out the door.

The service-and-support arrangements are first-rate: On-site service is free, Eltech's policy is to turn around repairs within two days, and technical support is toll free and available on Saturdays. When we called up and acted like a confused customer, we got accurate answers. The one detraction from Eltech's score came when tech support took several hours to return our call.

This Eltech *Windows* configuration is a solid choice: It's fast and inexpensive and has plenty of room for expansion.



VITAL STATISTICS

Street price: \$2571
PROS: Reasonably fast,
CPU-card design
CONS: No toll-free central
support
Contact: 800/821-0806,
510/498-1111, 510/6510728 (fax)
Reader service no. 650

Everex Tempo M Series 486/33

As you can probably guess from the model number, Everex's Tempo M Series 486/33 is another 33-MHz 486DX—and while it's not one of our superstar Best Buy systems, it's still a solid value. Its price just missed our target, but its performance is better than average, and the system comes with 8MB of RAM, a 256K external

memory cache, two floppy drives, a 125MB hard disk, and an integrated video accelerator. This is a modular PC with a CPU-card design, and the 33-MHz module in our machine will support the future 33/66-MHz OverDrive chip.

Everex marketing manager Raj Mitra says, "We upgraded the basic 128K write-back cache to 256K to better support the two-way interleaved memory architecture scheme of the Tempo M. The larger cache ensures maximum performance for most applications. Also, if the user upgrades to a 32-bit operating system like UNIX or Windows NT, the larger cache will ensure good performance."

The compact case allows room for three drive bays and an outstanding seven free slots. A nice consideration for *WordPerfect* users is that the keyboard comes with <Ctrl>, <Alt>, and <Shift> keys that are color-coded to match *WordPerfect*'s color template. Service and support is mixed: On-site service is free, there's a three-day turnaround, and the technical support queue moves quickly. But if you have to call long distance, you'll have to pay the toll—and the answers we got weren't always perfect. Adding it up: This PC isn't one of our top values, just a good performer at a reasonable price. You could do a lot worse.



VITAL STATISTICS

Street price: \$2686 PROS: Easy-open case, 15inch low-emissions monitor CONS: Unimpressive performance, limited expandability Contact: 800/752-0900 Reader service no. 651

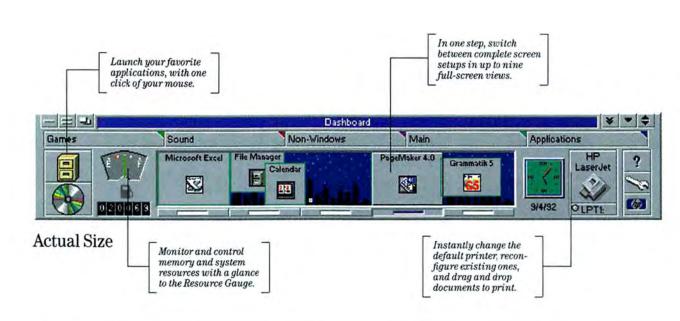
Hewlett-Packard Vectra 486/33N PC

There are 11 486DX-33s in this roundup. One of them, the Wyse Decision 486si, even took top place as best overall value. The Hewlett-Packard Vectra 486/33N PC is also a 33, but it's almost three-quarters of the way down the list from number one. The problem isn't price—at least not price alone. Sure, the Vectra strikes almost \$200 above our \$2500 bull's-eye, but that price does include an expensive 15-inch low-emissions monitor—and those who are concerned about emissions will be pleased to learn that it surpasses the tough Swedish MPR II standard. You also get an easy-open case and a generous 163MB hard disk. While the performance of this system is only middling—despite an integrated video accelerator—it's far from the worst here.

Speed was reduced by a number of factors: For one thing, after we tested the computer, Hewlett-Packard told us that its drive had come with its cache disabled, a factor that almost certainly hurt the system on the disk-intensive *Paradox* benchmark. HP would have corrected the problem if we hadn't already passed our deadline, and there should be no problem with models you'll find on the market by the time you read this. You can upgrade the 4MB of memory to 8MB and see more than 10 percent improvement in performance as a result. But there's nothing you can do to mitigate the lack of an external memory cache, as none is supported. Adding to its limita-



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WINDOWS SPECIAL SYSTEMS

tions, the compact case holds you to only two drive bays and three free slots, so you probably wouldn't want to use this system as a stand-alone PC.

The Vectra comes with solid service and support, but there's no central support number. The quality of Hewlett-Packard's on-site service is about as good as it gets; HP is one of the few companies that provide their own service rather than contracting with a third-party supplier. One area where Hewlett-Packard has traditionally been strong is design. Components used are always of top quality and assembled well with accessibility in mind. The Vectra 486/33N PC is no exception to this rule, so if design and quality issues rise to the top of your list, Hewlett-Packard computers are always worth consideration. If you're sold on Hewlett-Packard's adjustable clock, low-emissions monitor, and easy-access design, and can live within this ultracompact's limitations, the Vectra may appeal to you. For most users, however, this configuration just won't make it against the stiff competition in this roundup.



VITAL STATISTICS

Street price: \$2499
PROS: Fast, dual floppy drives
CONS: No turnaround guarantee
Contact: 800/874-3340, 508/836-4800
Reader service no. 652

Leading Edge D4/DX2-50

The Best Buy Leading Edge D4/DX2-50 takes advantage of Intel's DX2 clock doubler technology to give you a 50-MHz processor on a motherboard using a 25-MHz system clock. Our benchmark tests found it to be one of the faster systems across the range of the *Windows* test suite. No doubt its complement of performance-enhancing hardware had a lot to do with that: The D4/DX2-50 comes with 8MB of RAM, a 64K external cache (which you can expand to 256K if you wish), and a video accelerator. And if 50 MHz isn't fast enough for you, you can replace the system clock crystal with one that runs at 33 MHz and try out the forthcoming 33/66 OverDrive. The price is right on the mark, too—and you get both floppy drives, a 202MB hard drive, and a copy of *Microsoft Works for Windows*.

Although the unit comes in a space-saving compact desktop package, it's not at all stingy with slots or bays. There's room to install up to four drives, and the motherboard offers positions for six peripherals. We congratulate Leading Edge on upgrading its service-and-support package: To complement a year's free on-site service, you now get toll-free technical support—a refreshing reprieve from the 900-number support we've criticized in the past. The technicians were in all cases helpful and accurate, but it took us a while to get through to them. Furthermore, there's no turnaround policy on return repairs. Nonetheless, the system's pluses outweigh the minuses by such an overwhelming degree that we have no hesitation about awarding it Best Buy honors.



VITAL STATISTICS

PROS: Nice price, ZIF socket, great service and support CONS: None Contact: 800/989-9900, 714/852-1400, 714/852-1225 (fax) Reader service no. 653

Micro Express ME 486-Local Bus/DX2/50

Micro Express's Best Buy 50-MHz 486DX2 comes in \$100 under the mark. Despite the low price, it's loaded with high-performance hardware: a 4MB caching disk controller, an integrated local-bus video accelerator, and a 256K external RAM cache. Given all that, it's surprising the company included a minimal 4MB of main memory. Considering the low cost of SIMMs these days, we suspect that Micro Express could have added another 4MB of RAM and not pushed our pricing envelope far out of shape. Our control tests indicate that configuring with 8MB of RAM rather than 4MB can pay off with a 10 percent or more increase in system speed. That kind of boost would have made this good performer into an even better one.

Some of the Local Bus/DX2/50's extras don't have a direct impact on performance, but that doesn't mean you won't appreciate them. A 203MB hard disk provides plenty of room for *Windows* applications and data files. 5%-inch and 3%-inch floppy drives let you load software and save your work in both drive formats. The compact case is surprisingly well equipped with expansion space: five drive bays and six free slots. And all five of the bays are accessible from the front of the case, so even with the installed drives taking up three of them, you still have room to add a CD ROM drive and a tape backup unit. That's significant—considering the extra cost of external drives.

The system comes with a programmable keyboard that has a second set of function keys in two vertical rows on the left. This will appeal to users who fondly remember the original IBM AT keyboard. And if you want to wring the last drops of speed out of the system, the adjustable clock can be jumpered up to 33 MHz, allowing you to install the forthcoming 33/66 OverDrive. If you take that route, you'll be grateful for the ZIF socket that lets you swap CPUs without worrying about chip pullers or bent pins; taking out that old chip is as easy as lifting a lever.

Service and support is also excellent: An extra-long warranty means you can count on protection against failure for 24 months. On-site service is available from GTE for a nominal fee of \$50 for the first year, and if you need to return the unit to Micro Express for any reason, the company's policy is to turn it around to you within two days. In addition, you get toll-free tech support (including automated fax-back of requested documents) 24 hours a day, seven days a week. If everything here doesn't add up to a Best Buy, we don't know what does.



VITAL STATISTICS

Street price: \$2100 PROS: Least expensive PC here, dual floppy drives CONS: Slow, inferior keyboard Contact: 800/777-1688,

Contact: 800/777-1688, 510/623-5300, 510/623-5390 (fax)

Reader service no. 654

Mitac D4125

The 25-MHz 486SX-based D4125 from Mitac is the cheapest system in the roundup. It can be yours for an impressive \$400 less than our \$2500 price point. But the company might have done better to include a few more performance features, even if that raised the ante. The D4125 is one of the pokiest performers here, despite its 64K external cache and an Aamazing video accelerator. If you want to beef up the performance—as you probably will sooner or later—we'd recommend starting out by upgrading the system's RAM from 4MB to 8MB. After that, you might consider the more expensive upgrades of installing a 25/50 OverDrive chip or installing a 33-MHz clock crystal and the forthcoming 33/66 OverDrive CPU.

The compact case holds a generous complement of bays and free slots (six each), along with a good-size 203MB hard disk—and if you're worried about the effects of emissions, you'll be glad to know that Mitac throws in a low-radiation L1420 monitor. Documentation is minimal (separate manuals for motherboard, video board, and I/O board) but adequate. The keyboard, on the other hand, is a major drag: During our tests, several keys popped off. Service and support could be better, too. On-site service is not cheap at \$99 a year, and the seven-day turnaround policy is too slow for us. To compound our irritation, getting through to tech support took a *long* time. If price is your highest priority, Mitac's D4125 could be right up your alley. Just be prepared for some potholes.



VITAL STATISTICS

Street price: \$2478
PROS: Great design, 15-inch NEC 3FGx monitor, fine service and support
CONS: Slow, only one floppy drive
Contact: 800/388-8888, 508/264-8000
Reader service no. 655

NEC PowerMate 486/33i

NEC's 33-MHz 486DX, the PowerMate 486/33i, is one of the slowest performers we looked at, despite its integrated video accelerator. The lack of a CPU cache and the minimal 4MB of RAM are presumably the culprits responsible for the PowerMate's mediocre test scores. If you boosted the RAM to 8MB and installed a 64K external RAM cache (you can go up to 128K), our control tests indicate you could boost performance by 10 percent or more. The price on the configuration we received is almost perfectly on target, and you get NEC's fabulous high-contrast 15-inch 3FGx monitor. Marketing Manager Michael Everett says, "The PowerMate 486/33i features an optimized video subsystem with automatic MultiSyne refresh-rate adjustment to provide the ultimate flicker-free Windows display at all resolutions." The compact case provides room for four drive bays and four free slots.

This PC boasts some marvelous design touches. When it's time to go under the hood, NEC's outstanding easy-open chassis design makes the process a lot easier. The cover comes off with a turn of a latch, and drives snap in and out with no tools. The power switch, keyboard port, mouse port, and ports for use with the optional multimedia kit's microphone and headphone are conveniently located on the front of the system. In addition, the general fit and finish of NEC computers is always very good.

You could upgrade this 33-MHz 486DX to a 50-MHz OverDrive by stepping the adjustable clock down to 25 MHz and adding the doubler. But the smartest upgrade will be to drop in a 33/66 Over-Drive when it's available.

On the downside, you get only one floppy drive, and the 116MB hard disk is on the small side for a *Windows* workstation. But service and support is excellent, including free on-site service, a fast two-day turnaround, and a toll-free tech support line that provided answers with impeccable speed and accuracy.

Recent looks at NEC systems have left us impressed. There's no question that this company knows how to put together a PC. So this system's beautiful design may tempt you in spite of the machine's ho-hum speed scores.



VITAL STATISTICS

Street price: \$1868
PROS: Good price
CONS: Awkward design,
slow on Windows
Contact:
800/488-2905
Reader service no. 729

Packard Bell 486DX/33

The 486DX/33, like most Packard Bell systems, carries a reasonable price tag. And this compact desktop model includes a modem and Lotus Write—nice freebies with a personal computer that you can find for \$2499 on the street. When we say "on the street," we mean it: Packard Bell systems are very easy to find, thanks to the company's wide-ranging distribution, which lets you buy at membership warehouses (such as Price Club, Pace, and Costco) consumer electronics stores, and mainstream retail outlets. In addition, Packard Bell tosses in a capacious 234MB hard disk and provides four free slots, four drive bays, and an adjustable system clock—albeit one that is already topped out at 33 MHz.

Unfortunately, this 33-MHz 486DX system's performance suffered from its relatively small 4MB of RAM and lack of external memory cache and graphics accelerator. As a result, the machine took over six times as long as the leader to complete our series of benchmarks, winding up dead last in overall performance and bringing up the rear on the Excel, Freelance for Windows, and Word for Windows tests.

When we pointed out the poor test results to Packard Bell, the company sent technical representatives to add a cache and to put in a graphics accelerator. The scores improved threefold, which would have brought the machine up into the middle of the pack. This shows the benefits of graphics accelerators and external RAM caches in the *Windows* environment. Upgrading the unit we received would cost about \$200, but you won't be able to find the system configured this way on the shelf. Fortunately, Packard Bell plans to release a new system (which may be available by the time you read this) that will add the cache and graphics accelerator to its configuration.

Service and support includes a year of free on-site service and tollfree technical support that works 24 hours during the week and 9 hours on weekends. On the downside, there's no service turnaround policy, and it took forever to get through to technical support. When we did get through, the answers we got weren't always right.

Because of the 486DX/33's extremely slow performance, we can't recommend it. Even Packard Bell fans will want to search out the new model with cache and graphics accelerator improvements.



VITAL STATISTICS

Direct price: \$2755
PROS: Speed, 15-inch
monitor, local-bus video
CONS: Pricey, no service
turnaround guarantee
Contact: 800/468-9044,
814/234-2236, 814/2374450 (fax)
Reader service no. 657

Swan 486/33DB

This 33-MHz 486DX is a very good buy, but its price kept it out of our top five overall values. According to Chris Dippery, marketing coordinator, "The outstanding video performance of the Swan 486 Direct Bus systems is achieved by connecting the superfast S3 accelerator chip directly to the CPU via the local bus, eliminating the conventional I/O channel bottleneck. This technology allows the system to operate with no wait states.... The result is phenomenal video performance in Windows and other graphical environments." Although our tests don't isolate video performance, the system was quite fast—sixth overall, fourth in Freelance for Windows, and fifth in Word for Windows. Considering that its 33-MHz 486DX processor was only the fourth most powerful CPU represented here, that's more than respectable. Swan's 8MB of RAM and 128K external memory cache contributed to its fine showing.

The Swan is expandable, too: Inside the compact case, you'll find five free slots, four drive bays, and a 124MB hard disk. And Swan

gives you an array of ways to turn this machine into an even faster system. CPU board upgrades are available up to 50 MHz, or you can upgrade via the future 33/66 OverDrive without having to purchase a processor card. And if you like a little extra display size, Swan throws in a 15-inch noninterlaced SVGA monitor, although the company doesn't throw in the large fonts that can make running at 800 by 600 resolution so much easier on the eyes. Its total direct price exceeds our mark by \$255, however, so this configuration may not appeal to bargain hunters.

Swan's service-and-support package boasts a two-year warranty backed by two years of free on-site service and toll-free technical support seven days a week. And the answers to our technical queries were almost perfect, although sometimes it took a while to get through to a representative. Swan makes no guarantee about how long it will take to turn around a system that might need offsite repairs. Still, the wonderful warranty, great on-site service option, and very good performance all add up to one very tempting Windows package.



VITAL STATISTICS

Direct price: \$2495
PROS: 15-inch monitor
CONS: Only one floppy
drive
Contact: 800/466-3300,
415/342-9388, 415/3429380 (fax)
Reader service no. 658

Tangent Model 425s

The Tangent Model 425s 25-MHz 486SX is a solid value. The price is right on, and we have to credit Tangent for crystallizing some important price/performance issues in its letter: "The perceived speed of a Windows system has more to do with how quickly it responds to input than how long it takes to process a huge database.... A faster CPU that spends most of its time waiting on inadequate memory, hard disk, and video card resources is wasted performance." Tangent provides 8MB of RAM, a 256K external memory cache, and an Actix video accelerator. As a result, the 425s showed respectable, middle-of-the-road overall performance even though it had the least powerful CPU in our roundup. It even surpassed five 33-MHz 486DXs and one 50-MHz 486DX2.

Tangent is the first company we know of to make a graphics accelerator standard on all its *Windows* systems, a practice followed almost universally today. Tangent complements its SVGA accelerator with a flat-screen Taxan 15-inch monitor. This midsize tower's expandability is a strong point. Thanks to a replaceable system clock, which accommodates 33-MHz and 50-MHz upgrades, you can start out with a 25-MHz 486SX and move up to a 33-MHz 486DX, 50-MHz Over-Drive, 50-MHz 486DX, or 66-MHz Over-Drive when you're ready. You have the option of filling eight drive bays, and the six free slots should be plenty. Unfortunately, one slot will accept nothing larger than a half-card, as it's partially obstructed by a drive bay.

The 120MB hard disk is adequate, if not generous, and Tangent throws in a copy of *Stacker*; which you can use to approximately double its capacity. We conducted our performance tests in native mode, but we found in alternative tests that the data compression didn't slow the machine at all. However, we would have appreciated a second floppy drive.

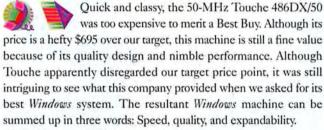
Tangent's service and support is consistently good and includes a year of free on-site service and a three-day service turnaround guarantee. Technical support is given via a toll-free line, and the technicians provided us with fast, accurate, and courteous answers. This is the only 486SX-25 machine to make it as one of the top ten values, and it is really fast for its processor class—which shows that when picking a *Windows* PC, the right configuration is as important as raw processing power.



VITAL STATISTICS

Direct price: \$3195
PROS: Fast,15-inch monitor, two-year warranty
CONS: Most expensive system in roundup, only one floppy drive
Contact: 708/810-1010, 708/810-9490 (fax)
Reader service no. 659

Touche 486DX/50



The Touche 486DX/50 was third fastest overall, coming in second on the *Paradox* test and third on *Freelance for Windows*, and *Excel*. You'd expect a 50-MHz 486DX to be fast, of course. But the Touche has all the essentials and more, with 8MB of RAM, a 256K external memory cache, a 1MB UltraStor 15C caching disk controller, a National Design Volante video accelerator, and a 234MB hard disk. You also get a 15-inch NEC 4FG monitor.

The Touche's tower case has eight bays, and the AMI motherboard has six free slots. The system comes with a replaceable clock crystal—but since you're already at 50 MHz, the only profitable gambit would be to put in a 33-MHz crystal and install a 33/66 OverDrive CPU when it's available.

Service and support is really outstanding: You get a two-year warranty, and on-site service is just \$29 for the first year. In addition, there's a one-day turnaround on off-site repairs, and toll-free technical support. If your experience echoes ours, all your questions will be answered quickly and accurately. All this brings us back to the question of how high a price you're willing to pay. This is no PC for buyers with thin wallets, but if you have some extra loot lying around, this machine is a very good buy.



VITAL STATISTICS

Direct price: \$2495
PROS: Fast, two-year warranty, dual floppy drives
CONS: None
Contact: 800/800-7668,
602/961-3401, 602/9614010 (fax)
Reader service no. 660

TriStar Tri-WIN 486DX/50 ISA

The TriStar Tri-WIN 486DX/50 ISA is a powerful 50-MHz 486DX. It also happens to be a terrific value and a Best Buy. It's the fourth fastest system here overall, finishing fourth on the *Excel* test and third on *Word for Windows*. What's more, it hits our price point nearly dead center. This PC is set up for *Windows* with 8MB of RAM, a 128K external RAM cache, and a Diamond Stealth VRAM video accelerator.

The big tower case has room for nine drives, and the Free Technology motherboard has six free slots. As with Touche's PC, the clock crystal is replaceable—but since you're already at 50 MHz, the only way to boost speed would be to drop back to 33 MHz and install a 33/66 OverDrive when it comes to market.

The TriStar gives you both standard floppy drives. But the 100MB hard disk in our unit provides only adequate space for *Windows* applications and data. *WordPerfect* users will like the keyboard: As with Everex's setup, the keyboard comes with color-coded <Ctrl>, <Alt>, and <Shift> keys matching *WordPerfect*'s template.

Service and support ranges from excellent to good: You can't find a better warranty than TriStar's two years, the two-day turnaround policy is among the best, and the first year of NCR on-site service is free. The toll-free technical support works on Saturdays, but it wasn't always easy for us to get through, and not every question was answered perfectly. Add up all the TriStar *Windows* machine's virtues, however, and you get a solid Best Buy.

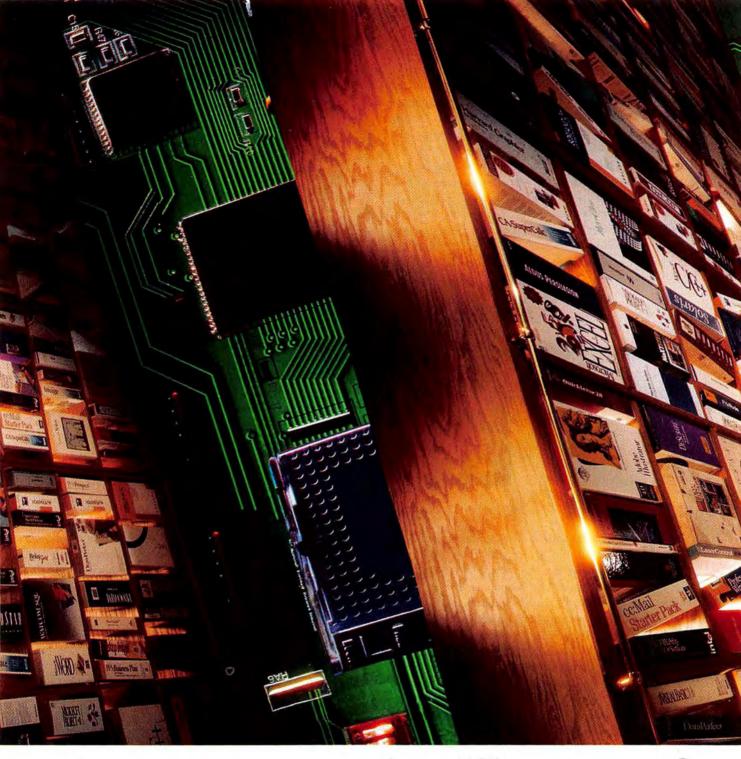


VITAL STATISTICS

Street price: \$2398 PROS: Good price CONS: Slow, limited capacity for adding peripherals Contact: 800/545-8946, 408/945-0808, 408/945-1080 (fax) Reader service no. 661

Twinhead Superset 600/452C

The price of this 50-MHz 486DX2 is attractive—undercutting our mark by about \$100—but Twinhead's Superset 600/452C Windows machine is still only a fair value. Why? Because it's one of the slower systems here, placing in the bottom fifth overall and next to last



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WINDOWS SPECIAL SYSTEMS

on the Word for Windows benchmark. These results are surprising, considering that the system comes with 8MB of RAM, a 64K external memory cache, and an integrated video accelerator. As we received it, this system runs with a 25-MHz system clock; if you want more speed—as well you might—you can drop in a 33-MHz clock crystal and an OverDrive doubler when available to run processing speed up to 66 MHz.

The clean-looking compact desktop case has room for four drives, but there are just four free slots, which means your ability to add peripherals is limited. Twinhead uses a motherboard design, integrating not only the video controller but the I/O ports, IDE interface, and floppy controller. Twinhead did supply a generous 200MB hard disk but just one floppy drive.

The documentation for this system is generic but adequate. If you need emergency help, however, you'll be glad to know that support is good, with a year of free on-site service, toll-free technical support, and a solid three-day turnaround policy. All our questions were answered within a reasonable time, and accurately to boot. However, considering the strength of the competition, we would pass on this system.



VITAL STATISTICS

Direct price: \$2499
PROS: Dual floppy drives,
CD ROM player, excellent
service and support
CONS: Below-average
performance
Contact: 800/769-3539,
708/351-7204 (fax)
Reader service no. 662

USA Flex 486SX/25

If your main interest is an inexpensive Windows machine that's also a full-featured multimedia PC, you need look no further than the USA Flex 486SX/25. This 25-MHz 486SX doesn't compete with the pack of faster performers, but it's a solid value nonetheless. It came in priced right on the money, which is impressive considering the incredible package of multimedia extras that comes with it. You get a Matsushita CD ROM player, an Audio-Master soundboard, 22-watt Studio Pro amplified speakers, and even the multimedia editions of Chessmaster 3000 and Microsoft Works for Windows. And that's not all-USA Flex also throws in PFS:WindowWorks and Anamotion-MCS sound software. As Don Hoff, USA Flex's advertising manager told us in the letter he wrote, "We didn't want a system that would appeal to only a small, highly technical audience, nor were we interested in offering a bare-bones low-priced machine that could not meet the demands of the professional user."

Business users won't find the system's performance dazzling, but it's no embarrassment, either. There's only 4MB of RAM, but you do get a 256K external cache and a Diamond Stealth VRAM video accelerator. If, after you've owned this box for a while, you want to get it up to business speed, you can add an OverDrive processor and get it cranking out at 50 MHz. And with 4MB in standard

SIMMs already priced below \$150, you can add an economical boost to RAM—and performance. The compact case will hold up to six drives, and a respectable five free slots leaves you room to add peripherals. Storage is no problem, as you get both standard floppy drives and a healthy 203MB hard disk.

Service and support is dandy: One year of on-site service comes free with the system, there's a fast two-day service turnaround policy for off-site repairs, and 24-hour-a-day technical support is toll free seven days a week. We got nothing but fast and accurate answers. This system bundle probably won't be your ticket for mainstream business applications, but multimedia fans will find it can really put on a show.



VITAL STATISTICS

Street price: \$2182
PROS: Fast, great price, local-bus video, ZIF socket
CONS: Spotty technical support responsiveness
Contact: 800/438-9973, 408/473-1200, 408/473-1972 (fax)
Reader service no. 663

Wyse Decision 486si



Lo and behold—after digging our way through all these red-hot processors and

exotic configurations, we turn over the card of the top overall value and find a tried-and-true 33-MHz 486DX. In such fast company, that's a very high honor. How does a system based on the fourth most powerful CPU here rate this kind of attention? For starters, the Wyse Decision 486si won't strain your budget; its \$2182 price is third on our Best Price list—more than \$200 short of the \$2500 limit.

And if you think that for this kind of dough you have to settle for a slowpoke computer, think again. Sure, this isn't the hottest machine here, but it still placed fifth in overall performance and no worse than fifth on any of the three Windows-specific tests. No doubt Wyse's well-thought-out configuration helped in achieving this sterling performance: Our Windows workstation came with 8MB of RAM, a healthy 256K external memory cache, and an integrated local-bus video accelerator.

If you're looking forward to an even faster future, Wyse's motherboard lets you simply move jumpers and adjust the system clock to run as fast as 50 MHz. But since you're already at 33 MHz, it probably makes more sense to simply insert the 33/66 OverDrive chip when it becomes available and jump all the way to 66 MHz—unless you already have a spare 50-MHz 486DX CPU kicking around the office. Whatever upgrade path you choose, a zero insertion force processor socket means you can swap processor chips with the flip of a lever.

The case is a handsome, easy-open compact that accepts up to five drives. We would have liked a second floppy, and the 120MB hard disk doesn't leave you a ton of extra room for applications and data. But six free slots give you room to add plenty of peripherals,

although the drive cage placement means you'll need to use halflength cards in three of them.

Service and support is sound, starting with a toll-free technical support line and a fax-back line for requested documents. You can have a year of on-site service for \$99, and the three-day service turnaround policy is good. Our biggest complaint is that it took too long to get through—and when we did, the answers we got weren't always perfect. Other than these quibbles, however, we have nothing but praise for this 486-33. In the past we've criticized this company's systems for being vastly overpriced, but this time Wyse is right on the money.



VITAL STATISTICS

Street price: \$2588

PROS: Great manual, LAN module, ZCM monitor

CONS: Slow, poor service and support

Contact: 800/553-0331, 708/808-5000

Reader service no. 664

Zenith Data Systems Z-Station 425Sh Model 80

Zenith Data Systems sent us a network-ready *Windows* workstation. We have to give ZDS credit for taking a unique approach, although limitations narrow the system's appeal. John Bace, ZDS manager of media relations, described the system: "The Z-Station 425Sh Model 80 comes network ready with an NE2000 Ethernet high-speed communications port and the three most popular LAN shells preinstalled and preconfigured." That means you get a plug-and-play Novell NetWare, *Microsoft LAN Manager*, or Banyan VINES client. And putting this box on a LAN would do much to mitigate the too-small 81MB hard disk—as long as you run your applications from a server.

Unfortunately, this was one of the slowest systems in the roundup, coming in next to last overall, last on our *Paradox* test, and close to the bottom on *Excel* and *Word for Windows*. We can only think that the lack of an external memory cache hurt performance, as the 425Sh comes with 8MB of RAM and a local-bus video accelerator. It is interesting to note that the Zenith Data Systems *Windows* Accelerator Module sells for \$329 unless you order it with the PC. So it makes sense to add it for \$179 at the time of purchase, Even so, however, with the module added, the system's price is just a bit high, at nearly \$100 over the mark.

The flat-screen ZCM 1430 monitor is outstanding, giving a particularly clear look at your applications. The case is compact, but you still get five drive bays. Three of the bays are accessible to the front of the case, so it's possible to add a tape backup drive or an internal CD ROM player even after installing a 3½-inch floppy disk drive to complement the installed 5½-inch unit. Four free slots isn't bad for a LAN client. You can upgrade with a 25/50-MHz OverDrive CPU or replace the clock crystal with a 33-MHz oscillator and go to a 33/66

OverDrive in the future.

If you have ever struggled with installation, setup, or troubleshooting, you'll appreciate the documentation, which is among the best here. ZDS gives you a concise guide and a user guide for Windows and DOS, a well-illustrated user guide for the system, and a mouse user guide. Too bad the service-and-support package isn't as complete: Although all our questions were answered quickly with fair accuracy, there's no service turnaround policy, and on-site service will run you a brutal \$220 a year. If the performance hadn't fallen so far short, we'd consider this a good Windows LAN workstation. As it is, however, it's not even close.

Late List Prices

You're probably used to PCs having their prices cut, and these Windows systems are no exception. In the two months from September to November, a number of vendors lowered their prices. Dramatic plunges were the exception this time rather than the rule, although the price on the Tangent Model 425s plunged almost \$500. As it always does, it pays to call vendors before making your final purchase decision.

PC Prices Still Headed Downward

Acer AcerPower 486e DX2/66 Model 5657 ALR Flyer 32DT 4DX/33 \$3166 none Arche Legacy-I 486-33 \$3503 none \$3490 AST Power Premium 4/25s Model 213W none ATronics Int'l ATI-486-50 \$2395 \$105 Blackship BLK 486/33 \$2145 none Compaq Deskpro 4/25si Model 120/W \$2332 \$321 Dell System 486P/33 \$2488 none Eltech Model 4330 \$2229 \$20 Everex Tempo M Series 486/33 \$2978 \$3098 \$100 Hewlett-Packard Vectra 486/33N PC Leading Edge D4/DX2-50 \$2299 \$200 1 Micro Express ME 486-Local Bus/DX2/50 \$2399 none \$2463 Mitac D4125 none NEC PowerMate 486/33i \$3248 \$2499 Packard Bell 486DX/33 none \$100 Swan 486/33DB \$2655 \$496 Tangent Model 425s \$1999 Touche 486DX/50 \$3195 none TriStar Tri-WIN 486DX/50 ISA \$2495 none \$2395 \$100 Twinhead Superset 600/452C USA Flex 486SX/25 \$2499 none Wyse Decision 486si \$2728 none \$199 ZDS Z-Station 425Sh Model 80

¹ Rather than using list pricing, Leading Edge projects expected retail prices.

FEATURES COMPARISON

Hot Windows Workstations: Look What \$2500 Buys These Days

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\ 21	Eyer 3-	A86-3-3	Arche Legacy	BEST BU	BIX ABOUT	Model 120) Wodel 120) Workship	ABGP) S	Dell System	486/33 ABG/33	Everex Tempo	
• Yes	esper ex-	2 3	18 52 M	7 8	and A	CE B X	1 20	5	G 33	4	
O No	Zagi /	ब्रं \	Egg No	orem \	S 1 3	2 B	2	3 stem	Mod 3	· em	
n/a = not applicable	odel 486	黄	5 B		=	3	255	-	2	8	
Standard features	5657	3	\	31	\	\	- \	\	1		
Direct/street price 9/921	\$2916	\$2374	\$2900²	\$2648	\$2500	\$2145	\$2335	\$2448	\$2249 ²	\$2571	
CPU	486DX2-66	486DX-33	486DX-33	486SX-25	486DX-50	486DX-33	486SX-25	486DX-33	486DX-33	486DX-33	281 15
RAM installed (MB)	8	8	4	8	8	8	4	4	8	8	
External memory cache											
Installed/maximum (K)	256/256	0/256	64/256	0/0	256/256	64/256	0/64	0/0	64/1024	256/256	
Bus	EISA	ISA	ISA	EISA	ISA	ISA	ISA	ISA	ISA	ISA	
Hard disk	Conner CP30174E	Maxtor 7213SR	WD Caviar 280	Quantum 240AT	Conner 30204	Maxtor 7120AT	Quantum customized	Quantum customized	WD Caviar 2200	Seagate ST314A	
Size (MB)	170	202	81	234	202	124	116	116	203	125	
Motherboard	Acer	ALR	Arche	AST	ATronics	AMI	Compaq	Dell	Eltech/0EM	Everex	
Graphics controller	ATI local bus	integrated	WD	integrated	Diamond Stealth VRAM	Orchid Fahrenheit 1280	integrated QVision	integrated	ATI Graphics Ultra	integrated	
Monitor	AcerView 34T 14 inch	ALR Flexview 14 inch	Arche 14 inch	AST 14 Inch	CTX 14 Inch	ViewSonic 6 14 inch	Compaq 1024 14 inch	Dell UltraScan 15 Inch	Arche 14 inch	EverSynch 14 Inch	
Expandability						77					
Free 32-/16-/8-bit expansion slots	4/1/0	0/2/0	0/4/1	5/0/0	0/5/0	0/6/1	0/3/0	0/3/0	0/5/1	0/6/1	
Externally accessible/internal drive bays	4/2	2/1	5/1	2/1	6/3	4/2	2/1	2/1	5/0	2/1	No.
CPU upgrade options	2011		5/1		0,3				3,0		
Replaceable CPU board			0		0	0	0	0	0	● 8	
User-adjustable or user-replaceable clock	9	0		0	•9	•	•	● ¹⁰	0	0	
Accepts OverDrive or DX2 chip					•				•		
ZIF socket	0	0	0	0	0	0	0	0	0	0	BANKS S
Weitek socket	0	•	0	0	•	0	0	0	•	•	Section 1
	1 0										
Design and construction		I STATE OF THE PARTY OF THE PAR	Inches de la constante de la c			Inches de la constante de la c			I I I I I I I I I I I I I I I I I I I		-
Case	compact	compact	minitower	compact	tower	minitower	compact	compact	compact	compact	
Parallel/serial/mouse/SCSI ports	1/2/0/0	1/2/1/1	1/2/0/0	1/2/1/0	1/2/0/0	1/2/0/0	1/1/1/0	1/2/1/0	1/2/0/0	1/2/0/0	
Service and support											
Warranty (months)	12	12	12	12	12	12	12	12	12	12	
On-site service price per year	free	\$9.95	\$149	varies	\$99	free	free	free	free	free	
Turnaround policy (days)	7	3	2	7	3	2	none	none	2	3	
Free unlimited support	0	•	•	•	•	•	•		•	•	
Vendor support			Constitution of the Consti		V.						
Toll-free central support	n/a	•	0	•	•	•	•	•	•	0	
Daily support (hours)	n/a	11	9	14	9	9	12	18	9	9	No.
Weekend support	n/a	1 2	0	12	0	0	0		1 2	0	
BBS	n/a	•	•		0				0	•	
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¹ All systems include at least one floppy drive, SVGA and color monitor, keyboard, mouse, DOS 5.0, and Windows 3.1. Price is either direct or the lowest price we found in calls made to multiple dealers.

² Includes Microsoft Works for Windows.

³ Includes Lotus Write and modem.

⁴ Includes Stacker.

⁵ Includes CD ROM player, soundboard, speakers, PFS:WindowWorks, Anamotion-MCS, and multimedia editions of Chessmaster 3000 and Microsoft Works for Windows.

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	Quantum customized	Maxtor	WD Caviar 2200	Conner	Quantum	Seagate ST3283A	Maxtor 7120AT	Maxtor 7120AT	Quantum 240AT	TEAC SD-3105	Conner CP3204F	WD Caviar 2200	Maxtor WD AC2120	WD Caviar 280
	163	202	203	203	116	234	124	1207	234	100	200	203	120	81
	HP	PCB	Ergon	Mitac	NEC	Packard Bell	Swan	Tangent	AMI	Free Tech.	Twinhead	USA Flex	Wyse	ZDS
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	HP Ultra 15 inch	Leading Edge 14 Inch	ME 14 inch	Mitac L1420 14 Inch	NEC 3FGx 15 inch	Packard Bell 14 inch	Swan 15 inch	Taxan 15 Inch	NEC 4FG 15 inch	MAG 14 inch	Twinhead 14 inch	FlexVision 14 inch	Wyse 14 inch	ZCM 1430 14 Inch
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	12	12	24	12	12	12	24	12	24	24	12	12	12	12
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⁶Includes LAN module.

 $^{^{7}\,\}mathrm{Estimated}$ at 234MB with Stacker real-time data compression software installed.

⁸ Fastest current option already installed.

⁹Top speed is currently 50 MHz.

¹⁰Top speed is currently 33 MHz.

¹¹ System has an 80387 coprocessor socket.

PC WORLD TEST CENTER REPORT

Acer's 66-MHz 486DX2 Shows There's Life After 50 MHz

	Excel 4.0	Word for Windows 2.0	Freelance for Windows 1.0	Paradox 3.5 in DOS window
Acer AcerPower 486e DX2/66 Model 5657	88	103	112	138
ATronics Int'l ATI-486-50*	100	118	145	157
Touche 486DX/50	132	187	170	139
TriStar Tri-WIN 486DX/50 ISA*	135	138	188	267
Wyse Decision 486si*	143	182	188	218
Swan 486/33DB	153	183	187	221
Leading Edge D4/DX2-50*	151	191	213	214
Eltech Model 4330	146	186	257	203
Micro Express ME 486-Local Bus/DX2/50*	162	199	253	183
ALR Flyer 32DT 4DX/33	168	210	210	223
Everex Tempo M Series 486/33	165	217	227	232
Blackship BLK 486/33	158	195	261	238
Tangent Model 425s	175	210	281	221
AST Power Premium 4/25s Model 213W	187	231	244	269
Arche Legacy-I 486-33	192	221	246	366
Hewlett-Packard Vectra 486/33N PC	215	206	269	258
Dell System 486P/33	215	233	334	198
USA Flex 486SX/25	226	236	337	313
Compaq Deskpro 4/25si Model 120/W	239	248	327	300
NEC PowerMate 486/33I	242	257	359	276
Twinhead Superset 600/452C	276	393	305	202
Mitac D4125	272	297	323	367
ZDS Z-Station 425Sh Model 80	278	373	272	40
Packard Bell 486DX/33		610 8	37 670	315

*Best Buy

Systems are arranged in order of overall speed, from fastest at top to slowest at bottom.

Time in seconds.

Methodology

Each vendor supplied a system optimized for Windows, with Windows installed in most cases. If we had to install Windows, we performed the default installation. We configured Windows on all systems with a Hewlett-Packard Laseriet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. Using vendor-supplied video drivers when possible, we set the resolution to 800 by 600 pixels in 256 colors. On systems unable to support 256 colors, we used 16. Finally, we loaded the test applications, test files, scripts, and Microsoft Test automation software.

Excel 4.0

We perform several data extracts; build and format a financial statement from scratch and print it out; and open a mortgage analysis, then scroll, move blocks, change the interest rate, print preview the statement, and save it.

Word for Windows 2.0

We use the spelling checker to check a 27-page document, then we scroll through it. We create, format, print, and save a single-page business letter, open a business proposal document, add a paragraph, then preview it and print it out.

Freelance for Windows 1.0

We load a single-page starter file (built from a standard template included with Freelance) containing a United States map with each state a separate object. Then we enter preformatted text on the page in preset headings, add a second page, and enter text as builteted items.

We add three more pages, each containing a single 3-D bar chart, and import data from a WR1 file. We add a sixth page containing four 3-D pie charts and preview a slide show using a vertical-louver fade effect between slides. We apply various views to the presentation and preview the slide show four more times, applying a different fade effect between slides each time. Finally, we save the presentation to disk.

Paradox 3.5 in DOS window

Running the program in a DOS window, we access a database made up from a simple customer list. We perform a variety of data entry, record searching, and updating tasks, and finally we generate reports using the customer list.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



3922P \$16.95 Softcover Hard Disk

Management

with DOS



881018 \$29.95 Softcover



3279-XX \$36.95



881782-XX \$29.95 Counts as 2/Softcove



3738 \$26.95



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QUATTRO

PRO 4

INSIDE

& OUT

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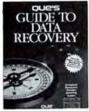


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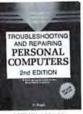
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Working with Windows 3.1

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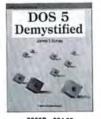


881622 \$17.95



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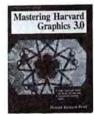




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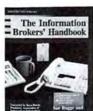
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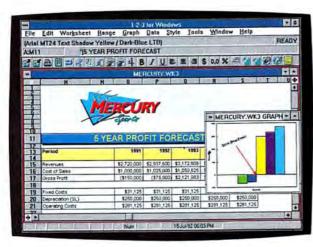
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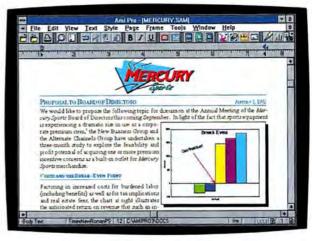
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Compared to Lo Microsoft Office look



1-2-3 for Windows Release 1.1 now includes over 25 new features and usability enhancements.



Ami Pro 3.0 includes new features that make it more powerful and easier to use than Microsoft Word for Windows.

It's true. When you evaluate our complete solution for Windows™ desktops and then look at theirs, you'll see why ours is a better business choice.

Of course, both SmartSuite™ and Microsoft® Office include fullfeatured products. But SmartSuite has been recently updated to include 1-2-3° for Windows Release 1.1 with SmartPak™ and the newly released Ami Pro® 3.0, as well as Freelance Graphics® and cc:Mail.™

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for example, share data, text and graphs between each application smoothly and seamlessly. So when an outline produced in Ami Pro is imported to Freelance Graphics, it's automatically converted into a Freelance Graphics outline and full-slide presentation. And a 1-2-3 graph exported to Freelance Graphics will arrive, fully editable. Not so with Excel and PowerPoint."

























































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Award-winning Freelance Graphics is the easiest, fastest way to create a stunning presentation.



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cc:Mail, the world's leading LAN-based e-mail system, allows you to send documents across all major networks and computing platforms.

applications just by clicking the icon of the application you want to open.

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SmartSuite for Windows

1-2-3, Ami Pro, Freelance Graphics, and cc:Mail

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As they say, it's all in the genes. Introducing the ThinkPad[™] from IBM. The slickest, sleekest little number that ever crunched one. A mere seven-and-a-half pounds of brains and beauty that begs you to take it anywhere. And once you own one, that's exactly what you'll do.



Introducing

ThinkPad

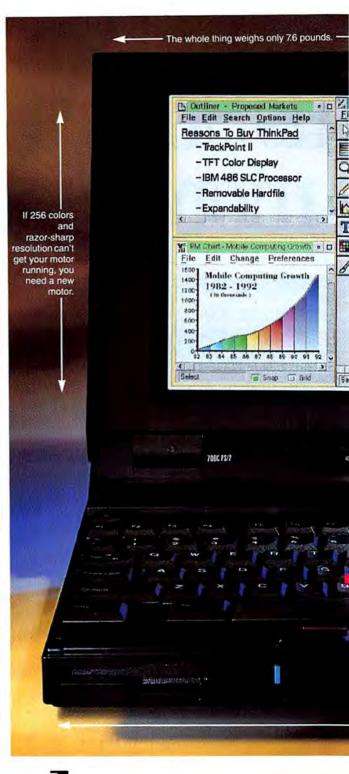
The top-of-the-line ThinkPad 700C sports a screaming 486 SLC™ 25 MHz processor. But it's built for comfort too. There's a surprisingly roomy interior, with a full-size, ergonomically designed keyboard. And a screen that literally bends over backwards.

Strategically placed on the keyboard is a little red spot called the TrackPoint II." It does what a mouse would do with a few million more years of evolution. Nothing dangles; it's part of the soul of the machine. You can operate it with one fingertip. And it lets you think on any terrain, even one without any flat surfaces.

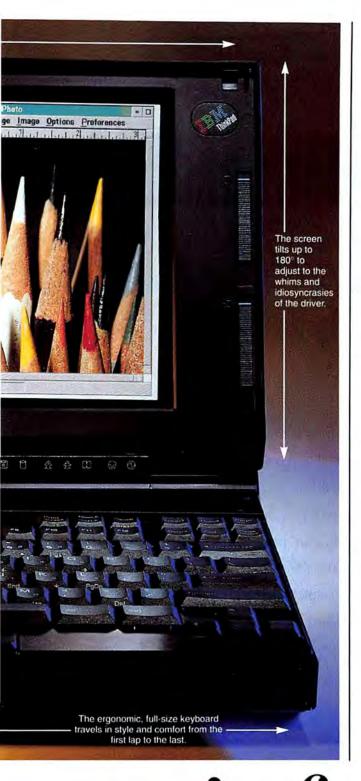
The ThinkPad's screen is a thing of almost aching beauty. Its 640 × 480 VGA resolution is sharper than that of many desktop computers. It displays 256 colors. And it's the biggest screen on any notebook. So it's very easy on the eyes.

The ThinkPad comes standard with things some other notebooks don't even offer as options. Like 4MB

*Depending on usage and configuration. **MSRP. Dealer prices may vary. †Warranty information available from the Personal Systems HelpCenter or an IBM authorized dealer. 700T warranty is available in USA and Canada only. †In Canada, call 1 800 465-7999. IBM is a registered trademark and ThinkPad, HelpWare, HelpCenter, SLC and TrackPoint II are trademarks of International Business Machines Corporation. PRODIGY is a registered trademark of Prodigy Services Company. © 1992 IBM Corp.



Its mother was Its father wa



of memory upgradable to 16MB. 120MB of hard disk space. Pre-installed DOS 5.0 and PRODIGY.* You can soup it up with a turbo-charged 486SLC2 50/25 MHz processor—just one of the upgrade products IBM

offers. And the hard disk is removable, so it's easy to upgrade and share your ThinkPad, not to mention the great security and virtually unlimited storage.

ThinkPad blows
the doors off its
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The world's smallest stick shift.

If you have questions along the way, ThinkPad Models 700C and 700 are supported by HelpWare," an invaluable service package that includes a three-year international warranty.†

ThinkPad	Model 700C	Model 700		
Processor	486 SLC/25 MHz	486 SLC/25 MHz		
Display	10.4" Active Matrix 256-Color Screen	9.5" Monochrome Display 64 Grayscale Screen		
Battery Life*	2-4 Hours	3.8-7.5 Hours		
Weight	7.6 Lbs. with Battery	6.5 Lbs. with Battery		
Warranty	3 Years (International)	3 Years (International)		
Price**	\$4,350	\$2,750		

For more information or an IBM authorized dealer near you, call our Personal Systems HelpCenter™ 24 hours a day, 7 days a week at 1 800 772-2227.^{††}

Then just park one in your lap and see what happens.



a mainframe. s a Maserati.

WINDOWS SPECIAL SPEEDUP TIPS

Windows and DOS Speedup Tips

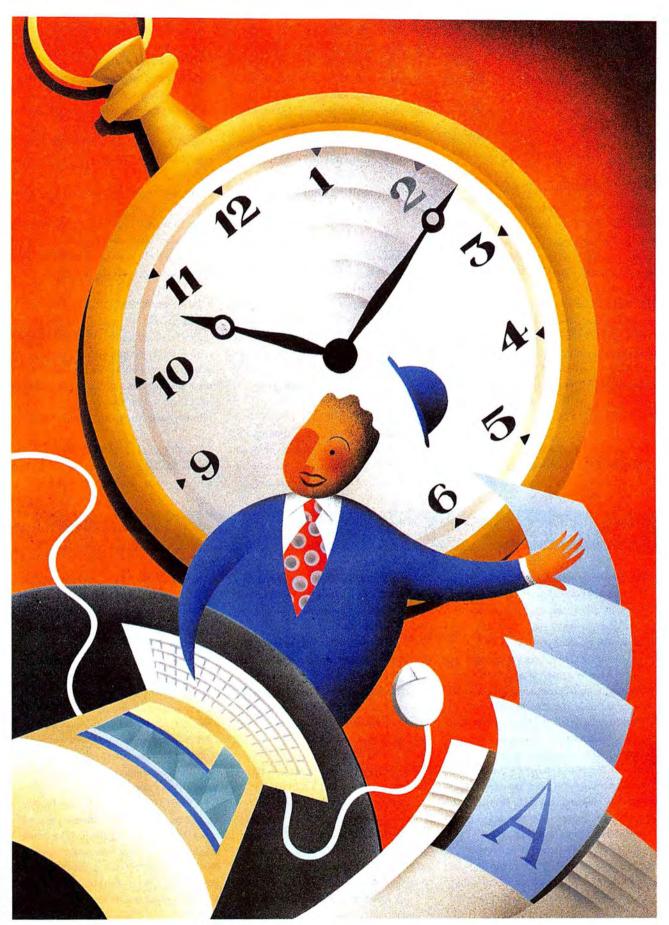
For all the snappy features of *Windows 3.1* and DOS 5.0, there are still times when they make you want to drop your PC down the nearest elevator shaft. Sluggish screen redraws, convoluted commands, and poky printing can bring your productivity to a screeching halt. That's why we've culled 75 tips on how to make using DOS and *Windows* just a little bit faster—keyboard shortcuts, ready-made batch files, even clever ways to arrange your desktop for light-



ning-quick access to icons. To help you navigate our sea of tips, we have divided our offerings into seven cate-

gories, from printing—everyone's most common source of frustration—to memory management, a less obvious but quite insidious culprit.

You can wait until your requisition for that 66-MHz 486 is approved, or you can read on and get fast relief.



WINDOWS SPECIAL SPEEDUP TIPS



Printing Acceleration

1. Avoid Print Manager Slowdowns

WINDOWS When an app sends data for printing, Print Manager creates a temporary file that can be several megabytes in size. If there's not enough room on your disk, your system can slow to a crawl or refuse to print.

First make sure the line SET TEMP=C:\TEMP (or another hard disk directory) is in AU-TOEXEC.BAT. This sends all temp files to the specified directory. To speed print spooling, the path should be on a drive with at least 6MB free. Don't send temp files to a RAM disk. Keep RAM free for other Windows functions. —George Campbell

2. Managing Print Manager

■ WINDOWS Sure, Print Manager can be a drag on performance, but you can fine-

tune it. Launch Print Manager, select Options, and choose one of the top three Priority lines in the menu. Low Priority is ideal when speedy printing is less important than getting back to work. Medium Priority (Windows' default) divides chores between foreground app and printing. Choose High Priority if printing speed is paramount (your foreground applications may slow a bit). For fastest output, disable Print Manager by opening Printers in the Control Panel and unchecking the Use Print Manager box. —George Campbell and Robert J. Lauriston

3. Drivers Built for Speed

■ WINDOWS Is printing from Windows as slow as a slug on Valium? The culprit is probably a Windows printer driver. Fortunately, Microsoft has rewritten its drivers for Hewlett-Packard's LaserJet III family and placed them on its download bulletin board. Callers with 2400-bps modems can access the board by dialing 206/637-9009; at 9600-bps, try 206/936-6735. —Daniel Tynan

4. Real Virtual Memory

er lag when churning out pages with downloaded fonts? Don't curse Adobe—the culprit may be the virtual printer memory setting. Windows uses this setting to estimate how many fonts it can download. When the setting shows less virtual memory than your printer has, Windows wastes time flushing fonts to reload others before it needs to.

To print a report showing your printer's virtual memory capacity, change to the directory containing the file TESTPS.TXT (usually C:\WINDOWS\SYSTEM). Then type COPY TESTPS.TXT LPTn (where n is the number of the port connected to your Post-Script printer). To increase the virtual memory setting, open the Control Panel and open Printers. Highlight the name of your printer and select Setup Options Advanced, then type the correct amount in the Virtual Memory dialog box. —Bob Weibel

5. Print Direct to Port

WINDOWS ■ Bypassing DOS by printing directly to your printer port can boost print performance. Simply open Printers in *Windows*' Control Panel, select the printer from the list, select *Connect*, check the Fast Printing Direct to Port box, and select *OK*. Your printouts will arrive a tad faster. — R. J. L.

6. Print Directly to Network Queue

LAN, you can print directly to a network

Basic Windows Navigation Tips

Whether you're a nervous Windows novice or a grizzled veteran of graphical user interfaces, there are some things that every user should know. Here are 15 of the most essential tips for speeding Windows.

- 1. Using keyboard commands, such as <Alt>FS to save a file, is a lot faster than mousing through pulldown menus. (For more keyboard tips, see the "Mouseless Windows" Instant Reference Card in this issue.)
- 2. To jump between programs, use <alt>-</ab>. (If <alt>-</ab> fails to cycle through all your Windows apps, click the Desktop icon in Control Panel and make sure the Fast "Alt+Tab" Switching box is checked.)
- 3. To cycle between open documents in the same Windows app, use <Ctrl><F6> or <Ctrl><Tab> (not all applications support both).
- 4. Use <Ctrl><Esc> to call up the Task List to see which programs are active and switch to one immediately. To call up the Task List

with your mouse, double-click the desktop.

- Double-click anywhere on the title bar to quickly toggle a program between running full screen or in a window.
- 6. Use <Alt>-<Space> to access the active application's control menu, or <Alt><Hyphen> to get control over the current document.
- 7. To launch a program whenever you start Windows 3.1, hold down <Ctrl> and drag the program's icon with the mouse to copy it into Program Manager's StartUp group.
- 8. To launch Windows quickly and bypass your StartUp programs, hold down <Shift> when you see the Microsoft start-up logo.
- To avoid that annoying Windows logo screen entirely, type WIN: to load Windows.
- 10. To close an application quickly, press <Alt>-<F4>, or double-click on the control box in the upper left corner of the window. To close the current document, press <Ctrl>-<F4>, or double-click on its control box.

- Assign icons to DOS programs and run them from Program Manager, not from the DOS prompt.
- 12. To toggle DOS apps between full screen and a window, press <Alt><Enter>.
- 13. Does Windows seem especially sluggish? In Program Manager, select Help About Program Manager to get the lowdown on your system resources. If less than 30 percent is free, it's time to close some apps.
- 14. For the fastest Windows getaway, switch to Program Manager and hit <Alt><F4>. Before exiting, Windows prompts you to save files or close DOS apps if necessary.
- 15. When an application goes into the Twilight Zone, hit <Ctrl>-<Alt>-<Delete>. In most cases you'll be able to close just the frozen program and save your work in other applications. But since any crash leaves Windows a little unstable, it's a good idea to shut down all your apps and restart Windows.

print queue, bypassing DOS and NetWare's CAPTURE utility to improve performance. Open Printers in Windows' Control Panel, select the printer from the list, select Connect Network, and select the queue from the list. (If no queues are visible, select Attach. In the next dialog box, choose your server from the drop-down list, input your user name and password, and click OK.) Then select your print queue and Connect OK Close OK.—R. J. L.

7. Use DOS's Print Spooler

Windows and all major word processors have built-in print spoolers-that is, you can print while you're using the program to do other work. But if your program doesn't have a print spooler, you can use DOS's. First, use the program's "print to file" command (most programs without spoolers have one) to save the print job to a file. Exit the program, and at the C> prompt, type PRINT, a space, the name of the print file you just saved, another space, and the name of the port your printer is attached to; then press <Enter>. For example, PRINT JOB.1 LPT1. If you're on a NetWare LAN, use NPRINT instead, and use the print queue name in place of the port. For example, NPRINT JOB.1 SERVER1\LASER. -R. J. L.

8. PCL vs. PostScript

If your laser printer has a PostScript mode, or if you use a PostScript cartridge with your LaserJet, use it sparingly. For everyday text output, PCL (LaserJet) mode is usually faster. Use PostScript only when you need fancy fonts or have an app like *CorelDraw* that can take advantage of PostScript's powerful draw and fill tools. —*Robert Luhn*

9. Faster Font Printing

EWINDOWS → For the fastest output, stick to an internal printer font, such as the HP LaserJet's built-in Courier. If that's not practical, pick TrueType fonts. For example, TrueType's Arial font prints about three times faster than Adobe Type Manager's Helvetica. To tell which fonts are which, run Windows Write, select Character • Fonts, and look at the Font menu. Most printer fonts have a printer icon next to them; TrueType fonts have a double T. —G. C.

10. Good to the Last Page

Looking for a quick way to eject a final, partially printed page from an HP LaserJet or compatible? Here's a one-line batch file, FORMFEED.BAT, that does the trick. To create it, use the following steps:

First, change to a directory named in your PATH statement. Then type COPY CON FORMFEED.-BAT and press <Enter>. At the cursor, type @ECHO, and press <Space><Ctrl>-L. Type the greater-than symbol (>), then type PRN. Finally, press <F6> and <Enter>.

Now, anytime you want to eject a page, give the command **FORMFEED** at any DOS prompt. —G. C.



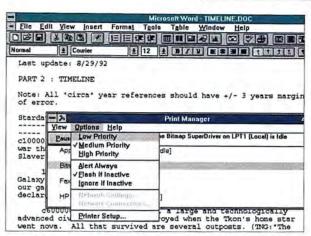
Windows Smart Starts

11. Load Windows Smart

doodads that make *Windows* fun—wallpaper, patterns, and so on. But loading these images at start-up takes time. To get up and running in a thrice, strip *Windows* of its wallpaper: Double-click the Desktop icon in the Control Panel, select (None) for both Pattern Name and Wallpaper File, and click *OK*. —R. L.

12. Load and Launch

and your favorite application at the same time. All you need to do is type WIN followed by a space, then the path and name of your application. To launch the app with a data file already loaded, type another space and the path and name of the data file. For example, to load Windows, Excel, and a data file in one step, you would type WINC:\EXCEL\EXCELEXE D:\PROJECTS\REPORT7.XLS. Even better, you can omit the application if



WINDOWS 3.1'S PRINT MANAGER lets you choose between getting faster output and returning quickly to work.

you associate it with its data file's extension (see tip 14).—R. L.

13. Templates of the Gods

menu commands, many apps will also load templates along with a program. Do you spend most of your day composing business correspondence? Simply add the name of a template such as LETTER.DOT to the Command Line in the Program Item Properties box (see tip 16), and your word processor starts up with that template ready to go. If you use several templates, you'd do well to create separate icons for each one, then launch the appropriate version of your app from Program Manager. —Steve Fox

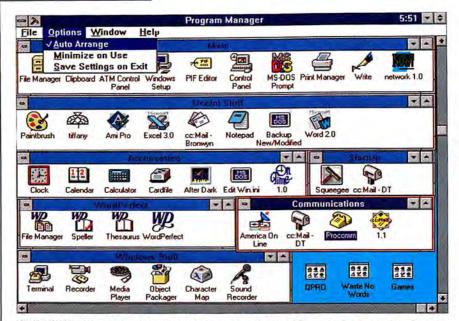
14. Launch by Association

more than one way to jump-start your applications. You can also launch and load data files from inside File Manager—just associate the data file's extension with the name of the application. Here's how: Simply launch File Manager, choose File•Associate, and type the data file extension. Then choose the appropriate application in the Associate With list (if it's not there, use Browse to locate it on your hard drive) and click OK. Next time you want to load a file in a hurry, just double-click on it from a File Manager list.—Scott Spanbauer

15. Optimizing Program Manager

problems with Windows' Program Manager is that you can waste too much time playing Find the Icon. The best way to avoid this is to create an organized—and permanent—

WINDOWS SPECIAL SPEEDUP TIPS



WINDOWS' PROGRAM MANAGER settings can be maintained from session to session. Arrange the desktop, uncheck Options • Save Settings on Exit, and press <Shift>-<Alt>-<F4>.

desktop. Here's one way to do it.

In Program Manager, make sure that Options•Auto Arrange is checked and Options•Save Settings on Exit is not. Then fire up the Control Panel and double-click the Desktop icon. In the dialog box's Icons section, reduce the Spacing between icons as much as you can without overlapping the program item titles—say, to 48 pixels—and make sure the Wrap Title box is checked. (You may have to experiment a bit to find the right setting.) Select OK, then close the Control Panel.

Now, minimize all Program Manager groups to align them along the bottom of the screen. Double-click the group icon that contains the apps you use most, then drag it to the top of the screen and size it as a horizontal box, just high enough to hold a single row of icons and descriptions. Select each icon that has a two-line description, then select File•Properties (or press <alt>Alt><Enter>) and shorten the Description field (for example, you can change 'ATM Control Panel' to 'ATM').

Finally, expand the group window until the scroll bars disappear, and leave room for new programs you may add later. Repeat the process for the remaining program groups, positioning them so their borders just touch,

The key here is to avoid overloading your program groups with more icons than can fit in a single row. If your groups are bursting with apps and file icons, you may want to split some off into separate groups. Select File • New • Program Group, type in the name of the new group window and group file, then drag the icons into the open window. Put programs you rarely use into their own group, then minimize the group icon and drag it to a visible but remote spot in the Program Manager window.

Once you're satisfied with your arrangement, hold down **<Shift>** while you press **<Alt>**-<**F4>**. From now on, your well-organized desktop will remain unchanged and will appear the same way each time you start *Windows*. —*G. C.*

16. Open Files Automatically

every morning when you begin working? Most applications will accept a file name as an "argument" following its executable file's name, letting you launch the application with the file already loaded.

To set up this arrangement, switch to the Program Manager, click once on the application's icon, and press <Enter">Alt><Enter or select File • Properties from the drop-down menus. Then in Program Item Properties, go to the Command Line field and type a space after the execut-

able file name (such as WINWORD.EXE), followed by the data file's drive, path, and name. Click *OK*. If the file is in your working directory, just supply the file name.

The same rules apply to menu items and macros. With applications like Word for Windows, you can add the function or macro that performs this task to the application's Command Line. For example, to issue the File Open command when you load Word for Windows, add /mFileOpen to the Command Line after WINWORD.EXE, and click OK.—R. L.

17. Custom Windows Setups

The same copy of Windows, you can use a batch file to let each of them use a different setting. (A single user can also use this trick to save multiple settings, say one for VGA resolution and another for super-VGA.) The following batch file, STARTWIN.BAT, shows you how:

@ECHO OFF

IF EXIST C:\WINDOWS\%1\NU1 GOTO MAIN MD C:\WINDOWS\%1

GOTO LOAD

:MAIN

COPY C:\WINDOWS\%1*.* C:\WINDOWS :LOAD

WIN

COPY C:\WINDOWS*.INI C:\WINDOWS\%1
COPY C:\WINDOWS*.GRP C:\WINDOWS\%1
COPY C:\WINDOWS*.DAT C:\WINDOWS\%1
COPY C:\WINDOWS\WIN.COM C:\WINDOWS\%1

Entering STARTWIN CHRIS, for example, will create C:\WINDOWS\CHRIS, start Windows, and when you exit Windows, will save the current configuration files (including any revisions) to that directory. The next time you enter STARTWIN CHRIS, that configuration will be restored, overriding any changes made in the meantime. —R. J. L.



THE PROPERTIES DIALOG BOX can be customized to load files or templates or run simple commands when you start an application.

18. Shuffling Cardfile Files

■ WINDOWS As a cheap and easy way to store phone numbers and addresses, it's hard to beat Windows' free Cardfile accessory. Cardfile's main drawback is that you can open only one card list per session. However, there's still an easy way to view two or more lists at once: Simply launch another session of Cardfile. You can open as many as system memory will allow, with a different card list for each session, and toggle easily between them. — B. W.



Beating the System

19. Optimize AUTOEXEC.BAT

Most programs add their own settings to AUTOEXEC.BAT, but all you need for general purposes is:

PATH=C:\DOS;C:\UTILS
PROMPT SPSG

SET TEMP=C:\TEMP

(This assumes, of course, that you keep your utilities and batch files in C:\UTILS, keep DOS in its own subdirectory, and have set up a C:\TEMP directory for temporary files.)

If you use *Windows*, DOSSHELL, or a third-party DOS shell like *XTree* or the one found in *PC Tools*, add the command to start it to the end of AUTOEXEC.BAT so it will load automatically when you turn on your PC. —R. J. L.

20. Shorten Your PATH

DOS finds programs faster if your PATH is short. If you run Windows, instead of adding a program's directory to your PATH statement, define its Working Directory in the Program Manager (select the icon and press -<Enter">Alt>-<Enter) or its Start-Up Directory in the program's PIF (program information file). If you don't run Windows, use batch files. (There's no need to create a separate directory for batch files—just put them in \UTILS, and use DIR \UTILS*.BAT to

list them.) Some programs will work only if you set an environment variable, start them from their own directory, or have their directories in the PATH. The following listing shows a batch file that handles all three scenarios:

@ECHO OFF

REM [add environment variable]

SET PROGRAM=C:\TEMP

REM [add program directory to path]

SET OLDPATH=%PATH%

SET PATH=C:\PROGRAM;%PATH%

REM [start program from its directory]

C:

CD\PROGRAM

PROGRAM %1 %2 %3 %4 %5 %6 %7 %8 %9

CD\

REM [reset path]

SET PATH=%OLDPATH%

SET OLDPATH=

However, few programs need such complicated batch files. Here's a simple WIN.BAT that starts *Windows*. The replaceable variables (%1 through %9) let you use command-line options, such as specifying a program you want to run (WIN EXCEL) or bypassing the startup screen (WIN:).

@C:\WINDOWS\WIN %1 %2 %3 %4 %5 %6 %7 %8 %9

-R.J.L.

21. Optimize CONFIG.SYS

Crank up DOS's BUFFERS, FILES, and STACKS settings too high, and you'll waste memory; set them too low, and your programs may not run properly. Here's a quick guide to optimizing your CONFIG.SYS. (Before editing the file, save the current version as CONFIG.OLD and have a boot floppy handy.) Start with this setup:

FILES=20

BUFFERS=50,8

STACKS=0,0

LASTDRIVE=C

If you run *Windows*, set FILES=30. If your hard disk is smaller than 100MB, set BUFFERS=xx, 8 where xx is half the number of megabytes on the drive. (For example, specify BUFFERS=20,8 for a 40MB drive.) If you use a disk eache program like Smart-Drive or Super PG-Kwik, set BUFFERS=2.

If some of your programs stop working properly, restore whatever STACKS= setting you had previously, otherwise delete STACKS=0,0. If you have drive letters that go beyond C, set LASTDRIVE= to the highest drive letter. Doing this will prevent

DOS from reserving RAM for drives that you don't have. —R. J. L.

22. Faster DOS Apps Under Windows

■ WINDOWS ■ Ever notice that your DOS applications seem to run a bit slower under Windows than under a virgin DOS prompt? No, you're not imagining things. In 386-enhanced mode, Windows steals a bit of time from your DOS apps to monitor other applications in case any of them wants to work in the background. If you don't need this feature, you can speed your work by preventing such multitasking when your DOS application is active.

To permanently disable this feature for any given DOS program, launch Windows' PIF Editor, and open the PIF file (or create one) for the DOS application you want to speed up. Check the Execution: Exclusive box, and save the PIF file.

You can also make this change for the current session. With your DOS program running, press <alt>-<space> to open the Control menu. Choose Settings, check the Tasking Options: Exclusive box, and click OK. For greatest effect, press <alt>-<setellar- so the application will run full screen. —Scott Dunn

23. DOS Speed and Multitasking, Too

monitoring any other application seems a bit extreme (see previous tip), here's a better solution: In the PIF Editor, leave the Exclusive box unchecked. Click the Advanced button, and type 10000 in the Foreground Priority box. Click OK (or press <Enter>) and save the file. This ensures that your DOS program gets the microprocessor's full attention as long as it needs it but permits other applications to run in the background when your active DOS application is idle. You get faster performance without sacrificing multitasking.

The more memory some DOS applications get, the faster they run (WordPerfect is a good example). If your DOS application falls into this category, here is a way for you to give it all the RAM it can handle. Open the application's PIF in the PIF Editor and enter 1 in the KB Desired box. Then save the PIF.—S. D.

24. When to Use FASTOPEN

Are you always opening the same files over and over? Running DOS's FASTOPEN utility when you power up your PC can help speed file access. When you read a file, FASTOPEN stores the location of the file in memory. The next time you read the same file, DOS reads its location from memory rather than having to take the time to look it up in the file allocation table. To see if this utility is worth using on your system, try adding the line FASTOPEN C:=999 to your AUTOEXEC.BAT. If you notice a significant speedup, lower 999 (the maximum number of file locations FASTOPEN can track) to 10. If performance drops, experiment with intermediate numbers until you find the lowest value that gives the full speed boost. Since FASTOPEN consumes about 48 bytes per file location, it pays to find the right balance between performance and memory consumption. -R. J. L.

25. Fast WIN.INI Edits

of time, and you'll soon be intimate with the ins and outs of WIN.INI. While you can edit WIN.INI in a word processor or the Notepad, there are faster ways to make your revisions.

The quickest method is to launch Windows' "hidden" system file editor from an icon in Program Manager. Here's how: Open File Manager in a partial window so that Program Manager is visible behind it. Click on the name of the directory where Windows is stored and then on Windows' SYSTEM subdirectory. Find the file named SYSEDITEXE, and drag it with the mouse to an open program group in Program Manager. When you release the mouse button, a Sysedit icon will appear inside the program group. Double-click on the icon, and Windows will launch Sysedit with your system configuration files already loaded.

Another method is to use DOS 5.0's EDIT utility. Though EDIT.COM can open only one file at a time, it has the advantage of letting you save your current WIN.INI file under a different name before changing it. You'll need to create a PIF file for EDIT. Launch the PIF Editor, and create EDWININI.PIF with EDIT.COM as the Program Filename, WIN.INI as the Optional Parameters, and the path of your Windows directory as the Start-up Directory. Then in Program Manager, select File New Program Item, and create a Program Item with the description Edit WIN.INI and the Command Line EDWININI.PIF. Assign a generic icon from the Program Manager selection. From here on, just double-click your Edit WIN.INI icon to load WIN.INI into your text editor at the speed o' DOS. (For fast editing of CON-FIG.SYS or other system files, you'll need to create a separate PIF for each.) —B. W.



Screen Gems

26. A Swift Resolution

WINDOWS If you're using a super-VGA card to display Windows 3.1 in 800 by 600 or 1024 by 768 resolution and/or 256 colors, you're seeing more of the picture but sacrificing speed. Windows is much sprightlier in standard 640 by 480, 16-color VGA mode. When fast display is more important than high-res color, it's time to switch display drivers.

First, shut down all Windows programs, then start Windows Setup from the Program Manager. Select Options • Change System Settings, then select VGA or a 640 by 480 16-color driver specific to your board from the Display list. Click OK, click Current in the next dialog box, and click Restart Windows in the box that appears next. —G. C.

27. Turn Off Your Screen Saver

-WINDOWS - Although screen saver programs for Windows save your monitor's phosphors, they also eat up processor time. If your PC is laboriously tracing a TIFF image, downloading a monster file, or recomposing a long document, an active screen saver will slow things down even more. To keep your PC running briskly, turn off your screen saver when the situation demands it. With After Dark, for instance, load its control panel and move the toggle from On to

Off. To shut off *Windows 3.1*'s built-in screen saver, double-click the Desktop icon in the Control Panel, locate the Screen Saver section, and select (None) in the Name field. The next time you leave your desk and need to save your screen, just turn your monitor off. —R. L.

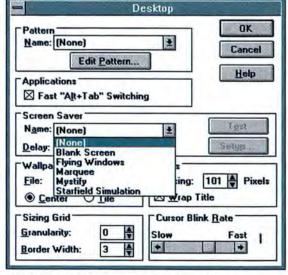
28. Turn Off Scalable Fonts

Type Manager and Windows 3.1's True Type give you snazzy displays with WYSIWYG fonts. But scaling those fonts makes textintensive displays ooze down the screen. The best solution: Just turn your rasterizer off when you're writing drafts or building spreadsheets, and turn it back on when you're ready to fine-tune your document's appearance.

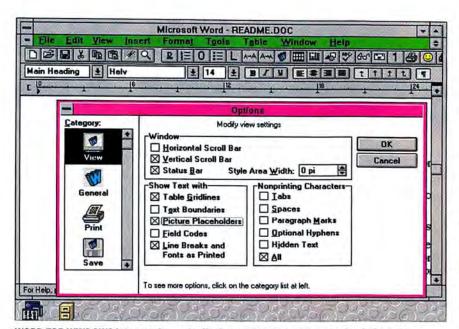
To shut off TrueType, open the Fonts section of Windows' Control Panel. Click the TrueType button and uncheck the Enable TrueType Fonts box. When you click OK, you'll have the option of restarting Windows, which you must do to make this change effective. To turn off Adobe's font rasterizer, start the ATM Control Panel, click the Off button, and then click Exit. As with TrueType, you'll have to restart Windows or wait till your next Windows session for the change to occur. Moving around your application will suddenly feel a whole lot snappier. —S. D.

29. Make Word Processing Screens Fly

full of graphics, you've no doubt noticed



BLANKING OUT WINDOWS' SCREEN SAVER will save your system resources—and make your system a tad faster.



WORD FOR WINDOWS lets you choose to display gray boxes on screen instead of graphics; it's not as pretty a picture, but your scrolling will zoom.

that scrolling in *Windows* word processors can slow to a crawl. The solution: Tell the program not to display graphics when you don't need to see them. Here's how:

In Ami Pro 2.0 and 3.0, give the View • View • Preferences command, then uncheck the Pictures box and click OK. In Word for Windows 2.0, give the Tools • Options command, press V, then check the Picture Placeholders box and click OK. And in WordPerfect for Windows, simply give the View • Graphics command.

You'll find similar commands in *Windows* spreadsheets and desktop publishing programs. —G. G.



Keyboard and Mouse Pointers

30. Get Your Hot Keys Here

Using hot-key combos to start or jump between apps can eliminate dozens of mouse clicks. In Program Manager, select a program's icon—say *Quattro Pro*'s—and select *File*•*Properties* (or press Alt><Enter>)

to display the Program Item Properties dialog box. Place the cursor in the Shortcut Key field, hold down **<Ctrl>** and press a memorable letter like **Q**, then click *OK*. Pressing **<Ctrl>**-**<**Alt>-**Q** in Program Manager will now load *Quattro*. If *Quattro* is already running, pressing the hot-key combo will bring it to the forefront of all your active apps. —R. L.

31. Assign a Hot Key to Program Manager

■WINDOWS A hot key is the fastest route back to Program Manager, but creating one takes a little ingenuity. First, launch File Manager in a partial window so that Program Manager is visible behind it. Click on the name of the directory where Windows is stored, and find PROGMAN.EXE. Select the file with the mouse, and drag it to your StartUp group in Program Manager. With the new Progman icon still highlighted, select File Properties (or press <Alt>-<Enter>) and assign a hot key as described in the preceding tip. Now you'll be able to get to Program Manager in a snap, without having to waste time cycling through all your other active programs. -S. S.

32. Turbocharge Your Cursor and Mouse

Party sluggish in general, you can boost the mouse and keyboard with a few quick Control Panel settings. Double-click the Mouse icon, configure Mouse Tracking Speed and Double Click Speed to a faster setting, and

click OK. Double-click the Keyboard icon, move the Delay Before First Repeat slider bar toward the "short" end of the scale and the Repeat Rate to a faster setting, and click OK. Now your mouse and cursor will roar across the screen, zip through menus and text, and perform operations more speedily. Just don't set these options too fast, or you might find it difficult to double-click items. An added bonus: If you exit Windows and load a DOS program, the faster keyboard settings will be passed along, speeding up your DOS program as well. —R. L.

33. Prompt DOS Commands

If you're starting a long session at the DOS prompt, why type the same command more than once? You'll save time and typos by letting DOS remember its own commands, especially if you're using commands with complicated switches or parameters. Start by giving the command DOSKEY <Enter>. Then go about your work. Anytime you need to repeat an old command, use the <Up> and <Down> cursor keys to move up and down through previous commands, or press <Page Up> or <Page Down> to jump to the top or bottom of the list. To see a numbered list of past commands, press <f7>. To choose a command from the list, press <F9>, type the command's number, and press <Enter> twice. To execute any command, press <Enter>. To clear the command line, press < Esc>. -G. C

34. The Fully Functional Mouse

■WINDOWS Most Windows applications treat your mouse's second button like a vestigial organ—but you don't have to. With a cheap utility like Numbers & Company's Whiskers, clicking the second mouse button can load a program, enter a string of keystrokes, execute a macro, pop open a specific menu, or even issue the equivalent of a left double-click. But the best speedup trick is to define the right mouse button as the <Enter> key.

To configure *Whiskers*, simply doubleclick the little mouse icon, click the *Buttons* option, select *Enter* for the Right Button, and click *OK*. That's it. Now you can load a program, skip through dialog boxes, and more with a single right click. Remember, too, if the desired icon or button is already selected (which is often the case), you can place the pointer anywhere in the

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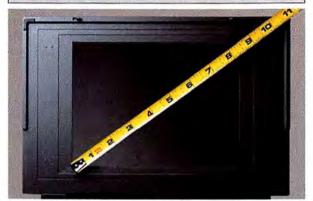
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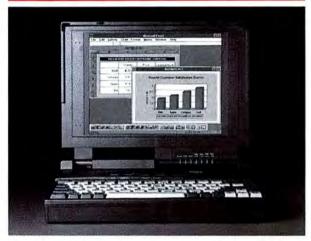
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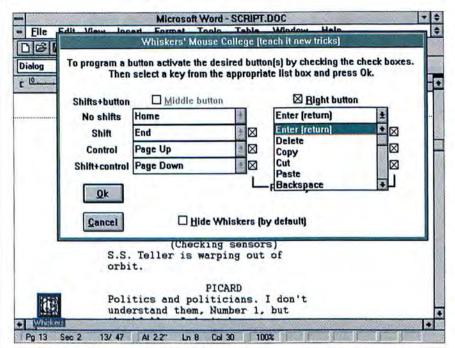




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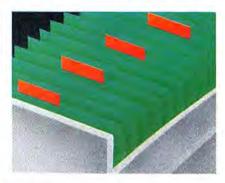
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window and click. -R. L.

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File Management

35. Print Directory Trees

Tired of roaming around your file manager hunting for obscure subdirectories? It is often faster and easier to scan a printed list of your hard disk's directory structure. You can use the DOS 5.0 commands TREE C:\/A>PRN and DIR C:\/S/B/A:D>PRN at any DOS prompt to make short work of the job.

You can substitute other drives as needed. The first command prints an indented directory tree, complete with lines; the second prints full directory names, one to a line. (If the page doesn't emerge immediately from the printer, hit the machine's formfeed button.) —G. C.

36. Find Files Fast

Need to locate a file somewhere on your system but can't remember where it is? The following DOS 5.0 batch file, LO-CATE.BAT, will look for your file on any drive.

@ECHO OFF
IF "%1" == "" GOTO NOARG
DIR C:\%1 /S /P
REM Add similar lines for additional drives
GOTO END
:NOARG
ECHO Syntax—LOCATE filespec
-FND

Use the EDIT command or any ASCII text editor to create the file, then save it in a directory named in your PATH statement. Then, to find a file from any DOS prompt, type LOCATE followed by a space and your file-name or wild-card specification, and press <Enter>. The file listing will pause after each screen. You can press <Ctrl>-CY to exit during a search. —G. C.

37. Find Recent Files Fast

Finding recently created files needn't mean loading a file manager or searching through file dates in a directory listing. The command @DIR%1/P/0:-D puts the most recent files at the top of the list. Use DOS 5.0's EDIT or any ASCII text editor to put it in a batch file, then save it as NEWDIR.BAT in a directory named in your PATH statement.

Use NEWDIR just like DIR, using file specification wild cards but without adding other options. You'll see a directory listing, one screen at a time, with the freshest files on top. —G. C.

38. Directories by the Numbers

Since many applications display directories in alphabetical order, you can save time by using numbers to begin the name of the directories you access most often, as in 1-DATA. When calling up files from within applications, 1-DATA will appear first, so you won't have to scroll through a lengthy list of directories to get where you're going. You can use the same principle for naming files. —S. F.

39. Fast Paths

Typing full path names and switches for every command has sent more than one DOS novice screaming from the room. Fortunately, it's not always necessary. If you simply type a command, such as COPY A:*.*, DOS assumes the current directory is the desired destination. This can save a lot of typing when you're working inside your C:\WP51\DOCS\LETTERS\ JAN subdirectory.

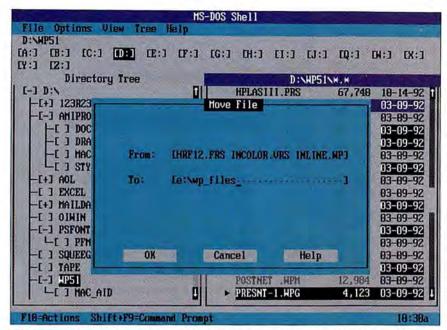
Another way to avoid some typing is to use the CD ..\.. command. This lets you jump up two directory levels—from, say, the JAN subdirectory to DOCS—with one simple command. —Kay Yarborough Nelson

40. A Ghost 720K Drive

Need to format 720K disks on your 1.44MB drive? Here's a way to do it without typing a slew of arcane drive parameters every time. Load your CONFIG.SYS file into an ASCII text editor. If your 31/2-inch drive is drive B:, add the line DEVICE=C:=DOS\DRIVER.SYS /D:1 /F:2 to the beginning of the file (if your 31/2inch drive is normally drive A:, substitute /D:0 for /D:1). Save the changes, then reboot. You've created a logical 720K disk drive. It will have the next drive letter available on your system, for example D: if your hard disk is C:. From now on, you'll be able to format a 720K floppy with FORMAT D:. DOS will prompt you to insert a disk in drive D:. Just pop the 720K disk into the 3½-inch drive. -G. C.

41. Reformat Used Disks

Using the DOS FORMAT command to clear off used floppies can be a painfully



DOS 5.0'S SHELL makes moving files faster by letting you use the keyboard instead of the mouse. Just press <F7>, and type in the destination path.

slow process. Fortunately DOS 5.0 provides a Quick Format command for clearing disks that have already been formatted. To use it on a floppy in drive A:, type FORMAT A:/Q at the DOS prompt. For the fastest way to format used disks, issue the command for unconditional, quick formatting: FORMAT A:/Q/U. But first make sure there aren't any files you really need on the disk—once you format a disk unconditionally, you won't be able to unformat it later. —K. Y. N.

42. XCOPY to the Rescue

If you're copying large numbers of files from the DOS prompt, use XCOPY instead of COPY. XCOPY works faster because it reads as many files as it can and copies them as a group instead of one at a time. XCOPY is also useful if you want to copy files you've modified on or after a certain date. For example, to copy all files modified after January 16, 1993, from drive C: to drive A:, type XCOPY C: •.• A:/D:01-16-93 /S. The /S switch tells XCOPY to include any files in subdirectories below the specified source directory (in this case, C:\, the root of drive C:). —K. Y. N.

43. Do the Directory Jump

Changing directories at the DOS prompt is a real pain, with all those backslash keys and drive names. The following batch file, JUMPTO.BAT, will take you to any directory on any hard disk or partition almost instantly. Create the file as shown, using the DOS 5.0 EDIT command or any ASCII text editor, substituting your own drive letters as needed.

@ECHO OFF

IF "%1" == "" GOTO NODIR

C:

CD \

IF "%1" == "c" GOTO GETOUT

IF "%1" == "C" GOTO GETOUT

CD %1 >NUL

IF EXIST C:\%1*.* GOTO GETOUT

REM Omit statements between double lines

REM if you have just one hard disk,

REM or add additional sections for other drives,

REM substituting drive letters.

D:

CD \

REM=

IF "%1" == "d" GOTO GETOUT

IF "%1" == "D" GOTO GETOUT

CD \%1 >NUL

IF EXIST D:\%1*.* GOTO GETOUT

GOTO NOTFOUND

:NOTFOUND

ECHO Can't find that directory. Try again.

GOTO END

:NODIR

ECHO Please include a directory name or drive letter.

GOTO END

:GETOUT

CLS :END To use JUMPTO.BAT to, say, move to your WINDOWS directory, type JUMPTO WINDOWS at the DOS prompt. (Don't type the drive letter or a backslash, or it won't work.) To jump to the root directory of any drive, use the format JUMPTO D, substituting just the letter for the drive. If you want to jump to a subdirectory, use the format JUMPTO WINDOWS\SYSTEM, again substituting your directory name. (For even less typing, you can change the file's name to JT.BAT.) —G. C.

44. Files on the Move

If you're in the habit of using DOSSHELL to copy and move large numbers of files, you may find it easier to use the keyboard instead of dragging files with the mouse—especially if the destination drive isn't already displayed on screen. Simply highlight the files and press <f7> (to move) or <f8> (to copy), and type the name of the target directory. —K. Y. N.

45. Fast File Delete

DOS 5.0's DOSSHELL won't let you delete a subdirectory if it contains files, but it will let you kill off groups of files in a hurry. Select the drive icon and move to the directory window you want. Press **<Ctrl><Slash>** to select all the files in the list, then hit the **<Delete>** key. To turn off the deletion confirmation message for each file, select *Options • Confirmation*, uncheck the Confirm on Delete box, and press *OK*. (Be sure to turn the confirmation back on when you're through, as a safeguard against unwanted deletions.) — *K*. *Y*. *N*.

46. Quick Picks in List Boxes

■ WINDOWS Why scroll down lists when you can jump? By typing the first letter of an item in a list, you can move directly to that area of the list box. The key is to make sure the list box you want is active. For example, to activate the file-name list in a Browse box, simply < Tab > over to the list box (or click inside it with the mouse). Type the first letter of the file name, and the list instantly shifts to show all files beginning with that letter. Type that same first letter to move down the list. — K. Y. N.

47. Instant Tree Collapsing

WINDOWS When you're in File Manager, you can collapse a whole tree display with just a couple of keystrokes. Press <hore> to go to the root directory, and type a

hyphen (-). Typing an asterisk (*) will then show your entire directory structure in the directory tree window. —K. Y. N.

48. No More Disk Swapping

WINDOWS Believe it or not, some things do go faster with *Windows*—like copying disks when your machine has only one floppy drive. With DOS, you have to play patty-cake with the disks, swapping source and destination floppies several times for each file copied. *Windows 3.1*'s File Manager, on the other hand, will read all the files on your source disk at once, then prompt you for the target floppy. The process is simple: Launch File Manager, select *Disk* • *Copy Disk*, specify the source and destination drives, and follow the prompts for inserting disks. —*K. Y. N.*

49. Megacopy

also the choice for copying large numbers of files from hard disk to floppy. There's no need to set archive bits or specify other DOS switches or to worry about how many files will fit on each floppy. Simply select the files you want to copy in a File Manager window, select File • Copy, and type in the drive and path of the destination disk. When the first floppy fills up, Windows will prompt you for another disk. Insert the new disk, hit Retry, and sit back as Windows fills each disk in turn until all the files have been copied. —K. Y. N.

50. Directories Be Gone

windows Need to lop off a branch of your directory tree and all its files and sub-directories in one blow? You can't do it from the DOS prompt or DOSSHELL—but you can with File Manager. Here's how:

Start File Manager, then choose your drive and select the top level of the directory tree you want to delete. Now select File • Delete. In the next dialog box, ensure that the directory name is the one you want to kill, then select OK. You'll see another dialog box and have another opportunity to abort the deletions. If you're sure, select Yes to All. Depending on the file structure, you may have to select Yes to All once or twice more. —G. C.

51. Dragging Files in File Manager

HINDOWS Shuffle files around your hard disk fast by opening File Manager and

dragging them with the mouse. Unfortunately, File Manager is a tad schizophrenic. When you drag a file between directories on the same drive, File Manager moves the file, but when you drag a file between drives, File Manager copies it. For a consistent way to move files regardless of destination, hold down <Alt> while you drag; to copy files, hold down <Ctrl>. And if you can't remember whether to

use <Alt> or <Ctrl>, try either while you watch to see whether or not the file icons preceding the name(s) of the source file(s) disappear. —Lincoln Spector

52. Making Directories Work for You

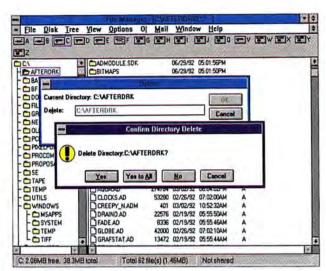
program files in one directory and your data files in another? You'll spare yourself a heap of directory switching by specifying a working directory for all your apps. From the Program Manager, highlight your app's icon and select File Properties. Then enter the drive and full path of your data files in the Working Directory field. That way you won't have to change drives or directories every time you load a file. —R. L.



Memory Magic

53. When to Use a RAM Drive

If you temporarily reformat documents, play with graphics, unzip files, and do other scut work, save time and disk space by creating a RAM drive. These operations will zip along, and you won't litter your hard disk with scratch files or the BAK and TMP



WINDOWS 3.1's FILE MANAGER lets you lop off full directories in a single blow—but gives you a chance to reconsider.

files that come with them. Best of all, RAMDRIVE.SYS, an able RAM drive program, comes with Windows and DOS 5.0. To create a RAM drive, open CONFIG.SYS in your favorite text editor and add a line like: DEVICE=C:\DOS\RAMDRIVE.SYS 256 /E. The number refers to the size of the RAM drive, in kilobytes. The /E switch tells DOS to use extended memory. Use /A instead to carve a RAM drive out of your expanded memory —R. L.

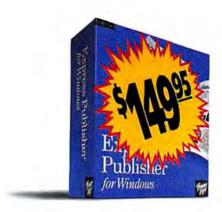
54. Get Rid of SmartDrive

SmartDrive 4.0 may be smarter than ever, but Windows 3.1's disk-cache utility still can't match that lightning-fast old shareware standby HyperDisk from HyperWare. A DOS program that loads in your CON-FIG.SYS file, HyperDisk dramatically improves disk-access operations for both Windows and DOS programs, especially if you let it cache disk writes as well as reads. The latest version (4.32) is fully compatible with Windows 3.1 and is available from PC World Online, CompuServe's WINADV forum, or from HyperWare's BBS (615/864-6871). The registration fee is \$69 for businesses and \$49 for home users. —S. D.

HyperDisk, HyperWare, 615/864-6868, 615/864-6870 (fax). Reader service no. **702**

55. SmartDrive's Cache Catch

disk-caching program helps speed disk operations by storing recently accessed data in memory and by waiting to write data until there's a pause in other operations. Unfortunately, this "write-behind" caching



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technique can muck up your system in nasty ways.

For example, if you use a program to boot up with different AUTOEXEC.BAT and CONFIG.SYS files, SmartDrive may prevent it from working. If your application has a Fast Save option—saving a file, then immediately reopening it—SmartDrive may lose your changes and damage the old file in the process. Finally, if you press the reset button on your PC or there's a power failure while SmartDrive is in the middle of a delayed write, it could corrupt your File Allocation Table, making it impossible for you to access any of your data.

If any of these situations sounds familiar, you should turn off SmartDrive's write-behind caching. Load your AUTOEX-EC.BAT file into an ASCII text editor such as Notepad, and add the drive letters for all hard drives to the SmartDrive line. If you've partitioned your disk into C: and D: drives, the altered line should look something like: C:\WINDOWS\SMARTDRV.EXE C D. You'll then need to reboot in order to effect the changes. —G. C.

56. Don't Use a RAM Drive

WINDOWS RAM drives can be useful for many things, but not for storing *Windows*' temporary files. Changing the SET TEMP=[path] entry in AUTOEXEC.BAT to direct temporary files to a RAM drive is a waste. You'll get a bigger performance boost by giving that memory to SmartDrive or another disk cache. —R, J. L.

57. Swap for Speed

■ WINDOWS When you run Windows in 386-enhanced mode, it frees up memory by building a temporary swap file on your hard disk. However, the file's constantly changing size can fragment your disk space and slow you down. Set up a permanent swap file, which doesn't fragment, to keep swap performance humming. Here's how:

First, exit Windows. Delete all unnecessary files from one drive or partition, then type CHKDSK/F at the DOS prompt and free your drive of any file problems. Next, run a defragger such as Norton Speed Disk to optimize the drive, since permanent swap files can't use fragmented disk space.

Those chores done, start Windows and activate the Control Panel's 386 Enhanced icon. Click the Virtual Memory button, then click Change. Choose the drive you just

optimized from the Drive list, then select Permanent from the Type list. You can accept the size recommended by Windows or type in a new value, depending on how much disk space you can afford to dedicate to the swap file. If you see the Use 32-Bit Disk Access check box, make sure it's checkedit'll speed up disk access when you're running non-Windows programs. Click OK . Yes, then click

Restart to restart Windows. -G. C.

58. Recover Wasted Memory

People often load drivers and memory-resident utilities that are never used. Removing them can free memory and speed up your system. If ANSLSYS, COUNTRY.SYS, DISPLAY.SYS, DRIVER.SYS, EGA.SYS, KEYBOARD.SYS, and PRINTER.SYS appear in your CONFIG.SYS, try disabling them with a 'REM' at the beginning of the line, as in REM DEVICE=C:\DOS\ANSI.SYS.

If all your applications and peripherals work fine without them, you can safely delete the REM'd-out lines. If they don't, delete the REMs and you'll be back where you were. DOS or other programs sometime install SHARE.EXE in CONFIG.SYS or AUTOEXEC.BAT when it's not really needed. Unless you're on a network, using DOS 4.x, or running multiple copies of Word for Windows, try REMming it out. You can REM out other mysterious entries in CONFIG.SYS or AUTOEXEC.BAT, but be sure to keep a boot floppy in case you delete something important. —R. J. L.

59. Conventional RAM to the Max

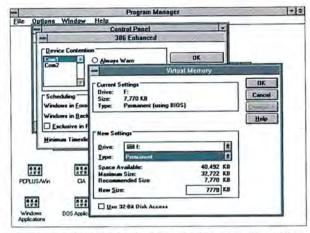
A few CONFIG.SYS entries can help maximize conventional memory available under DOS 5.0. This speeds up many apps by letting them load more code into memory and read the disk less often. As before, copy your current configuration file as CONFIG.OLD, load CONFIG.SYS into a text editor, and add the following three lines:

DEVICE=C:\DOS\HIMEM.SYS

DEVICE=C:\DOS\EMM386.EXE NOEMS /I=B000-B7FF

/I=E000-EFFF

DOS=HIGH,UMB



A PERMANENT SWAP FILE gives you a zippier system than relying on Windows' default temporary swap file.

If you have *Windows 3.1* (not *3.0*), replace C:\DOS with **C:\WINDOWS**. If your system won't boot with this configuration, replace EFFF with **E7FF**; if it still won't boot, remove /I=E000-EFFF. If you have video trouble, remove /I=B000-B7FF.

If you run DOS applications that use expanded memory, replace NOEMS with xx RAM, where xx is the amount of memory you want to configure as expanded. If you run Windows in 386-enhanced mode, it can emulate expanded memory for DOS apps, so xx RAM is unnecessary. —R. J. L.

60. Max RAM Part II

Here's another RAM-saving trick. To free up more conventional memory, replace the DEVICE= line with DEVICEHIGH= in your CONFIG.SYS file (for example, DEVICEHIGH=C:\DOS\SETVER.EXE), and precede commands to load memory-resident software in AUTOEXEC.BAT with LH (as in LH DOSKEY). These commands will load drivers and TSRs into upper memory (the area above 640K), leaving more room for your applications. Don't bother using DEVICE-HIGH with HIMEM or EMM386 or LH with SMARTDRV—they will have no effect.—R. J. L.

Kay Yarborough Nelson is the author of Voodoo DOS and Voodoo Windows (Ventana Press, Chapel Hill, N. C., 1992). Bob Weibel is a freelance writer in Ashland, Oregon. George Campbell, Scott Dunn, Robert J. Lauriston, Robert Luhn, Scott Spanbauer, and Daniel Tynan are contributing editors for PC World. Steve Fox is a senior editor and Lincoln Spector an associate editor for PC World.

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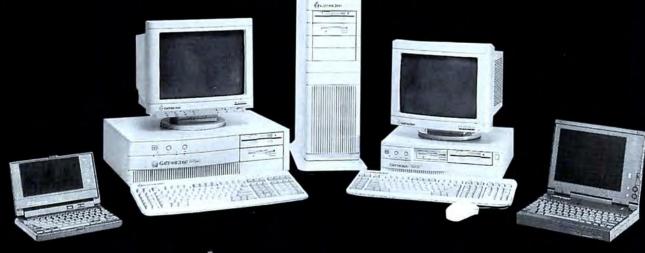
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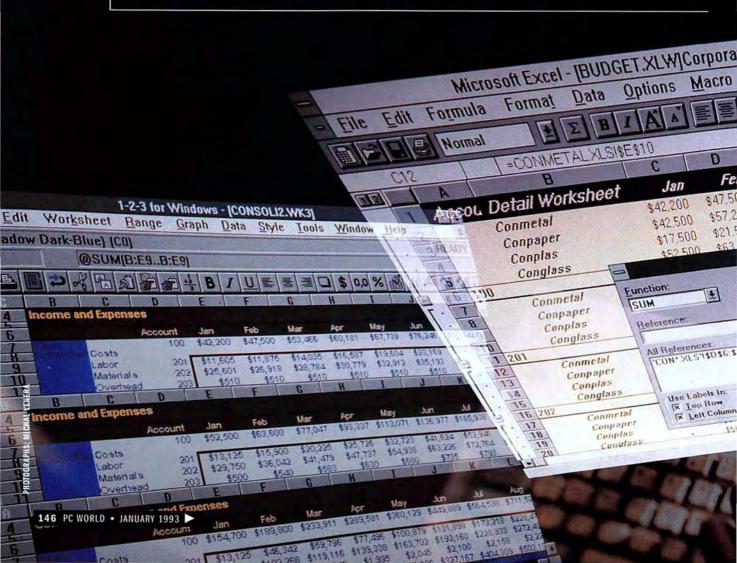




The players: 1-2-3, Excel, and Quattro Pro.

The challenge: To run a gauntlet of tasks just like the work you do every day.

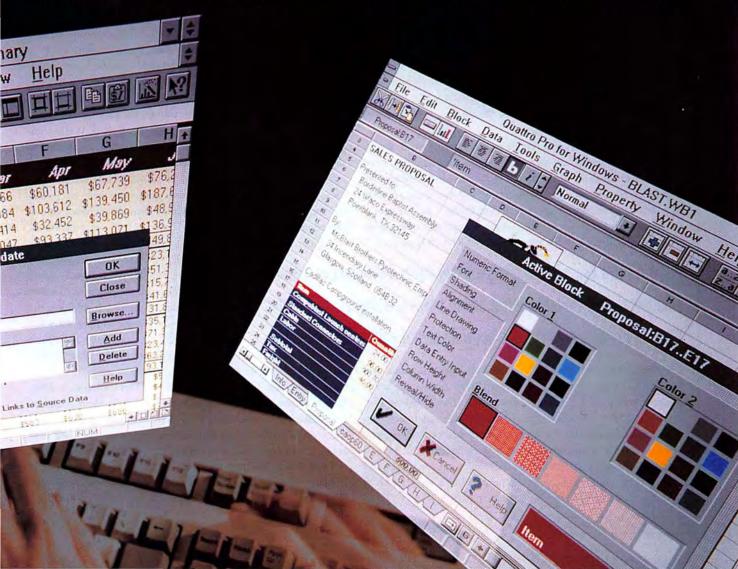
May the best spreadsheet win. by Richard Scoville with Steve Adams



sheet Challenge

If ever there was a time to adopt a new spreadsheet program, this is it. The new generation of Windows spreadsheets offers an unprecedented combination of sophisticated analytical features, ease of use, and greatlooking output. If you consider your DOS spreadsheet—in particular 1-2-3 or Borland's Quattro Pro—a necessary tool of the trade, then it might be time to

trade up. If you're currently using Microsoft Excel, or another Windows spreadsheet, then you're probably curious about what the new competition from Quattro Pro and 1-2-3 for Windows has to offer. As you shop for a Windows spreadsheet, you'll want to challenge some old assumptions. Over the past several years spreadsheet programs have evolved into powerful, broad-based work



platforms. In the "anything you can do I can do better" style of competition, the vendors have added powerful, often daunting features, including nonlinear solvers, 3-D graphics, esoteric statistical and analytical functions, and relational database management. Probably no one routinely uses them all. In fact, recent studies have shown that most people use only a tiny portion of their spreadsheet's capabilities. Thus, ironically, fierce competition in features has made traditional feature-based comparisons largely irrelevant: As a spreadsheet user, you don't really care which program has the most gadgetry, as long as it has the particular gadgets you want. (To find out if yours does, check the features comparison in this review.) Even if it doesn't, the next release probably will. Let's face it, any of the major DOS or Windows spreadsheet programs can do what most people need them to.

The "Real World" Test

With the advent of Windows, the emphasis is on helping you work smarter and easier. A lot of in-

spired perspiration has gone into giving busy people, with limited time for and interest in learning a new program, easier access to more of the spreadsheet's features. Accordingly, we decided to eschew the traditional "features roundup" approach to comparing these products in favor of a more realistic task-based comparison. Our goal was to find out how tractable these programs are in the hands of someone with real work to do-specifically a skilled 1-2-3 for DOS user.

Quattro Pro's way of organizing worksheets—a 3-D notebook with namable pages—and its hierarchical dialog boxes are elegant and useful. We also liked its graphics and sophisticated database query engine.

With that in mind, PC World challenged Lotus, Borland, and Microsoft to teach their new products to Steve Adams. Steve is a freelance writer and 1-2-3 consultant who, like many PC World readers, has used 1-2-3 for several years but had little experience with Windows. We designed four representative spreadsheet tasks to exercise a wide range of program features and techniques. While I monitored the sessions, each vendor's product representative spent a day leading Steve through the tasks, from upgrading a 1-2-3 for DOS worksheet to building a complex database report.

Best Buys



Here's our recommendation: If you're looking for a Windows spreadsheet with today's widest array of analytical features and a well-organized interface, choose Excel.

But if you want an easy transition from 1-2-3 for DOS, and if you take the long-term view, then be sure to give Quattro Pro's notebook spreadsheets a close look. While Excel is the clear winner in terms of its capability to handle sophisticated calculations, Quattro Pro offers a more intuitive interface, superior graphics and chart making, and by far the easiest method of navigating 3-D worksheets. If Borland now begins to build Excel's calculating power into Quattro Pro, it may well be the spreadsheet platform of the future.



As the stars of our Windows spreadsheet roundup, Excel and Quattro Pro shine for different reasons.

The sessions were held on three consecutive days: 1-2-3 for Windows went first, then Excel 4.0, and finally Quattro Pro for Windows. We conducted the training sessions under two stringent ground rules. First and foremost, direct comparisons with competitors' products were prohibited; we wanted to make our own comparisons based on Steve's experiences. Second, the vendors were not permitted to touch the keyboard or mouse. Each vendor brought a portable PC to demonstrate the best approach to each task for their product, but Steve had to install a shrink-wrapped copy of each program and complete all aspects of the tasks himself on a separate PC, a Zeos 386-25. We also reinstalled Windows 3.1 each morning on Steve's PC.

Taking Spreadsheets to Task

During the training sessions, we compared the programs on ease of use, ease of learning, and flexibility. We selected spreadsheet tasks that were not only realistic, but challenging as well; we wanted the programs to distinguish themselves. While com-

pleting the tasks, we posed the following questions, which anyone should ask when deciding which spreadsheet program to adopt.

Is it easy to use? This is the most important question because on a practical level it determines how much work you'll actually get out of the program. The menus, icons, dialog boxes, mouse procedures, and keystrokes should be easy to find and comprehend. The program should make frequently used features readily accessi-

> ble and should lead you step-by-step through more complex procedures. It should also let you organize your work so that data and results are easy to find. In addition, the program should provide simple ways (for example, macros, custom dialog boxes, and tool bars) to automate routine procedures.

Is it easy to learn? Assuming that most new users of Windows spreadsheets are upgrading from 1-2-3 for DOS, all three vendors designed their products to capitalize on 1-2-3 skills. We investigated how well the programs leverage your current knowledge of 1-2-3 into a new set of Windows skills, and whether they let you continue using your 1-2-3 files and macros as you make the transition to Windows.

Another consideration is that each vendor has its own style of implementing the Windows interface. Hence, if you're using other Windows applications from Microsoft, you may initially feel more at home with Excel than with Quattro Pro or 1-2-3/W. If you're a new Windows user, you'll find Excel and Quattro Pro are more compliant with the standard Windows interface than 1-2-3 for Windows is.

Can it do the job? How well does your program help analyze data? How comprehensive is the library of functions? Does the program provide special features to help with complex data reduction, such as database cross-tabulations and multiworksheet consolidations? The program should provide the specialized analyses you need, which might be Fourier analysis, advanced financial calculations, or the capability to solve simultaneous equations. Also check for special support for what-if modeling.

Does it help present your data? Since in this case the medium really is the message, we carefully compared the programs' presentation skills. We wanted to find out which program has the most flexible graphs and the best support for formal and informal on-screen presentations. We also looked at whether the programs let you print formatted reports without raising your blood pressure.

Can it access external data? With an eye to the networked future, and given that much of the data that goes into spreadsheets already exists in external database management systems, we asked which spreadsheet program provides the best database links, and whether the spreadsheet gives an intuitive way to summarize the data.

Surprising Quattro Pro

The big news is Quattro Pro's solid design and ease of learning. Given the enthusiastic reception Excel 4.0 has received from users and the PC press, we were ready for a one-sided contest. Frankly, we were surprised at Quattro Pro's strong showing against Excel.

Steve judged Quattro Pro to have the most intuitive interface, based on his 1-2-3 for DOS expertise. Like many of the spread-

1-2-3 for Windows 2.0: Don't Count Lotus Out

In our shoot-out, 1-2-3 for Windows release 1.1 fared poorly against the innovative design of Quattro Pro for Windows and the analytical arsenal of Excel 4.0. Lotus is looking to get back in the race with release 2.0, which it hopes to ship in the first quarter. I spent a day inspecting a pre-beta 1-2-3 for Windows 2.0 and came away impressed: The latest 1-2-3/W provides a fine new interface, fills the gaps in 1.1's feature list, and provides a work-group approach to what-if scenarios that could change the way organizations think about spreadsheets.

Playing Catch-Up

Many of the new features of 2.0 establish parity with Quattro Pro for Windows and Excel 4.0. To begin with, 2.0 has a completely revamped interface. Lotus has severely pruned the menu structure so it now conforms to general Windows principles. For instance, a single File • Open command has supplanted the separate options for retrieving, combining, and importing files. Dialog boxes are substantially reorganized and now lend a more intuitive feel.

Instead of offering a right-button "property inspection" approach, à la Excel and Quattro Pro/W, 1-2-3/W has context-sensitive menus and icon palettes: Select an object on the worksheet, and menus and icons change to reflect the possible options.

Like its sibling Ami Pro, 1-2-3 2.0 provides an active status bar at the bottom of the page. When you select a sheet object such as a range, the status bar shows the object's properties: font, format, and so on. To change font, click the font name in the status bar and the font menu appears. And speaking of fonts, the eight-font palette system that 1.1 inherited from 1-2-3 for DOS is now a fully Windows-compliant font system.

Other interface enhancements include discontiguous ranges, customizable icon bars, dialog box previews similar to Excel's, and innovative in-cell editing that brings the insertion point out of the formula bar and into the cell itself. Each worksheet has a "drawing layer" that supports free-floating graphs, and there's a set of drawing tools for annotating your sheets. You can align formulas and numbers as well as values, and you can even rotate text within a cell.

1-2-3 3.0 for DOS introduced the 3-D worksheet but left it to Quattro Pro for Windows to turn 3-D into a broadly useful organizational device, 1-2-3/W release 2.0 promises a similar system of sheet names and notebook tabs, though these features were not functional in the pre-beta copy I saw.

Macro Commands

Banished forever are the keystroke macros that so frustrated Steve Adams in our review. In their place is a host of new macro commands, along with an improved transcript system for recording macros. The new release has more than 100 new functions, including financial, engineering, and statistical ones hitherto available only in Excel.

With all its new features, a few deficiencies remain. Graphs are limited to 23 data

series: Better than 1.1's 6, but still not adequate for some users. And the program has no user-defined numeric formats.

An Innovative Scenario

Release 2.0 outdoes Excel with Scenario Builder, a scheme for managing the what-if process using versions and scenarios. A version identifies the values or formulas in a specified range. A scenario is a named collection of versions. Suppose you're the manager of a fast-food chain forecasting next year's performance. You might create one version to model cash flow from a new franchise if it opens in January, another if it opens in February. Another scenario might reflect variations in the price of potatoes. Then you could set up best case, worst case, and other scenarios composed of various combinations of the versions.

The Scenario Index feature lets you view, organize, select, and combine versions and scenarios by name, user, date, and so on. You can create a template version of your sheet and distribute it on disk or network. When your colleagues have provided their own versions, you can merge them into a single worksheet and generate alternative scenarios from their input.

Scenario Builder could make 1-2-3 a powerful player in the Windows arena. Of course, we'll have to wait for a fleshed-out beta release before we can make definitive comparisons. It needs to be bug free and to arrive before its potential customers have defected to the competition. -Richard Scoville

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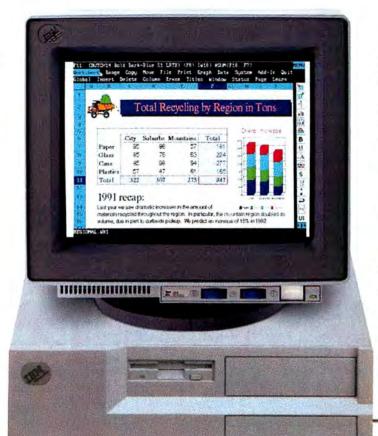
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sheet users I see in my training classes, Steve initially found it awkward to navigate with a mouse; he much preferred to use the keyboard. 1-2-3 users like him have developed a repertoire of keyboard commands that let them rapidly manipulate a worksheet. While it's pretty easy to learn a new menu structure (provided it's organized well), it's downright frustrating to unlearn these keyboard reflexes. While it's true that Excel provides an optional keyboard mapping that emulates 1-2-3 for DOS, Quattro Pro's handling of ranges and cell pointer movement allowed Steve to easily transfer his old 1-2-3 skills. (If you're using Quattro Pro for DOS, expect to spend time learning Quattro Pro for Windows' substantially revised interface.)

In addition, we found Quattro Pro's method for organizing worksheets—a 3-D notebook structure with namable pages—and its hierarchical dialog boxes to be elegant and useful. With superior graphics and a sophisticated database query engine based on Paradox, Quattro Pro is a firm foundation on which Borland can build its Windows spreadsheet line. One caveat with Quattro Pro for Windows 1.0 is that it's a new release, so expect the minor kinks that you would with any new program.

Exciting Excel

Compared to Quattro Pro and 1-2-3/W, Excel possesses a superior arsenal of analytical features, including built-in statistical tests, outlining, automated worksheet consolidation, and a huge function library, among many others. The majority of spreadsheet users won't need Excel's esoteric features, although statisticians, engineers, and financial analysts will appreciate them.

Unlike Quattro Pro's and 1-2-3/W's 3-D worksheets, Excel 4.0's worksheets remain strictly two-dimensional, making intersheet formulas and file handling cumbersome. Excel 4.0 lets you bind sheets together into Workbooks complete with tables of contents, and provides a group-editing mode to help construct a set of similar sheets. This approach isn't as elegant or easy to use as Quattro Pro's more integrated, 3-D notebook solution, but it achieves a comparable level of functionality. If you've already invested time and effort in learning Excel, you probably won't want to switch to Quattro Pro. But be aware that 3-D worksheets are the wave of the future.

Microsoft has made an enormous research-based effort toward improving Excel's usability, resulting in features such as its Crosstab

Point/Counterpoint

n the tradition of lively debate, PC World encouraged Richard Scoville (a Windows spreadsheet expert) and Steve Adams (a 1-2-3 for DOS expert) to offer their different perspectives on the new crop of Windows spreadsheets: Excel 4.0, Quattro Pro for Windows 1.0, and 1-2-3 for Windows 1.1. Their insights will help you determine the best program for you.

RS: I think that Quattro Pro breaks new ground in the area of spreadsheet organization. Way back with the DOSbased 1-2-3 release 3.0, Lotus touted 3-D worksheets as a way of building com-



Richard Scoville

plex data models, but I've always found them to be far more useful for avoiding spreadsheet sprawl. Now Quattro Pro has made 3-D primarily an organizational tool. With named pages, flexible grouping of pages for formatting and editing, the model-copy procedure, and a command to move pages around, Quattro Pro users have a wealth of resources for keeping their work neat and accurate. And it's a lot handler to use than Excel's Workbooks.

SA: I agree that Quattro Pro's tab system is the best method for navigating 3-D files that have more than two or three sheets. Excel can perform many 3-D functions, but it's not truly a 3-D spreadsheet. For instance, you cannot define 3-D ranges. And unlike in 1-2-3/W and Quattro Pro, in Excel you cannot



Steve Adams

simply add worksheets to a file: You have to create separate sheets and then bind them into a Workbook, which is considerably more cumbersome. Formula references to cells and ranges in

external sheets are inherently more awkward because they have to include the name of the file.

RS: But Microsoft argues that "true" 3-D Is irrelevant. They've provided special features such as automatic consolidation and the Scenario Manager, which offer specific help with tasks that the other programs used 3-D to solve. So aside from simplifying a few awkward formulas, why does Excel need 3-D?

SA: I agree that Excel's Data Consolidate command is neat. But the Scenario Manager doesn't provide the same degree of flexibility as a well-designed 3-D worksheet. The more I look at these programs, the more I think Excel needs to stop tinkering with add-on bells and whistles and work on the basic platform. Both Lotus and Borland have managed to convert their flat worksheets to 3-D, so why not

RS: How about the touchy-feely stuff, Steve? Why are you so enthusiastic about Quattro Pro's interface? Is it really better than Excel's, or is Quattro Pro just more in tune with your 1-2-3 experience?

SA: It has been easier in general to find items in Quattro Pro's menus because it's structured more like 1-2-3 than Excel is. For example, Quattro Pro has a Graph menu, as does 1-2-3. But in Excel you have to either use the ChartWizard or select File . New . Chart. It's not a big deal, but the point is that Excel's chart features are not where a 1-2-3 user would intuitively look for them. Of course, with 1-2-3/W's Classic menus, an experienced 1-2-3 user will be able to pick up 1-2-3/W and continue working as usual with the slash and colon commands. But if you're going to do that, why upgrade at all?

RS: Quattro Pro's graphs are pretty flashy, but aside from the special graph page in the notebook to organize them, I don't see much to recommend Quattro Pro's graphics over Excel's or 1-2-3's. What's your call?

SA: There's not much difference among the programs in 2-D charts. However, Quattro Pro's 3-D graphs are much more elegant than those of the other two programs. It also took me far less time to learn how to create the ReportWizard, which guides you step-by-step in creating a database summary report. Although its interface is not as intuitive as *Quattro Pro's* for a *1-2-3* veteran, it is logical and flexible and tightly consistent with other *Windows* products from Microsoft.

Disappointing 1-2-3

1-2-3 for Windows ran a poor third in our comparisons. Lotus's DOS spreadsheets have evolved into a pastiche of poorly integrated components, and unfortunately this tradition continues throughout 1-2-3 for Windows release 1.1. (See "1-2-3 for Windows 2.0: Don't Count Lotus Out.") The arrangement of menu options continually frustrated even an experienced 1-2-3 user like Steve. Here's one of many examples: Unlike most Windows programs, 1-2-3/W doesn't automatically change the current directory when you open a worksheet. But there is no File•Directory command; to change the current directory, you must search out the User Setup dialog box in the Tools menu. One advantage to 1-2-3/W, however, is that it's the only Windows spreadsheet that facilitates trading files with 1-2-3 for DOS release 3.1, essential if your office uses this DOS-based 1-2-3.

1-2-3/W offers essentially the same features as 1-2-3 3.1, with additional options such as database cross-tabs, automatic range fill (a smarter version of the old Data Fill command), and automatic range formatting provided in its SmartPak add-in, which has been distributed with the program since last June and is available free to current licensees. But even with SmartPak, the feature list comes up far short of Excel's. Coupled with the program's disorganized menus and inflexible interface, it gives little reason to adopt 1-2-3/W 1.1.

The following descriptions explain how the programs performed on each task. The "Point/Counterpoint" sidebar below contains a discussion between Steve and me on the merits and drawbacks of the contenders.

Richard Scoville is a software training consultant based in Chapel Hill, North Carolina, and a contributing editor for PC World. He can be reached on PC World Online (see page 8 for more information).

Steve Adams is a writer in Raleigh, North Carolina, and the author of numerous books on computer applications, including 1-2-3.

graphs I wanted in Quattro Pro than in Excel. In 1-2-3/W, you create graphs pretty much the way you always did, and with the exception of an icon bar in the graph-editing window, they are as awkward to edit and annotate as ever. Excel has a workable slide-show feature, but it's considerably more bothersome than Quattro Pro's, which is really an elegant solution. In 1-2-3 you'd have to write a macro to create a slide show. With all of Quattro Pro's features, it can neatly double as a presentation graphics program for many users.

RS: Quattro Pro also includes the best system for placing charts on the worksheet: Unlike in 1-2-3/W, you can move and scale them with the mouse. And unlike in Excel, the text in Quattro Pro's graphs changes to accommodate changes in the size of the graph.

SA: Excel is the only program that has made significant advances in functions. Quattro Pro offers some improvements over 1-2-3/W in financial functions, but they were there in Quattro Pro's DOS version. 1-2-3 has added no new functions since 3.1. Excel blows their doors off in this area.

RS: True. And it's not just functions. Microsoft has added an enormous amount of analytical capability throughout Excel. It's a pretty impressive list: Random sampling routines, automated what-if scenarios, the crosstabs feature, statistical tests, fast Fourier transforms. And that's just for starters!

SA: That's certainly true. But doesn't Excel venture into the arcane? Are real spreadsheet users going to do hypergeometric distributions, Fisher transformations, and Bessel functions, to pick a few that I've never heard of? Or are they going to switch to a professional statistical program like SAS?

RS: Well, let's say your organization has 50 spreadsheet users. Forty of them will never need anything more than a sum function. Six or seven will use a few financial functions or

SA: I certainly agree that Excel's analytical capabilities are vastly superior. I have been talking about this with a commercial real estate appraiser, and it's clear that he would choose Excel for its financial and statistical functions, regardless of the interface. Excel's interface does provide a little more of a challenge for a 1-2-3 user than Quattro Pro's, but the only real problem I've had with it is that it handles multiworksheet applications very awkwardly.

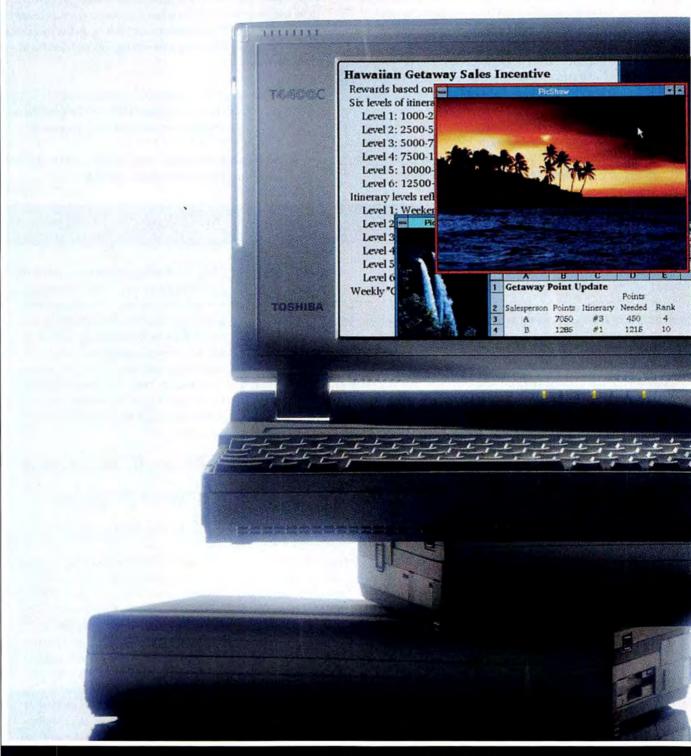
Excel is the analytical champ. Quattro Pro takes the prize for easiest interface, best spreadsheet organization, superior graphics, and easiest database query system—and 1-2-3 is still playing catch-up.

maybe the database cross-tabs. And a small handful will need advanced features in their areas of expertise. Nobody's going to need everything that Excel provides, but the advantage of having a universal platform like Excel for data analysis is that there's only one program to buy and support: Everyone gets the same introductory training, and all the users speak the same language. They can easily exchange files and swap tips and advice; over time, the expected level of expertise in the organization will rise. You don't get that kind of synergy if the power users are off using a specialized analytical program.

In short, Excel is the analytical champ. Quattro Pro takes the prize for easiest interface, best spreadsheet organization, superior graphics, and easiest database query system—and 1-2-3 is still playing catch-up.

RS: But remember, Steve, you don't just purchase these programs—you subscribe to them. Any upgrade decision should take the long-term view. Now imagine Quattro Pro's 3-D platform with analytical features comparable to Excel's functions, outlines, autoconsolidation, and the rest. If Borland continues to improve Quattro Pro's analytics, it may well end up the spreadsheet of the future.

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Task 1: Upgrading a 1-2-3 Worksheet

Task 1 challenges the spreadsheets in several key areas: how easily an experienced 1-2-3 for DOS user can learn them, how they organize and format a worksheet, and how they automate a printed report.

he first task focused on 1-2-3 for DOS compatibility and basic ease of use, worksheet organization, and report formatting and printing features. We provided a typical 1-2-3 for DOS worksheet that accepted data into a data entry screen and contained a separate report area for printing a sales proposal. Steve's job was to open this worksheet in the new Windows program, reorganize it if necessary, format it using the capabilities of the new program, and then run the report.

Making the Transition From 1-2-3 for DOS

Since Steve is an experienced 1-2-3 user, we wanted to see how much of his knowledge he could use with the new programs. 1-2-3/W and Excel both provide special help for 1-2-3 for DOS users, but it turned out that Quattro Pro's well-organized interface, with no special 1-2-3 help, was easier for Steve to master.

In 1-2-3/W, he could proceed as before: Most of his habitual keyboard gestures worked identically, and when he pressed <Slash>, he found the Classic 1-2-3 menu where he could simply rattle off 1-2-3 for DOS commands. Unfortunately, the Classic system gives no clue as to how to use the Windows interface, so it was actually more of a hindrance than a help in learning how to use 1-2-3 for Windows.

In Excel, pressing <Slash> calls a 1-2-3 help system, which accepts 1-2-3 commands; when you've completed all the 1-2-3 keystrokes, it takes over and steps through the equivalent Excel procedure, providing a kind of minitutorial. But Steve found Excel's menus more productive than this help system.

As a result of Lotus's lawsuit against Borland, Quattro Pro doesn't respond to 1-2-3 command keystrokes. But that proved to be irrelevant. Quattro Pro provided the best transition from 1-2-3, first because of its high compatibility with 1-2-3 worksheet navigation keystrokes, and second because of the clean, logical organization of

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QUATTRO PRO'S COMPOUND DIALOG BOXES, often accessible with a simple right-button mouse click, let you change many attributes of a selection in a single step.

its menus and dialog boxes. Steve simply found it easiest to find what he was looking for in *Quattro Pro*. For instance, both *Excel* and *Quattro Pro* let you click the right mouse button on various worksheet objects in order to change their properties. In *Quattro Pro*, you get a compound dialog box that lets you quickly locate the feature you want to change and make multiple selections before returning to the sheet. In *Excel*, a right-click yields a pop-up menu, which leads in turn to a single dialog box; if you choose the wrong menu option, or if you want to change several properties of the selection, you must start over with another click.

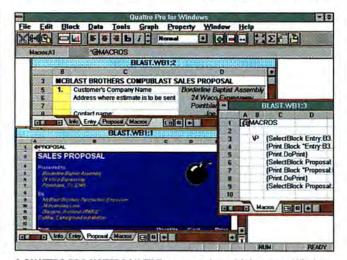
Organizing the Worksheet

The 1-2-3 for DOS proposal worksheet we provided was organized into discrete work areas for data entry, macros, and sales proposal, arranged in a diamondback pattern (each new area starts below and to the right of the previous area) to prevent changes in one area from disturbing the other areas. All three spreadsheet programs have a zoom feature that lets you reduce the size of the worksheet to view the overall layout and structure of the sheet. We assumed that vendors would want to take advantage of the organizational features of their new programs by reorganizing our worksheet.

Eager to demonstrate strict 1-2-3 compatibility (and perhaps because of Excel's 2-D structure), however, Microsoft and Lotus both chose to retain the original diamondback layout. Borland's representative had Steve reorganize the worksheet onto separate pages of a notebook, then assign names to each page—a relatively smooth process. Simply by naming the pages of the notebook, Steve could flip quickly from one area of the worksheet to another. This is a new and altogether superior way to navigate even the most complex worksheet.

Formatting the Report

Formatting the 1-2-3 for DOS proposal allowed Steve to exercise the worksheet publishing features of the programs. The proposal area contained a title, subtitle, and two company names and ad-



A QUATTRO PRO NOTEBOOK FILE can contain multiple pages: Window 1 shows a sales proposal that prints data to the data entry sheet shown in window 2. Window 3 shows the macros page.

dresses, plus a table of detailed costs. Although all three programs offer some kind of automated formatting option, *Excel*'s did the best job because it's "smart" enough to apply formatting based on the contents of cells. However, none of the programs automatically gave "finished" results: Steve still had to align and format individual cells and ranges in the proposal.

Like its DOS forebears, 1-2-3/W limits you to a palette of eight fonts at a time. A more serious handicap is 1-2-3/W's unique inability to align numbers or formulas.

All three programs provide extensive color options for formatting your worksheets, such as shading and color backgrounds for cells, color for text, and so on. It's fun and often informative, but when you need to print, you'll appreciate *Excel*'s sensible option to disable all color formatting and print legible copy.

Printing the Report

Our 1-2-3 worksheet contained a macro that printed the data entry area with appropriate page header and footer, then printed the sales proposal without the headers. First we wanted to see if the Windows spreadsheets could run the 1-2-3 for DOS macro. Then we wanted to find the best automated report solution for each program.

Excel and 1-2-3/W made it easiest to read the 1-2-3 macro: a mere matter of pressing <Ctrl>-P. In Quattro Pro, Steve had to switch on the 1-2-3 key reader first. When we formatted the proposal report with fonts and lines and ran the print macro, all three Windows spreadsheets omitted the formatting and printed a plain report with no enhancements.

Lotus's expert had Steve rewrite the macro in order to get the

new formatting onto the page. It was a mess: Unlike *Excel's* or *Quattro Pro's* macro language, *1-2-3's* is still keystroke based, which made plenty of sense when the program menu interface was driven keystroke by keystroke. But trying to record and debug the keystrokes necessary to navigate *Windows* dialog boxes was an exercise in frustration.

Both Microsoft and Borland demonstrated ingenious ways to automate this routine report. Microsoft sidestepped the macro entirely by using *Excel*'s report manager to define spreadsheet views consisting of selected windows and print settings. Steve knitted the views together into a single named report. The result is flexible, but the issue of managing changes in the views and reports proved confusing.

In Quattro Pro, a named report comprises just a single print range, so Steve created one named report for the data entry area and another for the proposal, then tied them together with a very simple macro. Borland's expert showed him how to attach the print macro to an on-screen power button, so a user could simply click the button to produce the report.

Best in Task

Based on its keystroke compatibility with 1-2-3, Quattro Pro offered Steve the easiest transition to Windows. 1-2-3/W's Classic menus were somewhat helpful, but Excel's help system for 1-2-3 was limited. Quattro Pro also proved outstanding in its method of organizing a worksheet into notebook pages. Excel and Quattro Pro eleverly automated a routine report, but 1-2-3/W's macro language, which is based on keystrokes, proved inadequate.

Task 2: Analytics and Graphs

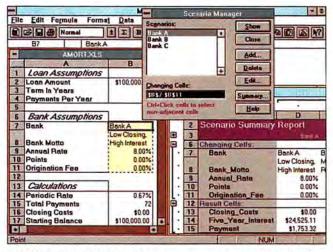
In Task 2 we test the spreadsheets' analytical features, the convenience of what-if comparisons, and the ease of creating and editing graphs for a slide-show presentation.

n the second task, we explored the programs' analytical capabilities: formula-building procedures, functions, graphs, and support for what-if modeling. Steve had to build a mortgage loan amortization schedule to compare the deals offered by three fictional banks. He created graphs to compare the interest portion of each loan payment and the fees for each bank, and then he prepared an informal slide show to present the results.

Building a Loan Amortization Schedule

Constructing the basic amortization schedule was a routine task, and all the programs handled it accordingly. Steve was pleased with some of the new amenities offered by these *Windows* programs. For instance, all three programs offer the autofill capability. Select a cell containing a recognized string (MON) and autofill, and a series will progress into the adjacent cells (TUES, WED, THURS). Select a set of cells containing a series (DIV1, DIV2, or 1,2) and autofill, and that series will progress into adjacent cells (DIV3, DIV4, or 3,4). Select a cell or set that doesn't fit the first two types and autofill, and the contents of that cell or set are replicated in the adjacent cells. The autofill feature is a standard button on *Quattro Pro*'s tool bar, and you can readily customize *1-2-3*'s tool bar to include one.

In Excel, the cell pointer has a small, square "autofill handle" at the lower right corner; drag it to select and fill a range. It's clever, but maybe too clever: New users often drag Excel's autofill handle by mistake. Unlike Quattro Pro and Excel, 1-2-3/W offers definable fill ranges, but you have to edit the SmartPak INI file. This isn't a difficult chore as long as you're familiar with Windows INI files.



EXCEL'S SCENARIO MANAGER lets you name and store a set of alternative input values for a spreadsheet model and generate a summary worksheet to compare the scenarios.

WINDOWS SPECIAL SPREADSHEETS

Building the amortization gave us a chance to compare the programs' function libraries, and what a difference! As in most of the analytical comparisons, *Excel* dominates. Along with *Quattro Pro, Excel* includes functions to calculate the interest and principal portion of an individual loan payment, plus full support for annuities due. It also provides an additional 30 specialized financial functions.

At the interface level, both 1-2-3/W's and Quattro Pro's approach to building formulas strikes a good balance between robust help

and gentle reminders. Unlike Excel, they provide ready access to help screens as you fill in the function arguments. But Quattro Pro's method of helping you build functions is the best. Instead of Excel's oversolicitous way of selecting and replacing prototype arguments on the formula bar, with Quattro

Pro you press <F1> to get information specific to the function you're trying to construct. In *1-2-3/W*, unless you access the help screens, you don't get visible hints as to the arguments.

Comparing the Deals

In *Quattro Pro* and *1-2-3/W*, once Steve had completed the amortization schedule for one bank, he copied it onto two additional worksheet pages in order to compare the loans across the three banks. Copying formulas from one sheet to another causes potential confusion about how the cell references should change during the copy. In *1-2-3*, Steve had to carefully set up mixed cell references like B:\$B\$7 to ensure that the copies would contain the correct formulas. *Quattro Pro* has a special "model copy" command that automatically keeps the absolute and relative cell references straight.

Excel's Scenario Manager allowed Steve to do all the bank comparisons with just one amortization schedule. It lets you name alternative sets of entries for certain worksheet (input) cells, then switches quickly among the sets to see the effect of each set on certain other (result) cells. Excel can generate a table in a separate worksheet that summarizes the inputs and results for each scenario.

Steve found the Scenario Manager to be as economical as it was convenient: It saved three times as much spreadsheet space in this case. But he still thought the 3-D approach he used in 1-2-3/W and Quattro Pro was more flexible. For instance, in Excel you can't view multiple scenarios side by side unless you generate a summary sheet, and even then the summary sheet doesn't contain live formulas: If you change the scenario values, you must regenerate the summary.

Presenting Graphs and a Slide Show

Setting up and presenting graphs in *Quattro Pro* was a breeze. *Quattro Pro*'s graphs are free-floating objects, in contrast to 1-2-3/W's, so it was easy to move and scale the graph with the mouse. And as Steve adjusted it, the text in the graph changed size to match (unlike in *Excel*). Steve found it easy to edit the graph; instead of searching through menus, he could simply right-click the mouse button on any graph feature and change its properties. To create graphs for the other banks, Steve copied the graph onto the other two sheets, then edited the data ranges to refer to the new page. The swift result was three identically formatted graphs.

At that point most of the work for the on-screen slide show was already done. Steve flipped to the last page of the notebook and found an icon for each graph. It took only a few moments to select them, create a named slide show, arrange the images on a "light table," specify transition effects for slide changes, and run the show. Although you can obtain similar presentation features for *Excel* and 1-2-3/W by purchasing Microsoft's *PowerPoint* or Lotus's *Freelance Graphics for Windows*, *Quattro Pro*'s built-in features are a workable alternative to a separate program.

Excel's charts provide a range of options similar to Quattro Pro's, and they're almost as easy to use, although its slide-show feature

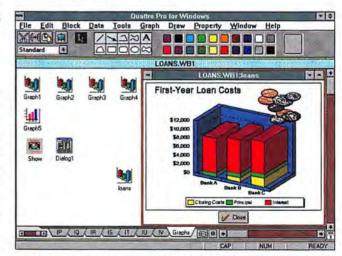
Excel's Scenario Manager allowed us to do all the bank comparisons with just one amortization schedule. And it's as economical as it is convenient: It saved three times as much spreadsheet space.

comes up short. Excel's effort to make graphs user-friendly is called the ChartWizard, which led Steve step-by-step through creating a graph. After a couple of graphs, Steve found the ChartWizard to be cumbersome but had difficulty finding alternative methods for creating charts. The procedures for editing a chart in Excel aren't as easy as Quattro Pro's either. Excel's slide-show feature offers a similar range of options, but because you must create a new file and slide images into it using the clipboard, it's not nearly as usable.

1-2-3/W's graphs are essentially the same as in 1-2-3 3.1. They are still limited to six data series, a serious deficiency compared to the others. And they're awkward to edit. For instance, you can place objects such as rectangles on the graph, and you can move them with the mouse, but to resize an object, you must select a menu option. And in order to edit the text in the graph, you must search out one menu for graph titles and another for annotations. Steve didn't prepare a slide show in 1-2-3/W; since it lacks a slide-show feature, setting one up is complicated and time-consuming.

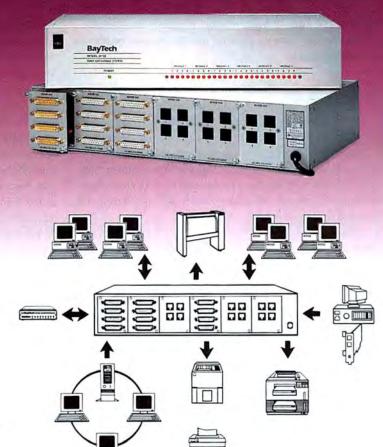
Best in Task

Excel's analytical capabilities far outstrip those of *Quattro Pro* and 1-2-3/W. Excel's Scenario Manager is a nifty way to organize what-if comparisons, but it's not a substitute for a 3-D worksheet, which both *Quattro Pro* and 1-2-3 support. *Quattro Pro*'s graphs and slide show are the leaders of the pack.



QUATTRO PRO'S NOTEBOOK WORKSHEETS: The last page is reserved for graphs, slide shows, and dialog boxes.

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Task 3: Budget Consolidation

Task 3 looks at the spreadsheets' wizardry in consolidating the budgets of four fictional company divisions, and the programs' techniques for automating the job.

he third task emphasized spreadsheet organization and consolidation techniques. We provided budget worksheets in WK1 format from four divisions of a fictional company. We identified the line items by labels and account numbers. To make it challenging, each division had a slightly different set of line items, and in some cases the same account numbers were labeled differently. Steve had to consolidate the four sheets into a single worksheet file and calculate quarterly and annual totals and totals across the four divisions.

Consolidation

Borland and Lotus offered remarkably similar strategies in this task because both *Quattro Pro* and *1-2-3/W* are true 3-D worksheets: They combined the four WK1 files into a single multipage worksheet, edited them so their structures were the same, and then built 3-D sum formulas to sum the four divisions. As it turned out, this was the best route to accomplishing this job.

Microsoft, in contrast, used *Excel's* automatic consolidation feature to total the divisions. To keep the sheets organized, Steve gathered the separate sheets together into an *Excel* Workbook, which is not a 3-D structure but a named set of separate worksheets combined into a single XLW file. *Excel's* smart consolidation looks for matching labels in the leftmost column of ranges in a set of individual worksheets, and combines the information for those lines. The program then constructs a new sheet containing formulas that gather and sum the values from all the sheets.

Steve found *Excel*'s automatic consolidation ingenious and easy to use—he didn't need to standardize the individual sheets, as required by 3-D sum formulas—but ultimately not as flexible as a 3-D worksheet. Since *Excel* treats the worksheets as separate files even when they're bound into a Workbook, when you close the

1-2-3/W, LIKE QUATTRO PRO, is a true 3-D worksheet. The three pages shown here are from the budget consolidation worksheet. The rectangles beginning in E9 of each worksheet constitute a single 3-D range.

Workbook you must respond to prompts about saving each individual sheet, whether you've disturbed them or not—a real hassle if they're numerous. In sum, *Excel*'s "smart" consolidation, Scenario Manager, and Workbooks are all clever features, but together they don't compensate for the lack of a 3-D worksheet structure.

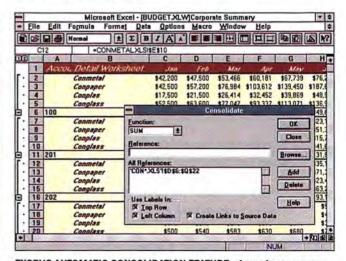
Automating the Job

Steve made extensive use of autoformatting, autosum, and autofill functions to speed up the work, and all the programs operated comparably. Each one provides an autosum button, and all three vendors directed Steve to use the button to prepare yearly totals for each division. In 1-2-3/W and Quattro Pro, the autosum operation incorrectly incorporated the account numbers into the total; in Excel, the autosum button stops just short of entering the formula, so you can check the range being summed.

Each of the programs provides a group-editing mode that enables the formatting changes you make to one sheet to affect all the other sheets in the group. Steve found this feature to be a real time-saver for this multisheet application, and discovered that *Quattro Pro*'s was the easiest and most flexible. In *Quattro Pro*, you can define a temporary group by shift-clicking on the notebook page tabs, or you can define a permanent, named group through the menus. Then, when you want to do group editing, you click a button to switch on group-editing mode. In contrast, 1-2-3/W's group mode affects all sheets in a file. With *Excel*, you can group-edit selected sheets, but when you change the current sheet the group disappears.

Best in Task

As 3-D spreadsheets, *Quattro Pro* and 1-2-3/W made it easiest to organize the four division budgets into a single multipage worksheet. *Quattro Pro*'s notebook tab system is a superior method for group editing and worksheet navigation. *Excel*'s automatic consolidation is convenient, but its Workbook system is more trouble than a 3-D worksheet when, in typical cases like ours, a model lends itself to 3-D construction.



EXCEL'S AUTOMATIC CONSOLIDATION FEATURE, shown here, summarizes the data from multiple files without requiring you to reorganize the individual worksheets.

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Task 4: External Database Access

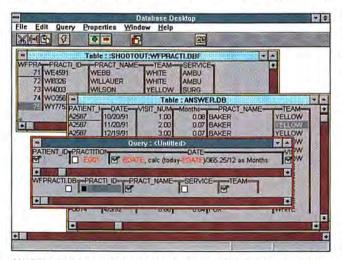
Task 4 focuses on the spreadsheets' methods for linking to an external database system and summarizing the extracted data in a crosstabular report.

he data that goes into many worksheets already exists in a database system somewhere, and as trends toward serverbased database systems accelerate, direct access to external data sources will become more commonplace. To contrast the three programs' approaches, we provided three DBF data files containing health care data: Patients, practitioners, and visits by patients to a clinic. Steve had to open and browse through them, add records, and modify and sort the data. We posed questions that required him to link the tables, extract related data from all three tables, and calculate the number of days since each patient's last clinic visit. Finally, for two groups of patients receiving different treatments, he prepared a cross-tabulation report to compare the average group score on a blood test for each of six visits the patients made to the clinic.

Linking to a Database

In this task, 1-2-3/W and Excel followed strikingly similar procedures: Each used a special add-in (1-2-3/W's DataLens, Excel's Q+E) to link the worksheet to the external database tables, then they set up worksheet criteria ranges with special criteria to establish relational links. Finally, they extracted data into the worksheet using a traditional output range. To compute the average blood test values, they used specialized cross-tabs features.

1-2-3/W's approach is identical to 1-2-3 release 3.1's. It's a complex, finicky procedure. The DataLens driver that accesses the external database tables establishes a dummy range name to represent each real one. The lack of a file selection dialog box made this process more difficult than it otherwise might have been. Steve had to set up a data query system that included the external table names as input ranges. After pasting a set of field names from each table onto the worksheet, he built criteria and output ranges, editing



QUATTRO PRO features a database desktop modeled on the Paradox database manager. The query shown in the Query window selects data from the Practitioners' table (top) and the Visits table (not visible).

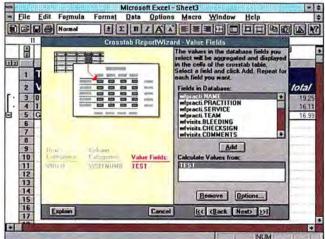
the field names to distinguish fields that occurred in more than one table. Then he entered logical formulas into the criteria range to establish the relational links between the tables. Once the system was established, Steve was able to include additional criteria and extract the selected records to the output range. *1-2-3/W*'s calculated output fields allowed him to compute the time since the last visit as the data was extracted.

In Excel, the procedure was similar, but Excel's interface made the job more manageable than in 1-2-3/W. For instance, after Steve attached Excel's Q+E add-in and used it to select the three external DBF files as the database, he was able to select the fields he needed from a dialog box without editing the field names. On the other hand, since Excel does not provide for calculated output fields, Steve had to enter and copy a set of formulas in order to compute the time since the patients' last clinic visit.

Quattro Pro takes a unique new approach to external database access, but it's limited to Paradox and DBF formats. (Unlike Excel and 1-2-3/W, Quattro Pro can't access SQL databases.) Quattro Pro includes the Database Desktop, a database query add-in (actually, it's a separate program) that is almost identical to the query engine that accompanies Paradox for Windows. It operates under Paradox's Query By Example system, so it will be instantly familiar to Paradox users. Even a database neophyte like Steve was quickly able to grasp the mechanics of selecting and rearranging fields, setting up key field examples to mediate joins, and creating calculated fields. When Steve executed the query, the selected fields appeared in an answer table in the Database Desktop. From there he selected values and pasted them back into the worksheet.

Cross-Tabulation Report

The cross-tabular report to calculate group changes in blood test values over a number of clinic visits represents a very common spreadsheet task, namely tallying and summarizing groups of records. *Excel*'s Crosstab ReportWizard and *1-2-3/W*'s SmartPak cross-tabs feature provided similar results. In both programs, the



EXCEL'S CROSSTAB REPORTWIZARD provides a convenient way to tally or summarize database information. Here, it's creating a report that calculates the average test value for the patients in two groups.

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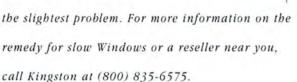
That means that these often used Windows functions

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Daily su	pport hours	24	12	11

Drag-and-drop, copy, and move	0	•	• 5
Select entire column/row/sheet	0	•	•
Select and name discontinuous ranges	0	•	•
Definable autofill sequences	•	0	0
Right-click to change object properties	0	•	•
Model copy	0	0	•
Paste functions arguments	0	•	0
Movable, sizable worksheet pages	0	•	•
3-D ranges	•	0	•
OLE client, server	0	C,S	C
Customizable tool bars	•	•	•
Group editing		•	

2-3 transition			
Recognizes 1-2-3 slash key commands	•	●6	0
Compatible with 1-2-3's @ functions	•	07	
Executes 1-2-3 2.01 macros	•	•	
Executes 1-2-3 3.1 macros	•	0	0

nalytics			
Automated multiworksheet consolidation	0	•	0
Automated what-if scenario management	0	•	0
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Nonlinear solver	•	•	•
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Analysis of variance	0	•	0
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Fast Fourier transform	0	•	0
Statistical functions	10	71	10
Math, trig, and engineering functions	17	94	19
Financial functions	12	50	18
User-defined functions	0	•	0
Outliner	0	•	0
Percentile calculations	0	•	0

Free-floating graphs	0		•
Drawing layer for worksheet annotations	0	•	0
Auto-compress report to >1 page	0	●8	0
Auto-formatting	•	•	•
Number of series per graph	6	255	9
Number of points per series	32,767	4000	9
Formatting styles	10	•	•
User-defined formats	0	•	•
On-screen slide show	0	•	•
Converts color for B&W printing	On	•	O¹
Center label in a range	•		0

Database access			
Relational queries		•	•
Calculated output fields	•	●13	●13
Dynamic links to external database	0	•	•

Many functions require a different syntax.

Direct access to SQL databases

Align numbers and formulas Store named report settings

procedure involved stepping through a series of dialog boxes to indicate the database fields to use for column and row headings, the fields to summarize in the cross-tab cells, and the summary statistic desired, in this case "average."

1-2-3/W's cross-tab required that Steve extract a subset of the data into a worksheet, then select the output records and run the cross-tab on the selection. Excel, on the other hand, allowed him to connect directly to the external DBF tables and build the cross-tab table in a new worksheet, using a standard criteria range to join tables and select records for the cross-tab. Quattro Pro doesn't provide an equivalent cross-tabs report (neither does Paradox)-a serious drawback-and Borland's expert did not attempt a solution during the training session.

Best in Task

In the realm of external database access, Quattro Pro easily takes first prize for ease of use. But when it comes to summarizing the results, Excel's cross-tabs feature is indispensable.

WHERE TO BUY

Excel 4.0 Microsoft Corp. 800/426-9400, 206/882-8080 Reader service no. 741

Quattro Pro for Windows 1.0 Borland Int'l, Inc. 800/331-0877, 408/461-9000

Reader service no. 742

1-2-3/W 1.1 Lotus Development Corp. 800/343-5414, 617/577-8500 Reader service no. 743

²Includes Quattro Pro for DOS: \$99 upgrade.

³Free for first 6 months, additional support programs available.

⁴Toll call, unlimited.

⁵Can't drag single cells or insert a dragged range.

Recognizes the commands, then displays Excel equivalent.

⁸Compresses only width or height of print range to yield multipage report.

⁹Maximum number of points in a graph is 30,000.

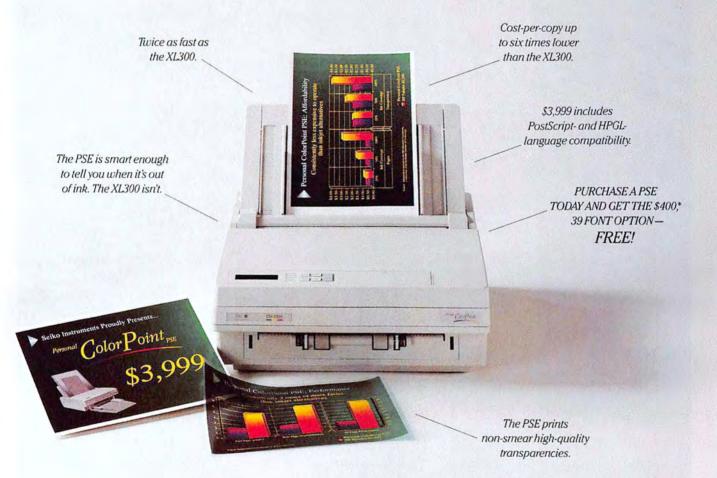
¹⁰ Limited to 8 styles.

¹¹ Substitutes gray scale for color.

¹² Named reports store only partial report

¹³ Excel via Q&E; Quattro Pro via database deskton.

If you're thinking of buying an HP PaintJet XL300, give us a week to change your mind.



Introducing the new Seiko Instruments Personal ColorPoint PSE.

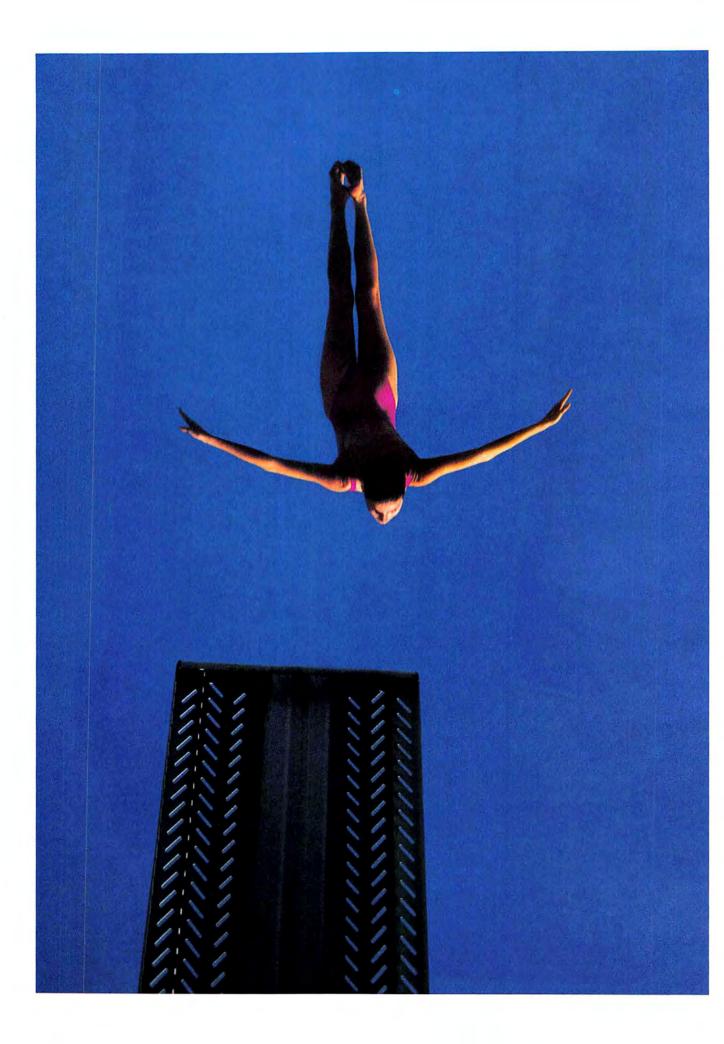
Why buy an HP PaintJet XL300 when for about the same price, you can get a lot more color printer: the Personal ColorPoint PSE—with both PostScript™ and HPGL-language compatibility.

To prove to you how vastly superior the Personal ColorPoint PSE is, we invite you to take it for a test drive—absolutely free. Or, if you'd like to see the difference thermal transfer printing can make, we'll send you a color printer comparison kit so you can see for yourself.

For information on the free test drive or the free color printer comparison kit, call **1-800-888-0817**.

Either way, you'll see just how good this printer looks on paper.





The drive and determination to advance can be seen in many forms. Here's a couple we think you'll be excited about.



Introducing the Microsoft database management systems. Some people aspire to become famous athletes. Others to become great scholars.

But for a group of

us here at Microsoft, there's nothing more important than creating a new line of databases with the tools and technology you need to do your everyday tasks.

For example, some of you will need dBASE* compatibility and unequaled performance. That's why we have Microsoft* FoxPro* 2.5. Some of you need seamless access to data in multiple formats. For you we have the Microsoft Access* database for Windows."

But all the tools in the world won't do you much good if you can't get help when you need it. So we have a world-class product support organization to quickly answer all of your database questions.

In addition, we've created a special program for developers that will put you directly in touch with some of our senior product support people.

In the future, our technology will con-

tinue to evolve with you in mind. So what you create today will still work tomorrow. In short, there will be no dead ends.

We're also committed to supporting open standards and compatibility. Cur-

rently, we are working with ANSI to develop a standard Xbase language.

Plus we fully support the Open Database Connectivity (ODBC) technology, which will allow you to access files from even more of today's database management systems.

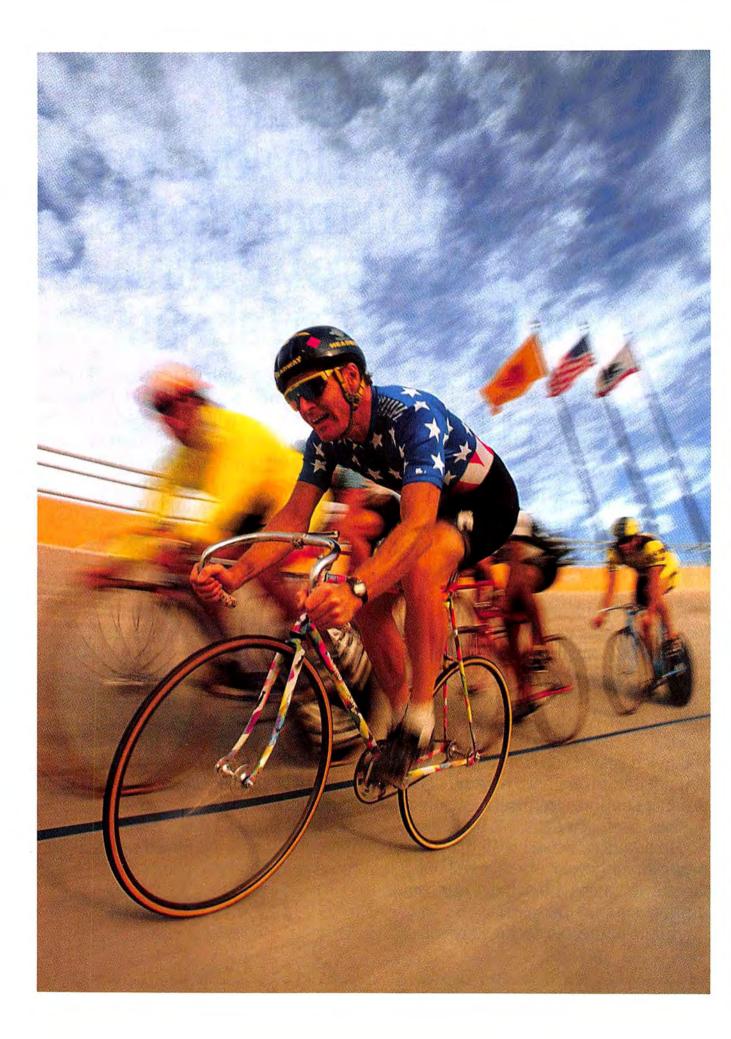


Both Microsoft FoxPro 2.5 and Microsoft Access were created to take complete advantage of the Windows operating system.

And to ensure there will always be a vast supply of industry-specific products and services to meet your database needs, we're forming strong business partnerships with many other companies.

So if you'd like additional information on Microsoft's database solutions, give us a call at (800) 882-2000, Dept. JH2. And find out just how motivated we are to become your database company.





Since the beginning of time, people have been obsessed with reaching ever increasing rates of speed. So what else is new with Microsoft FoxPro 2.5?



Microsoft FoxPro version 2.5 is the fastest PC database management system available today. Plenty. For starters, the new Microsoft FoxPro 2.5 for Windows has a rich and productive environment with an intuitive graphical interface. Which means it's never been easier for you to use and de-

velop powerful Xbase applications.

Plus there's a virtual hardware store of tools for both developers and users.

For developers, there are professional tools designed to help you create the most powerful applications possible.

Like the Trace and Debug windows, Project Manager, Menu Builder, Screen Builder and Report Writer.

For users, there are handy tools that make it easy to do complex database tasks without programming. Like Relational Query By Example (RQBE), which allows you to build and see queries instantly. Or the graphical Browse tool, an intuitive

the graphical Browse tool, an intuitive way to view data. And finally, Quick Screen and Quick Report, two easy ways to create objects and see data.

And now with the arrival of FoxPro 2.5

for both the Windows and MS-DOS operating systems (and soon for the Macintosh and UNIX), you can have the most powerful and most graphical Xbase applications across all major PC platforms. And if you are thinking about migrating to Windows

in the future, have no fear. Because Microsoft FoxPro for Windows will easily run all your FoxPro 2.0 files.

But no matter

which platform

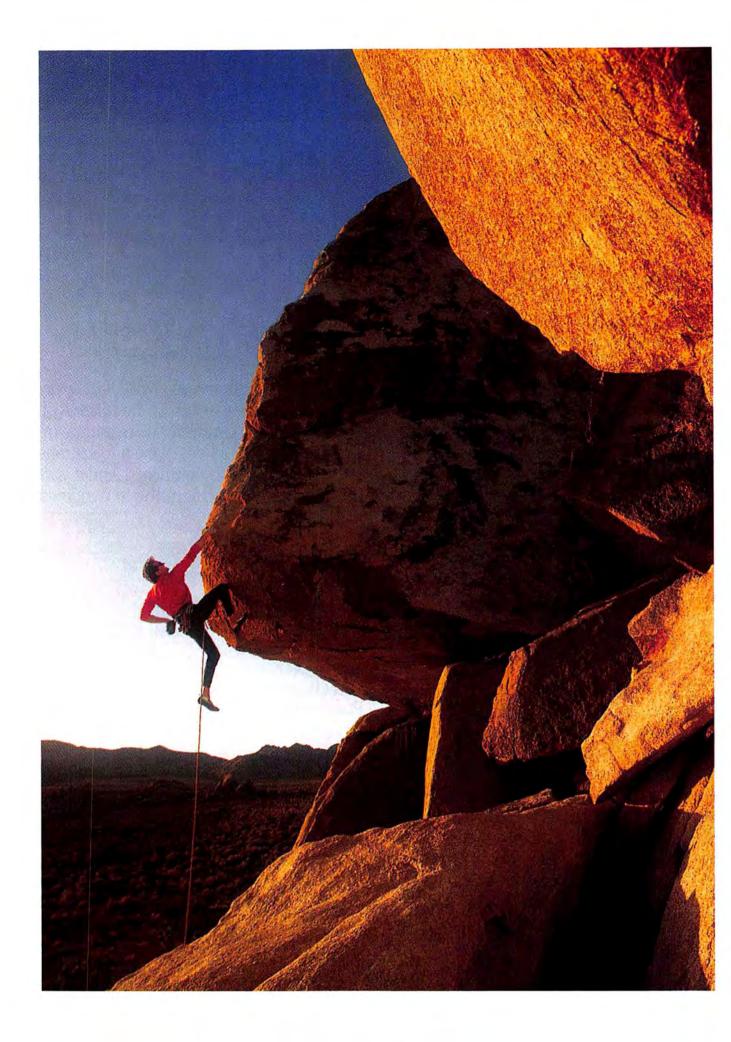


FoxPro 2.5 takes advantage of Windows and allows you to create dazzling applications.

you choose, you can count on Microsoft FoxPro to provide you with the fastest PC-based database management system.

For additional information, just zip on over to your nearest reseller, or call us at (800) 882-2000, Dept. JH3. We'll be more than happy to tell you all the ways Microsoft FoxPro 2.5 for Windows can get your adrenaline pumping.





People always seek the most direct route to achieve their goals. So you've probably been looking for a database like Microsoft Access.



With AccessWizards, you have a guide to walk you through complex tasks, one step at a time.

If you're a database user or programmer, we'd like to show you a great shortcut. It's called Microsoft Access. It's a new database management system for Windows that can give you something no other

database can. Easy access to the powerful features you need to do your job.

To start with, Access takes complete advantage of the Microsoft Windows operating system. Which means it has never been easier to create great-looking forms and reports. Plus you can store objects like pictures, graphs, sound, and video. Right in your database files.

And if you ever get stuck, there are ReportWizards, FormWizards and Chart-Wizards to come to your rescue. They'll ask you questions about format, content and style. Then they'll automatically create your report, form or chart.

There are also Cue Cards to walk you through the most difficult database tasks. Guiding you one step at a time.

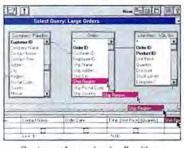
In addition, it's easy to create complex

queries by using the graphical Query By Example. You just drag and drop tables, join fields, and plug in all of the specifics.

And you developers can write sophisticated database applications with Access Basic. A powerful, extensible program-

ming language.

What's more, Microsoft Access can easily read and write all the major database formats directly, including dBASE;

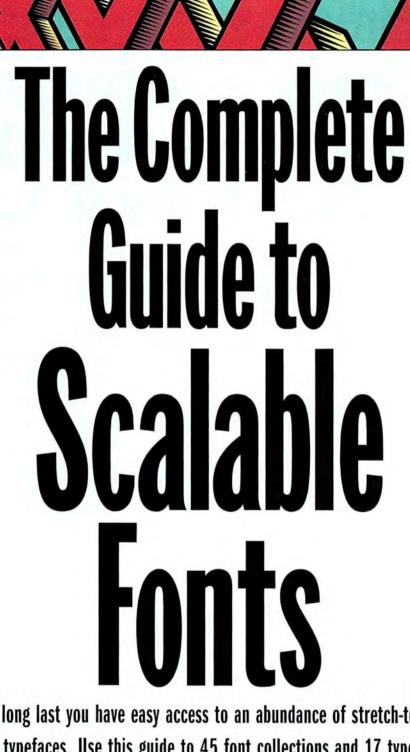


Create complex queries visually with our graphical Query By Example.

Paradox and Microsoft SQL Server. So you and your coworkers can still use all your old files, no matter what format they are in. That means, your investment is safe and everyone can easily migrate to Microsoft Access at their own pace.

To receive additional information on Microsoft Access, call (800) 882-2000, Dept. JH4. We'll give it to you straight.





At long last you have easy access to an abundance of stretch-to-fit typefaces. Use this guide to 45 font collections and 17 type management utilities to find the right font solutions for you.

by Deke McClelland

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Type managers can't work in a vacuum; they need type to manage. Most type managers come with a basic selection of fonts. If you want more, there are font collections—additional font outlines coded so the various type managers can understand and work with them.

Literally hundreds of font collections are on the market. Space considerations limited our chart to commercial font collections only; and for some vendors, only a few of their many offerings appear. Not included are any of the innumerable shareware collections.

If you already have fonts in one format but want to use a type manager that uses another, you can get *font converters* to translate them. If you want to get fancy with the fonts you have, you can use a *font editor* to redefine an existing font outline, creating a new typeface or adding a special effect such as warping.

out of the printer.

Nowadays there's a Mac-like solution for the PC: the type manager. This utility offers easy access to scalable fonts within applications. For example, if you install Adobe Type Manager for Windows, you immediately gain access to every PostScript typeface on your PC through the character formatting menus of all Windows programs. Moreover, you can scale the typefaces from 4 to 127 points with the click of a mouse. True Type, the type manager that comes with Windows 3.1, performs similar tricks with True-Type fonts.

Type managers such as ATM and TrueType offer huge benefits for the font-hungry. Instead of storing and using copies of every typeface in every size (which could take up an entire hard disk), they use *outlines*—mathematical descriptions of characters independent of size—to render fonts instantly when you need them. Select

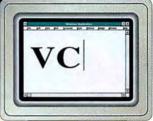
How a Type Manager Works

When you type an R on the keyboard and style it as 19-point Times Bold . . .



APPLICATION

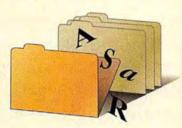
The application sends Windows a message that you want a 19point Times Bold R to appear on screen. The type manager intercepts the message.







The type manager finds the Times **Bold font file, from which it extracts** the mathematical formulas that define capital R.



TYPE MANAGER



The type manager uses the formulas to create the outline of a Times Bold R and scales it to 19 points.



It then maps a virtual grid (matching the output device's resolution) to the interior of the outline in order to generate a bitmapped image of the character.

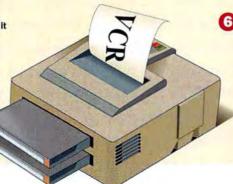


Then the type manager applies hinting rules to the bit map to optimize its appearance for the character's chosen point size and the resolution of the output device.



SCREEN

Windows fetches the R from the font cache and sends it to the video controller. which in turn sends it to the display.



4 FONT CACHE

The type manager sends the character to the font cache and notifies Windows that the character is ready.



PRINTER

When you issue a print command, the application sends Windows a message that you want to print. The type manager intercepts the message and performs steps 2, 3, and 4 to create the character for the printer.

Adobe Type 1: The Proven Format

If you're looking for the widest possible selection of fonts, the first format you should consider is Adobe's PostScript Type 1. The program that introduced Mac-like type management to the PC—Adobe Type Manager for Windows—uses Type 1 fonts,

and it was the first type manager to take advantage of the *Windows 3.0* graphical user interface.

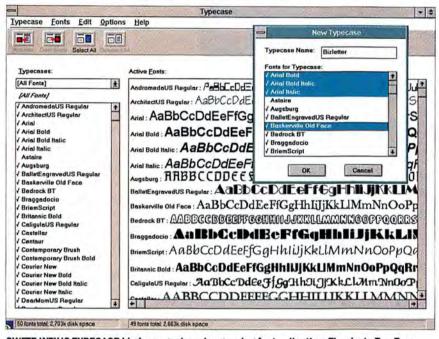
Type 1's early entry into the PC font market produced an abundance of Type 1 collections—from Adobe as well as thirdparty designers, While ATM comes with 13 fonts, most major font vendors as well as many smaller companies sell Type 1 font collections. Of the 62 font packages in our table, 44 come with Type 1 fonts.

Using Type 1 fonts and ATM is also advisable if you're working in a mixed computing environment or intend to send documents to a service bureau for output. Type 1's host, the PostScript page description language, is the number-one choice of graphics professionals in six major environments—Macintosh, OS/2, NeXT, UNIX, Windows, and DOS. Furthermore, PostScript is the only PC page description language that equips film-based typesetters, and virtually every service bureau in the United States supports huge catalogs of Type 1 fonts.



If ease of use is more important to you than selection or cross-platform compatibility, and if you run Windows 3.1, you needn't look beyond TrueType for a type manager. TrueType is integrated so seamlessly into Windows that using it is a simple matter of clicking on the Fonts icon in the Control Panel and installing the TrueType fonts you want. Once installed, the fonts are available in any Windows application.

Another point in True Type's favor is the



SWFTE INT'L'S TYPECASE I helps organize a burgeoning font collection. Thanks to TrueType technology built into Windows 3.1, more users than ever can take advantage of scalable fonts.

Electronic Font Glossary

To help you understand this buyers' guide, these font packages, and the folks in the graphics department, we offer the following list of terms you'll need to know when choosing and using typefaces.

Antialiasing: A complex term for smoothing jagged edges by blending two neighboring areas of color along their shared border.

Ascenders: Lowercase characters that extend above the x-height, such as b, f, and k. Other lowercase letters are descenders, which extend below the baseline (g, j, and p), and medials(such as a, c, and e), which fit between the baseline and the x-height.

Baseline: The imaginary horizontal guideline on which the characters in a line of type sit. Other horizontal guidelines include the x-heightwhich defines the top of medials, and the cap height, which defines the upper limit of uppercase characters.

Condensed: The narrow style of a typeface, in which a font is redrawn—as opposed to numerically compressed.

Font: In digital typography, a font is the electronic description of a particular typeface, weight, and style, such as Helvetica Bold Italic. (Some define a font as the combined result of typeface, weight, style, and size, but this meaning is outmoded.) Fonts come in two varieties: A bit-mapped font describes characters as fixed patterns

of pixels, limiting its utility to a single size, such as 10-point Times Italic. An outline (or scalable) font traces its characters using complex mathematical equations, enabling you to scale the characters to virtually any size and even edit their outlines in programs such as CorelDraw and Adobe Illustrator.

Font converter: A program that converts a digital typeface from one format to another, i.e., from TrueType to PostScript Type 1.

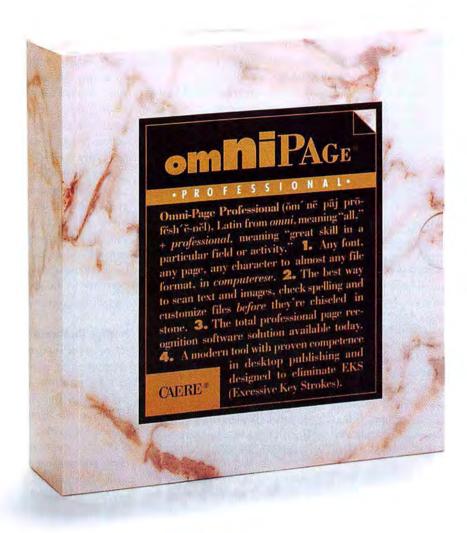
Font editor: A program that enables you to create your own typeface or edit the appearance of characters in an existing one.

Hinting: Instructions that govern the way a character outline is rasterized (see below) to ensure legible results. Hinting plays a decisive role when displaying text on screen and printing text at small type sizes or on a low-resolution device. Also called scaling intelligence.

Intellifont: A hinted font format codeveloped by Agfa Compugraphic for inclusion in Hewlett-Packard's PCL 5 command language.

Italic: A slanted typeface, generally accompanied by calligraphic flourishes. A slanted sans-serif font is often termed oblique.

Kerning: The spacing between individual letters; also, adjusting that continued on page 179



Great OCR...

When OmniPage® was introduced everyone took notice. The world finally got fast, reliable and highly accurate OCR software. With OmniPage you could scan virtually any font, regardless of font size or column format, and enter it directly into just about any word processor, spreadsheet, database or page layout application. Business professionals could eliminate typing with a single software application – a major step in terms of personal productivity.

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OmniPage lets you accurately scan thousands of pages of text and graphics directly into your PC or Macintosh® without ever having to type a single letter, number or symbol. Every "i" dotted. Every "t" in place. *OmniPage* gives you the power of an office "typing pool" every single minute of every working day.

OmniPage is the undisputed leader in OCR software. The standard by which all others are measured. And today with OmniPage Professional, you have the ability to scan more words, numbers or symbols than ever before; in less time and with an even greater degree of accuracy and flexibility.

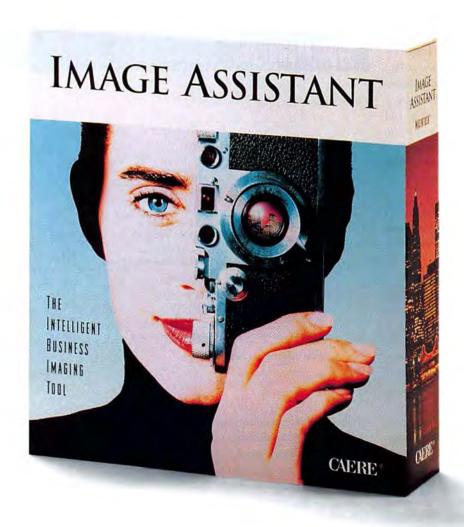
Now get the whole picture with Image Assistant."

OmniPage has won more awards in more countries than any other OCR

product in history. So it comes as no surprise that Caere can now bring you *Image Assistant*, the first color image software designed with the business user in mind, while still providing the rich feature set required by design professionals. So you can capture and enhance images as easily as words – in seconds with a single keystroke.

Color image software that's easy-to-use.

Image Assistant greatly simplifies the task of modifying and integrating color images into your most critical business documents, presentations or reports. In Assist Mode simply press a button to balance colors – the rest is done automatically. Color, grayscale



...and beyond.

or black and white images are located, cropped and rotated just as easily. Image Assistant is the only color image-editing software for both Windows" and Macintosh that lets you pick the enhancements that look best to you from a gallery of sample images. You can even "proof" the end result by printing out thumbnail samples that you select.

Powerful enough for graphic design professionals.

Image Assistant has all of the functionality that you would expect to find in a sophisticated color image processing product – without the hassle. Choose from a wide range of "professional tools" to fine tune images. In Standard Mode, Image Assistant's shrink-to-fit tool or multi-tonal magic wand allows for fast and exact selection of objects within an image. Edit in RGB or CYMK or even individual color planes for truly professional results. Image Assistant includes complete PANTONE* color support; which makes it a hit with graphic designers and advertising professionals who require precise comps as well as state-of-the-art color separations. Only Caere provides it all. Great OCR. Great color image software that's powerful and easy to use.

Enhance Your Image Today.

Have you found your current photo image-editing program too difficult or too slow to use? For a limited time only, take advantage of Caere's special S129 Image Assistance Upgrade Program. Call Now 1-800-535-SCAN.

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WINDOWS SPECIAL FONTS

quality of its fonts. Type 1 fonts are hinted for good aesthetic quality, but TrueType fonts incorporate the same hints and go one step further. TrueType font outlines allow type designers to adjust font definitions. A designer can make the width of stems and pixels dependent on the amount of white space around them, for example, to prevent tiny characters from filling in. This customizability improves laser-printed text, particularly for smaller type sizes.

Prices for TrueType fonts may be lower than comparable Type 1 collections. In our table the average price of a TrueType font is \$7.20; a Type 1 font, \$10.94.

On the downside, True Type has a way to go before it measures up to Type 1's selection. Windows 3.1 comes with its own True-Type fonts, variants on the three Type 1 classics: Helvetica (called Arial in True-Type), Courier (Courier New), and Times Roman (Times New Roman), but there aren't as many third-party collections of True Type fonts as Type 1.

True Type fonts are also less portable than Type 1. Despite its incorporation into Windows and the Macintosh System 7, True-Type is not yet a widely embraced standard. If you tried to send a True Type document to users on another platform or to an outside service bureau, they wouldn't be able to use the document's fonts.

Finally, if you want to maximize print speeds, there are not as many TrueImage printers on the market as there are Post-Script machines (TrueImage is a PostScriptclone page description language that uses TrueType as its native font format). Howev-

Type Managers

● = Yes ○ = No Company	Product	Price	Adines included	pe sites pe sites	
ADOBE SYSTEMS	Adobe Type Manager	\$99	13	4-999	
AGFA COMPUGRAPHIC	Type Director	\$49	8	4-999	
ATECH SOFTWARE	FastFonts for DOS FastFonts for Windows	\$99.95 \$99.95	30 30	4-999 4-999	
BITSTREAM	FaceLift for Windows FaceLift for WordPerfect 5.0/5.1	\$99 \$99	16 16	4-999 4-999	
GLYPH SYSTEMS	Typographer	\$99	0	4-999	
LASERTOOLS	Fonts-on-the-Fly PrimeType ¹	\$149 \$99.95	19 20	.25-200 .25-655	
MICROLOGIC SOFTWARE	TrueType for DOS	\$99.95	36	2-999	
POWER UP SOFTWARE	TextAppeal for Windows 1	\$99.95	13	4-999	

¹ Bundled with Adobe Type Manager

er, Hewlett-Packard's new LaserJet 4 ships with a TrueType rasterizer; it and the other TrueImage printers should make faster work of TrueType documents than their non-TrueImage counterparts.

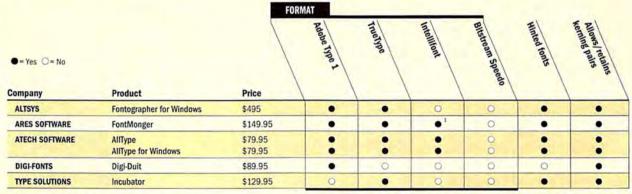
Theoretically, you don't have to make an either/or decision about Adobe Type Manager and TrueType: Their fonts should be able to coexist peacefully within Windows 3.1 and even within a single document. In practice, however, some users have reported difficulties using TrueType and Type 1 fonts together, particularly regarding print speed. If you're using the latest version of

Windows but want to use ATM, you may have to do some tinkering in order to get it all working together smoothly.

Intellifont and Speedo: The Other Alternatives

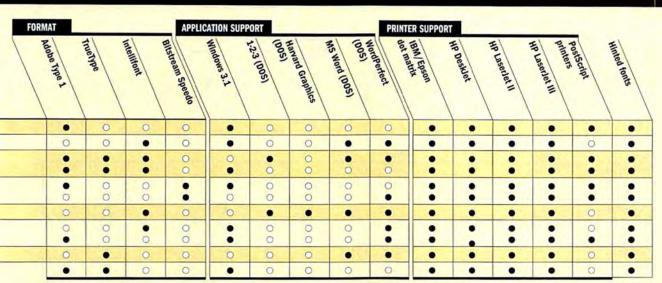
If, for example, you own a LaserJet III and want to maximize print speed, you might want to consider Agfa's *Type Director* or Glyph Systems' *Typographer 2.0*. Both of these packages use the Intellifont format codeveloped by Agfa and Hewlett-Packard. Because the LaserJet III's resident fonts are in the Intellifont format, print jobs using this format should be processed faster.

Font Editors/Converters/Utilities



¹ Conversion from only; can't convert other formats to Intellifont.

For more information about all products in this table, circle reader service no. 903.



For more information about all products in this table, circle reader service no. 904.

Electronic Font Glossary

continued from page 175

space to eliminate unsightly gaps. Av is a common kerning pair.

Monospaced: A typeface in which all characters are identical in width, such as Courier. A monospaced, or fixed-pitch, font is useful for formatting tables and lists in which alignment is essential.

PCL 5: The command language built into the world's most popular laser printer, Hewlett-Packard's LaserJet III. While it incorporates the Intellifont typeface format, it also accepts bit-mapped fonts compatible with PCL 4, the language introduced by the LaserJet Plus and continued in the LaserJet IIs.

Point: A system of measurement used to measure type. There are 12 points in a pica, which is almost exactly 1/6 inch.

PostScript: The page description language built into a wide variety of output devices, from the original Apple LaserWriter to film-based typesetters.

Rasterize: To convert a mathematical outline to a fixed pattern of pixels tailored to the resolution of a particular screen or output device.

Roman: Non-italic, upright text, generally used to describe a mediumweight serif font, such as Times Roman or Palatino.

Screen font: A bit-mapped font that approximates on screen the appearance of printed characters.

Serif: A tiny counterstroke that runs approximately perpendicular to the main strokes of a character. Times is a serif font. A font that lacks serifs, such as Helvetica, is called sans serif.

Soft font: The software version of a font that is distributed on disk for

use with various printer models, as opposed to one that is included on a printer-specific cartridge or is built into the printer's ROM.

Speedo: A proprietary hinted font format developed by Bitstream.

Truelmage: Microsoft's page description language.

TrueType: A hinted font format developed jointly by Apple and Microsoft for use in the Macintosh and Windows environments.

Type 1: A hinted font format developed by Adobe and included as part of the PostScript page description language. A less popular unhinted PostScript format, Type 3, accommodates graphics features such as gray values and stroked outlines.

Typeface: A collection of letters, numbers, punctuation marks, and other symbols executed according to a consistent artistic design.

Type manager: A utility that files font definitions and renders font outlines on screen and for a printer, such as Adobe Type Manager, TrueType, Agfa's Intellifont for Windows, and Bitstream's FaceLift.

Type size: Roughly, the height of a font measured from the top of an ascender to the bottom of a descender. Variations in font designs mean it's not always exact. Also called point size and font size.

Weight: The thickness of strokes in a character. A character with thin strokes is light; one with moderate strokes is medium or regular; one with heavy strokes is bold; and one with fat strokes is black. There are also book (slightly lighter than medium), demibold (not quite bold), ultrabold, and others.

X-height: see Baseline.

Font Collections

		Outlines	Average	FORMAT Adobe Type Outline	TrueType 1	Intelliton	Bitstream	Hinted 10	On the	on ROM
■= Yes ○= No				outline						
ompany	Product	Price	1							
ADOBE SYSTEMS	Plus Pack Type On Call ¹ Type Set 1	\$198 \$99 \$99	22 13 7	\$9 \$7.62 \$14.14		000	000	000		000
AGFA COMPUGRAPHIC	Desktop Styles	\$79	39	\$2.03	0	•	0	0	•	0
ATECH SOFTWARE	AllFonts for Business AllFonts for Home	\$79.95 \$79.95	12 12	\$6.66 \$6.66	:	•	•	0 0	:	00
B&P GRAPHICS	Serials Typecollection	\$2995	1998	\$1.50	•	•	0	0		•
BITSTREAM	PostScript Font Pack #1 TrueType Font Pack #1 Type Essentials	\$79 \$79 \$109	40 40 13	\$1.98 \$1.98 \$8.38	0	0	000	000	•	000
BLUE SKY RESEARCH	Computer Modern	\$295	75	\$3.93	•	0	0	0	•	0
CASADY & GREENE	Fluent Laser Fonts Library 2 Fluent Laser Fonts TrueType Starter Set	\$179.95 \$49.95	120 22	\$1.50 \$2.27	0	•	0 0	0 0	:	0.0
DIGITAL TYPEFACE	DTC MasterWorks Volume 1 DTC MasterWorks Volume 2 DTC MasterWorks Volume 3	\$295 \$295 \$295	100 100 100	\$2.95 \$2.95 \$2.95	:	• 0 0	000	000		000
ELFRING SOFT FONTS	KeyCaps Top Fonts	\$95 \$199.50	4 90	\$23.75 \$2.22	:	•	:	0 0	•	00
IMAGE CLUB GRAPHICS	AdPak One Designers Collection LetterPress CD ROM 2.0 NewFaces '92	\$199 \$199 \$3999 \$89	25 25 648 10	\$7.96 \$7.96 \$6.17 \$8.90			0000	0000		•
IQ ENGINEERING	SuperType Master Library ²	\$200	199 ³	\$1	h • hill		0	0	•	0
LASERG0	Type Commander-Blue Ribbon Collection Type Commander-Harvest Collection Type Commander-Springtime Collection	\$99 \$99 \$99	10 70 70	\$9.90 \$1.41 \$1.41	000	:	000	000		000
LAZY DOG FOUNDRY	Cheese Dog Collection Running Dog Collection Type of the 20's & 30's	\$99.99 \$99.99 \$99.99	10 10 10	\$10 \$10 \$10		:	000	000	:	000
LETTER-PERFECT	Florenz Spring Family Visage	\$65 \$65 \$175	2 2 5	\$32.50 \$32.50 \$35.00	:	:	000	000		000
MICROLOGIC SOFTWARE	Classic Faces	\$99.95	48	\$2.08	•	•	•	0	•	0
MICROSOFT	Hewlett-Packard Font Set TrueType Font Pack 2 for Windows	\$69.95 \$69.95	35 44	\$2 \$1.59	0 0	:	00	0 0	•	0
MONOTYPE TYPOGRAPHY	ValuePacks	\$89	57	\$1.56	•	•	0	0	•	0
PHOENIX TECHNOLOGIES SWFTE INT'L	Phoenix Fonts Typecase I	\$49.95 \$69.95	130	\$2.27 \$0.54	0	•	0	0	•	0
	Typecase II	\$49.95	100	\$0.50	0	•	0	0	•	0
THE FONT COMPANY UPGRADE SYSTEMS	Type Library ATM Font Pack TrueType Font Pack	\$49.95 ⁴ \$89 \$129	1 150 150	\$49.95 \$0.59 \$0.86	•	0	0	0	•	0
WEAVER SOFTWARE	LJ Fonts	\$29.99	4	\$7.50	•	•	0	0	•	0
Y&Y	Latex Plus Slitex	\$75	27	\$2.78	•	0	0	0	•	0
ZS0FT	SoftType	\$199	63	\$3.16	•	0	0	0	•	0

¹ Buyers are also entitled to order and download additional font files by modem.

For more information about all products in this table, circle reader service no. 905.

Buyers are also entitled to Green and download additional following the Superscript Buyers and 106 Type 1; all TrueType faces are duplicated in the Type 1; the extra 13 Type 1s are included with the bundled copy of ATM.

For one face; price per font decreases if you order more than one.

Unfortunately, the selection of Intellifont type collections, currently available only from Agfa and a few independents, is somewhat limited.

Bitstream's FaceLift for Windows, which can work with Adobe Type 1 fonts and those using Bitstream's proprietary Speedo format, is another option. One advantage of Speedo fonts is that they take up less disk space than their True Type counterparts. Also, some DOS applications (see below) use Speedo fonts, so if you use these applications and Windows, you might want to consider these fonts.

The DOS Solutions

When you leave *Windows* and enter the world of straight DOS applications, font scaling becomes a bit trickier, depending largely on the applications and fonts you want to use.

If you've made the switch to Windows but

Reader service no. 715

want to stick with your speedy old DOS word processor, your best bet is MicroLogic's *TrueType for DOS*. It supports TrueType fonts in selected DOS applications, *Microsoft Word* and *WordPerfect* among them.

Agfa's Type Director and LaserTools' Fonts-on-the-Fly both scale Intellifont type-faces for DOS applications. Atech's Fast-Fonts for DOS even goes a few steps further by scaling Type 1, TrueType, and Intellifont fonts in 1-2-3, Microsoft Word, and WordPerfect.

Several DOS programs, including Harward Graphics, 1-2-3 2.3, and Freelance Graphics ship with Speedo fonts and the Speedo type management software built in. These programs let you scale fonts and then edit the scaled characters on screen. If you want to incorporate Speedo fonts into WordPerfect documents, you could use Bitstream's FaceLift for WordPerfect. Be warned: You may have to install a different Speedo font file for each application and printer you use.

The problem with these DOS solutions is, even though you can scale your fonts, the type on screen won't match what's on the printed page. One development to watch: WordPerfect may bundle ATM in future products, which should let you edit WordPerfect documents in what is now called Print Preview mode. As Adobe seeks to stave off the TrueType threat, bundling may become common.

Once the domain of graphics professionals and desktop publishers, attractive fonts are now easier to use and more plentiful than ever. If you've been subsisting on a thin diet of Courier and Helvetica all these years, it's time to live a little.

Deke McClelland, a writer in Boulder, Colorado, worked for two years as artistic director for a desktop publishing service bureau.

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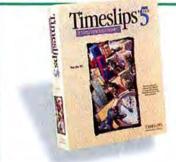
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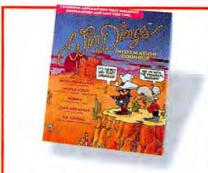


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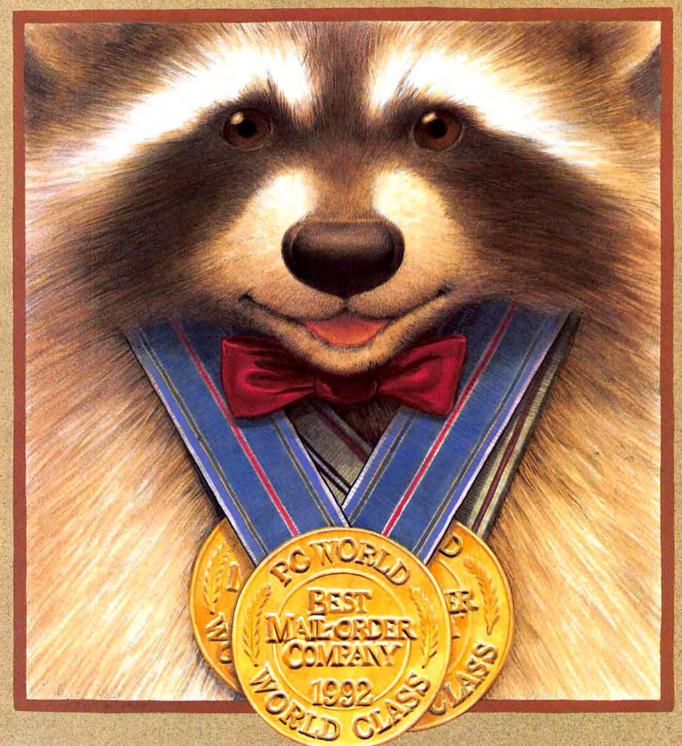
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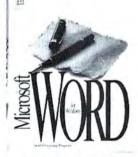


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SOFT WARE SPECTRUM

Ramping Up to Windows



This month, the PC World Adviser examines software training. We've asked three experts what advice they would offer a company looking to move its staff from DOS to Windows.

Jo MacLaughlin, director of information resources at Eastern Maine Healthcare, which operates several medical facilities in Bangor. MacLaughlin is facing a common training dilemma: How to move users from a DOS environment to Windows.

Money is tight. The already-slim training budget has no extra funds to increase the one-person training staff. In MacLaughlin's words: "Eastern Maine Healthcare has approximately 2000 employees, 600 of whom are PC users. Right now our users are 99.5 percent in the DOS environment. We've standardized on WordPerfect, Lotus, Paradox, and the PFS Series. We will not be migrating all users automatically. We'll decide which ones will benefit from Windows on a case-by-case basis. Only 100 of our PCs currently have the hardware required to run Windows, so we're going to be supporting both environments for quite a while. We're thinking now about upgrading—and thus training—about 200 users. Other users will be phased in over time as we get more Windows-capable hardware. The majority of our PCs are stand-alone, but we plan to network them in the near future.

"Historically we've done all our training in-house, using both traditional classroom training and CBT [computer-based training]. Between registration costs and travel time, external training has generally proved too expensive for our budget.

"I'm concerned about initial training for Windows and Windows applications, and I'm concerned about support. Our users are spread out in different buildings around the city on stand-alone machines. We want a training and support strategy that will get users up and running on Windows with as little time and effort as possible, and which minimizes after-training support calls and disaster recovery trips to remote

user desktops."

Edited by Alice LaPlante

CAROL MARTIN AND J.B. LEEP are principals of Blue Bear Computer Services, a San Diego-based consulting firm specializing in support, training, software implementation, and custom programming.

Solution 1

Computer-based training, then classroom/mentor applications training

Since you have severe resource constraints, we'll concentrate on getting the most done for the least cost. To get started we advise something that sounds obvious but surprisingly few people think of: Use the CBT program bundled with Windows. The fantastic on-line tuto-

SOLUTION 1 STATISTICS

PROS: Extremely low cost,

quick to implement, creates

internal support mechanism

without adding staff

CONS: Significant time

commitment from users to

learn basic skills and to

COST: First 200 users

\$24,000, remaining 400

users no additional cost

teach others

rial is an excellent way for beginners to become comfortable with the new environment. It's free, it's already on the machine, and it takes you through every aspect of *Windows*.

The 200 initial users should first go through the tutorial on their own. Then you can put them in a classroom with your trainer, who'll teach them the new *Windows* applications, as well as higher-level issues in *Windows* itself—things that weren't covered in the tutorial, or areas in which users need extra help.

Now comes the tricky part: leveraging those first *Windows* users. Have those people who are most successful at picking up the necessary skills train others. They can act as training assistants on a part-time basis. This way you can filter *Windows* expertise down through the organization.

We especially recommend a mentor program: New users—after finishing the on-line tutorial—are taught the new applications one-onone by someone in their department who has completed classroom training. This reduces the number of classes your trainer must teach and is better for users, who get more individual attention.

A mentor program also works for support, with users consulting their mentor first when they have a prob-

lem. Or since you are dealing with several separate sites, you could ask the best of your new *Windows* users to provide support coverage for each building on a rotating basis. You just have to produce a calendar of whom to call and when. This wouldn't be a full-time job: People would be "on call" for half a day every two or three weeks. This approach requires a commitment to the *Windows* migration at the executive level.

You should also investigate any computer training programs available in local schools and colleges. The San Diego area, for example, has a community program where local businesses have formed a partnership with schools to develop computer training programs: The businesses donate money, and the schools provide the computer labs as well as instructors.

You may also be able to get a lot of free support and training from

your vendors, since you're talking about buying a lot of software and hardware. Microsoft, Lotus, or WordPerfect might be willing to send a representative at no charge—after all, it's in their best interest for you to succeed. You're giving them a lot of business. Don't be afraid to leverage your buying power.



JEFF BERNKNOPF is president of Teknowsolve, a Somerset, New Jersey-based educational and consulting firm specializing in stateof-the-art technologies, including multimedia, imaging, and GUI development. Solution 2

Multimedia-based training

ultimedia solves a lot of training problems, particularly cost containment. It also solves a lot of the problems associated with other low-end approaches, such as in-house training courses and off-the-shelf computer-based training programs.

A traditional CBT approach is very inexpensive and easy to implement, but I don't think it's effective. Most CBT courseware has stu-

dents simply reading text off a computer screen. There's no human interaction, no feedback. And users get a poor demonstration of what the software can actually do.

If you do the training in-house, using traditional classroom methods, you'll need to develop a lot of different classes. You'll need an introductory *Windows* course, a *1-2-3* course, a *Paradox* course, and so on, each of which takes time to develop. Actually *teaching* these classes will consume all your limited training resources. If you put 10 to 12 students in a class, you are talking about 16 to 20 classes just to get those first 200 *Windows* users up and running. Multimedia solves a lot of these problems.

I recommend a line of multimedia products by Comsell in Atlanta. The Comsell courseware is highly visual and interactive, integrating graphics and video clips, and it runs the actual software—not just a simulation. Students receive constant feedback,

they are tested at the end of each section, and they have numerous chances to review what they've learned.

The courses themselves are fairly expensive. Their list prices run from \$1600 to \$2500. But once you buy a course, you have unlimited use of it. The *Introduction to Windows* course is essential. Users need to understand how *Windows* works, how to pull up the File Manager, and how to operate the windows, menus, and icons. There are also courses on the *Windows* versions of *WordPerfect* and 1-2-3, in addition to 15 to 20 other titles. Another advantage: Users can

SOLUTION 2 STATISTICS

PROS: Long-term cost savings, eliminates scheduling
problems associated with
classroom training, minimizes
staff time for preparing
materials and teaching
CONS: No human instructor
available to answer questions,
lack of classroom environment
to motivate beginning users,
high start-up costs
COST: First 200 users
\$62,125, remaining 400 users
no additional cost



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Hardware costs vary. IBM's 386-based Model 8557 Ultimedia box runs about \$7500. But there are cheaper alternatives. A local reseller put together a 33-MHz 386DX system with an 85MB hard drive, 4MB RAM, a Video Logic DVA4000 board, a 14-inch SVGA graphics monitor, and a Pioneer 2200 video disc player with headphones for \$4425. DOS 5.0, Windows 3.1, and a mouse are included. Lease or rental options are also available and can be cost-effective.

All this sounds expensive, but if you need to train an initial 200 users, and you buy five courses for five workstations, it works out to about \$73 per user. It's only \$57 per user if you lease the machines. Part of the initial cost can be offset by charging individual departments for training. I'd start by putting one machine at each location so you can determine exactly how many workstations you'll need.

Multimedia courseware also helps with support. If your single training person isn't tied up teaching classes, she can spend more time answering questions or working with people one-on-one.



NAOMI KARTEN is president of Karten Associates, a Randolph, Massachusetts-based IS management consultant and end-user computing expert.

Solution 3

Combination of classroom training and off-site courses

favor traditional stand-up training to computer-based training. Some of the new CBT/multimedia training products are very impressive, but they provide only generic training. Classroom training can focus on the specific needs not only of the organization but of the individuals in the

class. For example, you can assign exercises to help students make the leap from simply understanding the product to learning how to use it to meet their needs.

CBT training focuses on products and their functions. Classroom training, on the other hand, can provide a business-specific perspective. Classroom training can also address problem diagnosis and troubleshooting, so users can become more self-sufficient. CBT focuses on how things work when everything goes right.

Your classroom should be set up like a computer laboratory, with one or two people sharing a computer. The class should be designed so everyone has adequate hands-on time with the computer.

Pay attention to your classroom training materials: user manuals, exercises, and "tip sheets" containing answers to the most common questions and/or problems. Students should have something to take with them after their training.

Build a library of reference materials. You might also think about forming an internal user group so users can share information. This will increase users' skill level and knowledge base and in turn reduce your support burden.

Perform your conversion to Windows—and your subsequent training—one department or work group at a time. Users will have each other to turn to and can help one another out. This also allows you to design training around specific job skills: training for secretaries compared to that for accountants or admittance clerks.

Select a small department or group for a pilot test, and do everything from designing the courses to setting up the support infrastructure. Use this pilot to test out your ideas about *Windows* training and support. See what works and what doesn't, and use what

you've learned before moving to the next group. Then pick a more strategic group of users for training, based on the perceived opportunity for the greatest payback.

I'd also suggest creating a steering committee of managers, users, and support staff. Given your limited staff and budget, you have no choice but to get your users involved. Appoint a departmental coordinator or user spe-

SOLUTION 3 STATISTICS

PROS: High chance of success, ensures strong user commitment to the project

CONS: Time-consuming, off-site courses costly

COST: First 200 users \$30,300, remaining 400 users \$59,700

cialist to spearhead training and support for each group. This should be a formal appointment. That person is the designated support person for that group or department and should receive additional training and support materials. You can leverage your training dollars by sending these user gurus off site for some intensive training classes. Other users can go through a more rudimentary training course at your offices.

Classroom training has its drawbacks: scheduling conflicts, peer pressure, and the difficulty of teaching people at different skill levels. It's also more expensive than CBT. But high-cost training that works is better than lower-cost training that doesn't.

Alice LaPlante is a Palo Alto, California, freelance writer and a creative writing instructor at Stanford University.

Is your company struggling with a PC problem? Tell us about it. We'll take it to our panel of experts and address issues of broadest interest. Send a description of your problem to PC World Adviser, 501 Second St. #600, San Francisco, CA 94107 or 415/442-1891 (fax).

MacLaughlin's Choice

After considering the choices presented to her, MacLaughlin is investigating a combination of classroom training and use of the Windows 3.1 computer-based tutorials.

"We were recently approached by one department that is particularly eager to move to *Windows*, so we're going to use this as a pilot group, as Naomi Karten suggests," says MacLaughlin. "We're also going to follow her advice and organize a steering committee to oversee the move to *Windows*."

MacLaughlin is also pursuing the mentoring approach, since it will alleviate much of the support burden with remote users. For the time being, though, the multimedia approach is not feasible. "I love the multimedia idea and want to investigate it further, but it's unlikely that we'll pursue this option during the next fiscal year," says MacLaughlin. "I doubt that funding will be available."



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Here's How

Contents: Spreadsheets 2021 Word Processing 2101 Windows 2161

HELP LINE Q & A



Tip of the Month

DRAG-AND-DROP ARCHIVING: Windows 3.1's File Manager isn't half bad—and that's a big improvement over its predecessor. Meanwhile, PKware's PKZIP, the popular shareware file compression program, has a DOS command-line interface only a fanatic could love. Fortunately, another shareware utility, Canyon Software's \$20 Drag and Zip, works between these two programs to let you zip from File Manager.

In a File Manager window, you just select the files you want to compress and drag them over to D&Z's zipper icon in Program Manager. A dialog box pops up, prompting you for a file name, any desired parameters, and an output directory. D&Z has PKZIP compress the files inside a DOS window and stores the ZIP file as directed.

Want to peer inside a ZIP archive? Just double-click on It—D&Z's ZIpView utility lists the files it contains. You can then select files to view with the built-in ASCII viewer or to extract from the archive. You can even launch programs by double-clicking on executable or associated data files.

Drag and Zip and PKZIP are available as DRAGZP.ZIP and PKZ110.EXE on PC World Online and other BBS's. Canyon Software; 415/453-9779, 415/459-4904 (fax).

Daniel Tynan, contributing editor

Sign Fax-Modem Letters

I use WordPerfect 5.1 and a faxmodem for sending letters to my clients. Is there a way I can add my signature to the bottom of a letter before faxing it out? I have a faxed image of my signature in TIF format, but the only graphics program I have is Windows 3.1's Paintbrush.

Mark B. Buelsing, Cincinnati

A If the TIF file is a small image containing only your signature, it's easy. In WordPerfect, put the cursor on the line that you want your signature to appear on, then select Graphics (or press <Alt><F9>), select Figure • Options • Border Style • None • None • None • None, and press <Enter>. Select Graphics (or press <Alt><F9>) again, select Figure • Create • Filename, type the path and file name of the TIF signature, and press <Enter>. Then select Vertical Position, type 0, press <Enter>, select Horizontal Position • Center; and press <Enter>.

If the TIF file is a whole fax, you'll need to create a new, small file containing only the signature. If you have extraordinary mouse control or a very sloppy signature, you can use Paintbrush to create the file: Open Paintbrush, select *Options • Image Attributes*, set the width and height to create a box just big enough to hold your signature, and "sign" your name using the mouse.

If the results don't look good enough, you'll need to crop the signature from the TIF file. Unfortunately, Paintbrush can't read TIF files. If your fax software includes a Windows fax viewer, you should be able to view the fax and copy it to the Windows Clipboard. If you have only a DOS fax viewer, run it under Windows, display the portion of the fax with your signature, press Alt>-Enter> to put the viewer in a window, and use Alt>-Print Screen> to copy the viewer's image to the Clipboard.

Whichever method you use, return to Paintbrush and paste in the copy from the Clipboard. Then use the selection tool to copy only the signature, open a new file, and paste in the signature. When you save the new file, be sure to choose *PCX files* (*.*PCX*) in the Save File As Type list box before clicking *OK. WordPerfect* can't read Paintbrush's BMP format.

AUTOEXEC.BAT Versus WINSTART.BAT

I recently came across a reference to WINSTART.BAT. What's the difference between loading memory-resident software with AUTOEXEC.BAT and with WINSTART.BAT?

Ellen Zincavitch, Seattle

A If you run Windows in 386-enhanced mode, you can load memory-resident programs (often called TSRs, from the technical term terminate and stay resident) three different ways.

You can load TSRs with AUTOEX-EC.BAT (or at the DOS prompt) before starting *Windows*. When you load a TSR this way, it's available at all times to both DOS and *Windows* apps.

You can load TSRs by listing them in WINSTART.BAT, which Windows runs automatically when started. (WINSTART.BAT isn't created by Windows—you must create it yourself and store it in your Windows program directory.) When you load a TSR with WINSTART.BAT, it's available only to Windows and Windows apps.

Or you can load TSRs with batch files (or at the DOS prompt) in DOS ses-

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sions under *Windows*. When you load a TSR in a *Windows* DOS session, it's available only in that individual session. Loading each TSR so it's available only to the applications that use it can save memory. For example, if all your CD ROMs run under *Windows*, you could take the Microsoft CD-ROM extensions (MSCDEX.EXE) out of AUTOEXEC.BAT and put it in WINSTART.BAT, freeing about 16K more conventional memory in DOS sessions.

Another example: If you have an Intel SatisFaxtion board and want to be able to send faxes from both DOS and Windows apps, load CASMGR.EXE in AUTOEXEC.BAT. Only DOS apps use the board's pop-up menu utility, however, so you can save memory for Windows by loading FAXPOP.EXE separately for each DOS app from which you wish to send faxes. For example, you might start WordPerfect with WP.BAT, consisting of the lines:

C:\FAX\FAXPOP C:\WP51\WP.EXE

(store WP.BAT in WordPerfect's program directory, and use the PIF Editor to change the program file name in WP.PIF from WP.EXE to WP.BAT).

Normally, Windows won't let you use LOADHIGH or LH in a DOS session. If you want to use LOADHIGH to free more conventional memory for a DOS app by loading the TSRs for that session into upper memory, edit SYSTEM.INI. Under the [386Enh] section, type the line LocalLoadHigh=On.

Adding a Second Hard Drive

I recently purchased a damaged 386 that's otherwise identical to the one I already use. The newly acquired system is unusable, but the hard drive is fine. Can I connect that drive to the 80MB hard drive in my computer, either internally or externally?

Don Phillips

Mt. Pleasant, North Carolina

A If your system doesn't have a free drive bay, it would be easier to transplant your PC's innards into a new, larger case than to jerry-build an external hard drive case. Better yet, sell off both 80MB drives and put the proceeds toward a 200-megger.

If your PC has a free drive bay and the hard drives are identical, it should be fairly easy to install both drives in your PC. First, contact the system vendor or drive manufacturer to find out if there are any jumpers or switches on the drives or controller board that you need to change before installing the second drive.

Your system manual should have instructions for mounting a second hard drive. One thing they may neglect to mention: Before working inside your computer and while it's still plugged into a grounded outlet, discharge any static electricity from your body by touching bare metal on the case. Then unplug the computer and open the case. In most systems, all you have to do is slide in the drive and secure it with a few screws. Inside low-profile or small-footprint systems, you may have to remove other components to reach the second hard drive bay. That can be as simple as removing a single board or as complex as removing all boards, drives, and even the power supply.

Once you've mounted and secured the drive, hook up the data and power cables. Most hard drive cables come equipped with an extra connector (in the middle of the cable) to attach a second drive. If yours doesn't, you'll need to replace it with one that does. Unless you've already added a drive or two to your system, there should be an unused cable from the power supply. If not, you'll need to buy a power-cable splitter from a computer dealer.

The final step is to run your system's CMOS setup utility to register the new drive. If the two hard drives are identical, you can just copy the parameters from the first. If the second drive isn't identical, get the proper CMOS settings from the vendor or manufacturer. Using the wrong settings can damage the drive or prevent you from formatting it to its full capacity.

USER GROUP OF THE MONTH

New York PC Users Group

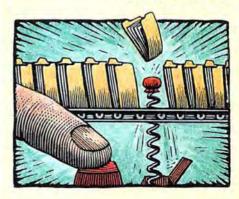
January's User Group Tips are supplied by the New York PC Users Group, which publishes a magazine ten times a year and holds beginners' sessions concurrently with regular monthly meetings. NYPCUG has over 50 special interest groups, including one for beginners, another for children and parents, and ones for Quicken, Paradox, Windows, and OS/2. SIG chairs provide tech support at meetings. Members have access to a small library of shareware and public domain software. For more information, contact David Klelman, president, 40 Wall St. #2124, New York, NY 10005-1301; 212/533-6972. Membership is \$35 a year.

Reader service no. 681

BATCH FILE TO EDIT BATCH FILES: If you use a lot of batch files, keep them in one directory and make a handy batch file for editing them: Save the line @C:\DOS\EDIT C:\BATCH\%1.BAT in a file called BATEDIT.BAT in a directory referenced in your AUTOEXEC.BAT's PATH command (C:\BATCH is a good place to put it). BATEDIT assumes that all your batch files reside in a subdirectory called C:\BATCH, and that you edit them with DOS 5.0's EDIT program. If these assumptions are incorrect, change the path 'C:\BATCH' and the path and command 'C:\DOS\EDIT' accordingly.

When you need to edit or create a batch file, you don't even have to change drives or directories—just type BATEDIT batname, where batname is the name of the batch file you want to edit. Do not include the BAT extension.

David Michael Blumenstein New York PC Users Group



CD ROM Info Wanted

I am very interested in CD ROMs as a source of information. Where can I find a comprehensive catalog of available titles?

Alexander Tendler, Haifa, Israel

A On CD ROM, of course. The CD-ROM Directory has information about every CD ROM the publisher, TFPL, was able to identify. The 1992 edition covers 2202 disks, and this year's will have even more. A printed edition is also available.

• The CD-ROM Directory disk \$199, book \$150; Omnigraphics; 800/234-1340, 313/961-1340, 313/961-1383 (fax)

Reader service no. 682

Lock Out Floppy Drives

Is there some way I can lock the company's floppy drives so that employees can't access them but technicians can still use them if necessary?

Dave Giamio, New York

A Several solutions offer varying degrees of security. If you just want to prevent unsophisticated users from copying files to or from floppies, you can put the command ASSIGN A=C B=C in a PC's AUTOEXEC.BAT. That will redirect any attempt to access A: or B: drives to C:. Of course, any sophisticated user can overcome that by entering ASSIGN at the C> prompt.

Another option is to delete the floppy drive descriptions from your CMOS. If your PCs have their CMOS setup utility in ROM, that method won't be any more secure than using ASSIGN. If the PCs don't have setup in ROM, in the event of hard drive trouble your techs may have to open the case and manually reset the CMOS (by disconnecting the battery) before they'll be able to boot from a floppy. The only real solutions are physical locks that prevent insertion of floppies and access-control programs that password-protect disk drives. Here are several of each:

Drive Locks

Disk Drive Lock \$25; Secure-It, Inc.;
 800/451-7592, 413/525-7039

Reader service no. 683

Disk Lock \$25; Doss Industries;

415/347-2301

Reader service no. 684

LamaLock \$35; CMG Computer Products, Inc.; 800/880-9980, 512/329-8220, 512/329-5532 (fax)

Reader service no. 685

Lockette \$19.95; Z-Lock Manufacturing Co.; 310/372-4842, 310/372-1598
 (fax)

Reader service no. 686

PC Guardian Floppy Drive Locks \$50;
 PC Guardian; 800/288-8126, 415/459-0190, 415/459-1162 (fax)

Reader service no. 687

Access Control Utilities

 Certus \$189; Certus Int'l; 800/729-6684, 216/546-1500, 216/546-1450 (fax)

Reader service no. 688

 Comlock-B \$59; Techmar Computer Products, Inc.; 800/922-0015, 718/997-6666, 718/520-0170 (fax)

Reader service no. 689

DiskLock \$79; Fifth Generation Systems, Inc.; 800/873-4384, 504/291-7221, 504/295-3268 (fax)

Reader service no. 690

 FastLock+ \$85; Rupp Technology Corp.; 800/852-7877, 602/224-9922, 602/224-0898 (fax)

Reader service no. 691

 HardLock Computer Security \$49; Sentry Software Corp.; 800/279-5625, 602/821-9294, 602/491-1383 (fax)

Reader service no. 692

 Menu Works Total Security \$150; PC Dynamics, Inc.; 800/888-1741, 818/889-1741, 818/889-1014 (fax)

Reader service no. 693

Microcom Citadel with Shredder \$150;
 Microcom, Inc.; 919/490-1277, 919/490-6672 (fax)

Reader service no. 694

 Microlok \$70, Microlok+ \$95, Kinetic Access II \$165; Kinetic Corp.; 502/583-1679, 502/583-1104 (fax)

Reader service no. 695

Secureall \$495; Secura Technology;
 714/248-1544, 714/248-1546 (fax)

Reader service no. 696

• StopLight \$295; Safetynet, Inc.; 800/851-0188, 908/851-0188, 908/276-6575 (fax)

Reader service no. 697

Trusted Access \$120; Lassen Software,
 Inc.; 800/338-2126, 916/877-0408,

916/877-1164 (fax)

Reader service no. 698

 Vlock \$135; Golden Bow Systems, Inc.; 800/284-3269, 619/298-9349, 619/298-9950 (fax)

Reader service no. 699

For more information about all products in this section, circle reader service no. 902.

NetWare and DOS 5.0

After I upgraded to DOS 5.0, my accounting software vendor made me switch back to DOS 4.01, saying that I might run out of memory using DOS 5.0 with NetWare 2.2. I'm confused: Isn't DOS 5.0 supposed to handle memory better than DOS 4.x?

Dave Pile, Cleveland

A It's true that your vendor should use DOS 3.3 or 4.01 when setting up a server using NetWare 2.x, or on any nondedicated server. But on workstations, DOS 5.0 works best. It leaves significantly more conventional memory free, particularly if you load DOS and NetWare's drivers (IPX and NE'T5 or NE'TX) into upper memory. Here are sample CONFIG.SYS and AUTOEX-EC.BAT entries to do so.

For CONFIG.SYS:

DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\EMM386.EXE NOEMS
DOS=HIGH,UMB

For AUTOEXEC.BAT:

LH C:\NET\IPX
LH C:\NET\NET5

If you run *Windows 3.1* (but *not* if you run *Windows 3.0*), replace C:\DOS with C:\WINDOWS, Also replace C:\NET with the path to NetWare's drivers.

By Robert Lauriston

Mail your questions to Help Line, PC World, 501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Help Line; CompuServe, 75300,3205; MCI Mail, 381-7106; Internet, rlauriston@aol.com; or 415/442-1891 (fax). PC World pays \$50 for published questions. Sorry, we cannot acknowledge unpublished materials.

Robert Lauriston is a contributing editor for PC World.

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William D. Harrel, Windows Magazine, July, 1992

"Business users who need a wide variety of graphics functions shouldn't pass up this package. It is an amazing bargain.

Luisa Simone, PC Magazine, August, 1992

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John Butler, Seybold Report on Desktop Publishing, July, 1992

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Aldus	Freehand	Persuasion	PhotoStyler	12	305	\$1885		
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486DX/33 Laptop Issue,

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386SXL/25	386SXL-25 MHz, Optional 80387SX	2 standard, 4 & 6 options	80	3.5+	:1,599 \$59/mo
386SL/25	Intel 80386SL-25 MHz, 64 K CPU cache Advanced SL power mgm*t, Optional 80387SX co-processor	as above	80	35+	\$1,799 \$67/mo
486SX/25	Intel 80486SX-25 MHz, Built-in 8K CPU cache	4 standard, 8 & 20 options	80	25+	:1,999 \$74/mo
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486\$X/25	Intel 80486SX-25 MHz Built-in 8K CPU cache	as above	80	1.2 & 1.44	16 bit SVGA card, 14" 1024 x 768 SVGA Color Monitor	1,199 \$44/mo
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486SX/33	Intel 80486SX-33 MHz 8K CPU cache	as above	120	as above	as above	:1,499 \$55/mo
486DX/33 CACHE	Intel 804860X-33 MHz 126K CPU cache	as above	120	as above	16 bit SVGA card, 1MB Video RAM & Hi-Color Support, 14* 1024 x 768 SVGA Non-Interlaced Multisync Color Monitor	\$1,799 \$67/mo
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486DX2/66 CACHE	Intel 804860X2-66 MHz, 128K CPU cache New Double Clock CPU	8 standard 32 max	200	as above	16 bit SVGA, Superfast Windows, Accelerator card, 1MB RAM, 14*1024 x768 SVGA Non-Interlaced Multisync Color Monitor	:2,499 \$33/mo

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SPREADSHEETS Q & A

The Power of Spreadsheets

A worksheet that I'm preparing requires me to raise several values to the power of other values. For instance, I need a formula that will multiply the value in C18 by itself the number of times indicated by D18. That is, if C18 equals 3 and D18 equals 4, the formula should give me 81 (3⁴, or 3x3x3x3). But I haven't been able to find a function that will do this for me. I found the @SQRT() function, which does square roots, but nothing that will take this in the opposite direction.

Sandy Yee, San Francisco

You couldn't find a function because you don't need one. What you want is called an exponential equation, and all popular spreadsheet programs use the ^ operator to make this as easy as adding 2 and 2. For instance, 3^3 yields 3x3x3, or 9. In your example, use the formula +C18^D18, which will raise the value of C18 by the power of D18. You can use ^ for roots too: 5^(1/3) will give you the cube root of 5.

No-Sweat Inserts in 1-2-3

I have a 1-2-3 worksheet that summarizes three months of vehicle expense and repair records. Each month, I have to delete the column that contains the leftmost month and insert a new column on the right for the coming month. That procedure ruins the formulas that reside in another column to the right of the most recent month, forcing me to rewrite them before I can

continue. Surely there must be an easier way to do this!

Becky Brown
Burlington, North Carolina

A By using a range in your formula that goes from the first column to the last you want totaled, you're creating a problem for yourself—a very common problem. When you eliminate the first column in your range, you invalidate the formula. What's more, the new column you create on the right falls outside the formula's range and therefore isn't in the sum.

The trick is to build formulas that include an extra column on each end of their ranges so you can insert and delete columns without disturbing them. Take a look at Figure 1. Although the data appears in columns C, D, and E, the @SUM() formula in G2 (which I have displayed in H2) sums the range B2..F2—one extra cell on each side. Where are these columns? I have hidden them with the /Worksheet • Column • Hide command.

When it's time for you to enter the April data, put the cell pointer in column C and use /Worksheet • Delete • Column to delete the column. Then insert a new column before the second hidden one: Run /Worksheet • Insert • Column; when prompted for a range, press <Esc>, then move the cell pointer to column E, which will just have become visible, and press <Enter>. You'll have a new column for your new month, and your formulas will still be valid.

As a further convenience, you can use the hidden column F as a "minitemplate" to prepare the new month: Before hiding it, use /Range Format to format its cells, and put an appropriate @SUM() formula in F6. Then, after you have inserted the new column for April, use /Copy to copy F2..F6 to E2. That gives April the formula it needs and formats the cells of column E in one step.

Making 1-2-3 and Excel Work Together

My office uses a 1-2-3 worksheet to collect data for our annual budget process. The worksheet is macro driven, to help those who don't know much about spreadsheets. This year, some of our cost centers are using Excel 4.0 to fill in these worksheets, and we're running into a nagging problem. We have some area codes that look like '92-4'. 1-2-3 interprets an entry like this as a formula and displays '88'. To get around the problem without requiring managers to begin each code with an apostrophe, we simply formatted the cell with /Range • Format • Text. Now when we try the WK1 worksheet in Excel, it always displays '88'. But if I try the same thing in a new Excel worksheet, I get '92-4'. What's going on here, and how can I fix it?

Michele Van Note Durham, North Carolina

This one's a little ironic: Your solution for 1-2-3's data entry problem has run afoul of Excel's efforts to be 1-2-3 compatible. Normally, Excel treats only entries that begin with an equal sign or other operand (+, -, and so on) as formulas. If an entry begins with a digit, then Excel interprets it as a number if it contains only digits and a decimal point (with special exceptions for dates and percentages), and as a label if it contains anything else. Thus in a standard Excel worksheet, entering '92-4' gives you a label—just what you want.

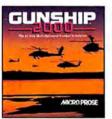
When you open a WK1 file that contains a macro, *Excel* automatically turns on its Alternate Formula Entry feature,

	A	C	D	E	G	н
1		JAN	FEB	MAR	SUM	FORMULAS
2	Mileage@.25	284	223	413	919	@SUM(B2F2)
3	Gas	83	65	121	269	@SUM(B3F3)
4	011	25	3	0	28	@SUM(B4F4)
5						
6	Totals	\$391	\$291	\$534	\$1216	@SUM(G2G4)

FIGURE 1: PROTECT THE INTEGRITY OF YOUR FORMULA by including hidden columns at both the beginning and the end of the formula's range.

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which causes it to treat '92-4' the way 1-2-3 would, as a formula. But because Excel has no Text cell format, the formula shows up as '88'.

The solution is simple: Open the file in Excel, select Options • Calculation, and deselect Alternate Formula Entry.

Then you are free to enter your data as labels.

Assuming your 1-2-3 file has a \0 AutoStart macro, you can automate the process. In 1-2-3, go to a cell that already contains an area code with a dash, and use \(Range \cdot Name \cdot Create \) to

name that cell code. Then, near the beginning of your \0 macro, insert the line {if @CELL("format",code)="G"}{xlcall CALCOFF-XLM!TurnOff}.

In Excel, select File • New • Macro Sheet. In the resulting new window, enter the following two lines, each in its

Master Class: Calculating a Median With 1-2-3, Quattro Pro, or Excel

Everybody knows about averages: You add everything up and divide by the number of values. That familiar calculation (performed by 1-2-3's @AVG() function) produces what statisticians call a mean value, and in many situations it provides a good summary of a set of numbers. But at other times it can be misleading.

For instance, if you're trying to determine how the average individual is doing, one person doing very well or very badly can throw a mean average off. That's when a median, which shows you the middle value of a group, provides a truer picture of your data. This month, we'll discuss the difference between a mean and a median and show you how to calculate the median in 1-2-3, Quattro Pro, and Excel.

Mean or Median

Take a look at Figure 2, and pretend you're using 1-2-3 or Quattro Pro to prepare a monthly report of sales activity for your division. You have nine salespeople who sold the amounts shown in B2..B10 last month. Through the formula @AVG(B2..B10), the average (that is, the mean) monthly volume per salesperson, \$51,111, is displayed in cell E2.

You have just added a new salesperson, who is scheduled to begin work tomorrow and whose results will begin to appear in your reports next month. In estimating sales volume over the next few months, should you predict that the new person will add \$51,111 to your division sales? Probably not, when more than half the members of your sales force each made less than half of that amount.

In this case, the median value gives a better estimate of your new hire's expected sales. As opposed to the mean, the median is the middle value: Half the values are greater than the median, half are less. With nine salespeople, an odd number, the median is easy to spot: It's Galsworthy's \$25,000. When the number of values is even, the way to find the median is slightly different—you take the mean average of the two middle values.

In 1-2-3 and Quattro Pro, creating a median involves a few preparations as well as a long and complex formula. First, sort Galsworthy is still in the middle. A median doesn't care how much the most successful sales rep made, as long as the same number of reps did better than Galsworthy as did worse.

Just how does the formula work? Inside the @IF() function, @MOD(count,2)=0 determines whether the range contains an odd or even number of values: @MOD()

	A	В	C	D	E
1	Salesperson	Sales			
	Imbersandt	150,000		Mean	51,111
3	Betson	100,000			
4	Eaglesmith	80,000		Count	9
5	Clodfelter	50,000			
3	Galsworthy	25,000		Median	25,000
7	Fornewt	20,000			
8	Albert	20,000			
9	Durham	10,000			
10	Harborshort	5,000			

FIGURE 2: MEAN AND MEDIAN AVERAGES, shown here in cells E2 and E4, can give you very different results from one another.

the values in ascending order or, as they are shown here, descending order. Use /Range • Name • Create to give the range of values the name all. In an out-of-the-way cell, enter the formula @COUNT(all), and name that cell count.

The Middle Formula

Now you are ready to create the formula. In the cell where you want your result (E6 in this example), enter: @IF(@MOD(count,2)=0, (@INDEX(all,0,count/2)+@INDEX(all,0,count/2-1)) /2,@INDEX(all,0,@INT(count/2))).

Note that the median result behaves differently from the mean result of the @AVG() function. If you reduce Imbersandt's sales to \$120,000, the mean result in E2 changes, but the median in E6 does notgives the remainder when one number (the @COUNT() of the salespeople) is divided by another (in this case, 2). When the remainder is zero, the number is even, and the formula (@INDEX(all,0,count/2)+@INDEX(all,0,count/2-1))/2 selects the two middle items from the list, adds them, and divides the result by 2.

If there's an odd number of values, @INDEX(all,0,@INT(count/2)) picks out the middle one. In this specific example, with nine values, the value of 'count' is 4.5; the @INT() function reduces that to 4, and the @INDEX() function picks the fourth item from the list.

Excel users will find the task a tad easier thanks to Excel's MEDIAN() function: Just use the formula = MEDIAN(source).

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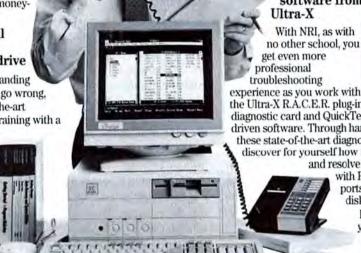
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own cell (there are ten commas in the first line):

=CALCULATION(,,,,,,,,FALSE) =RETURN()

Use Formula • Define Name to name the first cell TurnOff, and File • Save to name the macro file CALCOFF.XLM.

What does this setup accomplish? When you open the file in 1-2-3, the code cell is formatted as Text, so that @CELL("format",code) returns "T'. When you open it in Excel, the formula returns 'G', and the {if} statement executes the {xleall} command. This tells Excel to execute CALCOFEXLM's TurnOff macro, which switches off the alternate formula entry, and then you're on your way.

Quattro Graphs in WordPerfect

S. H. Logue, San Diego

Quattro Pro 4.0 for our regular data collection and analysis and WordPerfect 5.1 for our reports. But when we export Quattro Pro graphs as PIC files, then import them into WordPerfect, the results look terrible: Grid lines overprint the bars of a bar graph, shading is inaccurate, and the fonts are not what I saw in the spreadsheet. Is there some way that we can put those graphics where we want them without having to resort to using scissors and paste?

A Your problem is the PIC file format, which was developed in the days when plotters were the only practical way to get graphs onto paper. PIC files simply don't carry enough information for WordPerfect to reconstruct the graph properly. The solution is simple: Don't use PIC files. If you export your graph from Quattro into the PCX format, WordPerfect will have no trouble understanding and printing it.

But first, assuming you use a noncolor laser printer, set up your Quattro graph for maximum contrast: Choose /Graph • Customize Series, and set the color of all series to black. If the graph will be less than about 4 inches wide in the final document, choose the crosshatch fill patterns instead of dots, which tend to appear uneven when crowded too closely by WordPerfect. Choose /Graph •

Overall, and set the Grid color to black and the Fill and Background colors to bright white.

Once you've set up your graph, select |Print • GraphPrint • Write Graph File • PCX File, and enter a file name. Back in WordPerfect, press <Alt><F9>, then FC to create a figure. At the Figure Definition screen, press F (Filename), enter the name of your PCX file (including the extension .PCX), and press <Enter>. Next, press E (Edit) to check your image, then press any key if you're satisfied with it. Before you print your document from the <F7> Print screen, be sure to press GH to ensure maximum image resolution.

Adding ZIP to Excel

Pive been importing data from a mainframe database system into my Excel spreadsheet. One of the fields in my file contains ZIP codes. When I bring the mainframe-produced ASCII file into Excel, all the five-digit ZIP codes are right-aligned numbers, but the nine-digit codes (which contain dashes and therefore appear to Excel as text) are left-aligned. What's more, all the five-digit ZIP codes from New England lose their leading zeros, turning, for example, 05849 into a very unhelpful 5849.

I discovered that I can make everything look passable by using Format•Number and specifying the custom format '00000', then left-aligning the column. But if I sort the data on the ZIP code, all the five-digit codes sort first, followed by all the nine-digit codes. Isn't there some way to convert the five digit codes into text so that the data will sort consistently?

Mark Dibner

Research TrianglePark, North Carolina

A Converting everything to text is indeed the answer. Although ZIP codes are made up of digits, they're best treated as text—you'll probably never need to subtract Boston from San Francisco.

Let's assume that your ZIP codes are in column D. Begin by inserting a temporary column, E, directly to the right of it. Then in E1, enter the formula =TEXT(D1,"00000"). The TEXT() function converts a number in the source address (in this case D1) into a text string with the format that's specified by its second argument. If the source address already contains a label, TEXT() will copy it unchanged.

Now copy this formula down through all of column E, or at least as far as the ZIP codes go in column D. Select column E, and press <Ctrl>C or <Ctrl>Insert> to copy the formulas. Select column D, and execute the command Edit Paste Special. In the resulting dialog box, select Values and click OK. This command copies not the formulas but their results—in this case the ZIP code text. Finally, delete the temporary column E, and you have a sortable column of ZIP codes in column D.

By Richard Scoville

Mail your spreadsheet questions to Spreadsheets, PC World, 501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Spreadsheets; CompuServe, 72341,2727; MCI Mail, 357-4517; or 415/442-1891 (fax). PC World pays \$50 for published questions. Sorry, we cannot acknowledge unpublished materials.

Richard Scoville is a contributing editor for PC World and a software training consultant based in Durham, North Carolina.



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Lincoln Spector Associate Editor

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WORD PROCESSING Q & A

Choosing a WordPerfect Document Directory

I use WordPerfect 5.1 and like to store my documents in a directory other than the one used by the program files. When I want to retrieve a file, I use the <F5> (List Documents) command, but I'm tired of having to type the new directory name to see my documents. How can I avoid this?

Michel Clemont, Montreal

A WordPerfect is way ahead of you. To change the default directory for your current session, press <F5>. When asked for a directory, press ≈, type the directory path, and press <Enter>. The equal sign tells WordPerfect to make the new directory the current default.

Of course, that default is changed when you exit WordPerfect. To permanently change the default directory, press <\$hift><F1>LD, type the directory information, then press <Enter> three times. This won't affect your current session, but the next time you load WordPerfect, that directory will be your default, and pressing <F5><Enter> will bring you to a list of its files.

Sorting Things Out in WordPerfect

I have a problem with sorting in WordPerfect 5.1. My document is a list of titles, one per line. While Word-

Perfect sorts the first word of each line correctly, the rest of the line isn't sorted. For example, In a Mist, In Odessa, and In the Gloaming end up out of order. How can I get an accurate sort?

Jane Curtis, Sterling, Virginia

A I can help sort out your problem. Since your document is a simple list of titles, you can use WordPerfect's search-and-replace feature to replace the spaces between words with "hard spaces," which WordPerfect will ignore when sorting—in effect, seeing each title as a single word.

With your document loaded, press <home><home><Cursor Up> to make sure you're at the top. To replace ordinary spaces with hard spaces, press <Alt><\F2>N<\$pace><F2>Home><Space><F2>.
Press <home><home><Cursor Up> again to return to the top of the document. If you press <Alt><\F3>, you'll see a hard space symbol ([]) between words.

Now for the sort: With the cursor still at the top of the page, press <Ctrl><F9>S<Enter><Enter>P. Your list will be sorted perfectly. There's no need to go back to the regular space characters if you won't be justifying the titles.

WordPerfect Goes Hollywood

I'm a screenwriter and need a word processing program that can pro-

duce the exacting formatting required for screenplays and scripts. Is there anything that will do this tough job? Leo Hurtado, Dallas

A You're right, multiple columns and precise pagination requirements make formatting a screenplay difficult. There is, however, an add-on program for WordPerfect 5.1 designed just for the job. SuperScript Profrom ITE Technologies

works with *WordPerfect* by presetting the correct layouts for feature films, TV situation comedies, TV dramas, and stage plays. You use <Ctrl>-key combinations to handle formatting and other chores. Other features let you insert scenes, change character names globally, and more, allowing you to concentrate on the art of screenwriting rather than the mechanics. The program sells for \$159. Contact ITE Technologies, 310/559-3814.

File Formatting Woes in WinWord

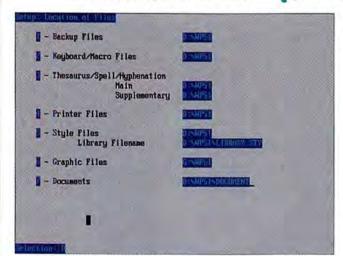
I often need to edit other workers' Word for Windows 2.0 documents. When I open one, I get the other person's WinWord font and formatting preferences, but I'd rather see my own. I can redefine the styles, but that's time-consuming. Is there a shortcut? Kris Jacobsen, Cape Coral, Florida

This can be an annoying problem, particularly if the original author used some bizarre font for the text. However, the solution is simple. Instead of selecting File•Open to retrieve a document, start with a blank document, then select *Insert*•File. Choose a document file, then select *OK*. Any text that uses an unaltered style will use the style having the same name in your default template. You'll get not only your preferred fonts, but also your margin settings and other style-based formatting attributes.

This won't work if your co-worker, in preparing the document, selected text and chose a specific font or applied some other attribute. In that case, you'll see that text in the fonts and attributes used by the original author.

WinWord Macro Dialogs

I'm writing a macro in Word for Windows 2.0 but have come up against a stone wall. The macro must display the program's table creation dialog box, let the user enter the desired number of rows and columns, then insert the table in the document. I've



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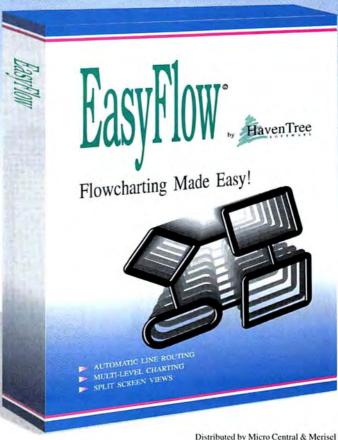
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tried everything I can think of, but nothing seems to work. Everything else in my macro works fine. Do you have a solution?

Eric Matthiesen, Bloomington, Illinois

A The answer to this one is not obvious, and the Using WordBasic manual and WinWord's macro help screens aren't clear. In your macro, wherever you want to call the Insert Table dialog box, insert these four lines:

Dim MyDialog1 as TableInsertTable GetCurValues MyDialog1 Dialog MyDialog1 TableInsertTable MyDialog1

Here's how it works: The first line defines the standard *TableInsertTable* dialog box as the one you want to show. The next line tells *WordBasic* to get the values when the user enters them. The third line actually displays the dialog box, while the fourth line uses the values the user enters to actually create the table. You can use the same structure to display any *WinWord* dialog box for user input, using any name you like to replace 'MyDialog1'.

Killing Files in Word for Windows

I use Word for Windows 2.0 often and would like to be able to preview and delete files in the program without switching to File Manager. Can WinWord handle this chore for me? Terry LeRoy Coleman

Inglewood, California

A In November 1992's Dialog Box column, we offered a simple macro for quickly deleting files from within Word for Windows. For loading, previewing, copying, and deleting files, however, you'd do best using WinWord 2.0's capable file management system, which many users don't know about. Here's how to proceed:

Select File • Find File. If the file you want is in your current directory and is a WinWord document, you'll see it in the list box. Click on a file name to bring up a preview of the document in miniature, and select Delete to delete the file. You won't be able to delete any files currently loaded into WinWord, however. To select more than one file for deletion, hold down the <Ctrl> key while you click on the file names.

If the file or files you want to preview or delete aren't in your current directory, you'll have to go a bit further. As before, select File Find File, then select Search. In the next dialog box, Search, click the Edit Path button. In the Edit Path dialog box, navigate the tree in the Directories box—changing drives in the Drive box if necessary—to highlight the directory you want to search, then click Add. You can add more directories to the Search Path box if you want. Click Close or press < Esc>. Back in the Search dialog box, select Start Search. When WinWord finishes the search, you'll return to the previous dialog box, where you can delete any files in the list.

Turning the Tables in Ami Pro

I like the table feature in Ami Professional 2.0, but the tables must be centered or aligned with the left margin. I need to position a table in another location. Can Ami Prodo this?

Markus Dubach St. Paul, Minnesota

A No problem. The trick here—and it's not obvious until you try it—is to put your ta-

USER GROUP TIP

Easy WordPerfect Dot

Dot leaders look great in a table of contents, connecting chapter titles to their page numbers. If you know how, they're very easy to make. First, type the text that belongs on the left side of your line, before the dot leader. Then press <F6><F6>, followed by the text for the right side of the line. The first time you press <F6>, It right-justifies all the text from the cursor position to the end of the paragraph; the second time, it adds the dots.

David M. Kleiman New York PC Users Group

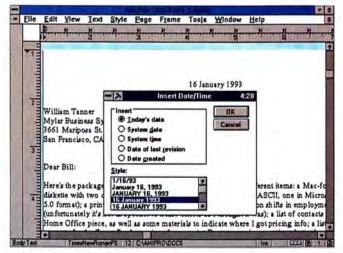
ble in a frame, rather than on the base page itself. Start by selecting Frame • Create Frame • Manual. With the mouse, move the frame cursor to the upper left corner of the position for your table, then hold down the left button while you drag the frame to the size you want. Next, release the mouse button, and select Tools • Tables, set the number of columns and rows you want, and select OK.

Now, with the empty table inside the frame, you can use *Ami Pro's* Table commands to fill in the table. If you want to edit the table later, all you have to do is double-click inside the frame. As with all *Ami Pro* frames, you can position or resize your table frame at any time.

By George Campbell

Mail your word processing questions to Word Processing, PC World, 501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Word Processing; CompuServe, 71571,222; MCI Mail, GCAMPBELL; or 415/442-1891 (fax). PC World pays \$50 for published questions. Sorry, we cannot acknowledge unpublished materials.

George Campbell is a contributing editor for PC World.



INSERT THE CURRENT date without typing in Ami Pro. Just select Edit • Insert • Date/Time, then select a format. Recording a macro to do this job can save you several commands.



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WINDOWS Q & A

Setting the Recorder Straight

I'm trying to build a macro in Recorder that will jump from one application into another and have found that it's virtually impossible. Is there some trick to this?

David Schmidt, New York

Windows' Recorder is well known for its finicky need to have playback conditions nearly identical to those in which the macro was recorded. But with Windows 3.1, you can assign shortcut keys to minimize these problems.

First make sure you have keyboardpredictable access to Program Manager: With Program Manager's StartUp group window open, choose *New* from the File menu. Select *Program Item* and click OK. For 'Description', type Program Manager, and for 'Command Line', PROG-MAN.EXE. Alternatively, you can drag the file PROGMAN.EXE from your WINDOWS directory in File Manager to Program Manager's StartUp group window and press <Enter">Alt><Enter. Either way, move the cursor to the Shortcut Key box and press <Alt><Alt><-P">P (or whatever shortcut key you want to switch you to Program Manager). When you click OK, you'll have a Program Manager icon in your StartUp group. The next time you start Windows, you'll have shortcut key access to Program Manager.

Before you record your macro, use the same technique to assign shortcut keys to the applications you want to jump between. (To access the Program Item

When you record your macro, use the shortcut keys. When it comes time to switch to application, first press < Ctrl>-< Alt>-P to get to Program Manager, then the shortcut key for the application. This launches the application if it is not already running, or switches to it if it is. Your Recorder macro is likely to have far fewer problems this way, since it won't matter whether a given application is running when you execute the macro.

One last tip: Some applications, such as Notepad and Cardfile, let you run multiple "instances" or copies of themselves. If you want your macro to launch a second instance of a

program rather than switch to an existing one, go to Program Manager via its shortcut key when you record your macro. Once there, press <Alt>-F, then R to open the Run dialog box (don't select File*Run with the mouse), and type the path (if necessary) and executable file name of your program (for example, C:\WINDOWS\NOTEPAD.EXE). Your macro will always launch the program and never switch to it.

Dumping Duplicate Fonts

Over the years, I've installed Windows 3.0 and Windows 3.1 as well as Adobe Type Manager (ATM) 1.0, 1.1, and 2.0. I now have several versions of Times and of Helvetica. Can I get rid of the extras without ruining the look of my existing documents, which were created in various applications? And which version of each should I keep? Phil Landis, Brookfield, Connecticut

A If the subtle distinctions among Gill Sans, Arial, Helvetica, and other look-alikes don't matter to you, and you're running short of disk space, you can safely delete the extras. Windows seldom has problems substituting a look-alike for a no-longer-available font.

As for which fonts to keep, that depends on your system needs (and personal taste). If you want the fastest option, both for scrolling through pages of text and printing them, keep your True-Type fonts. On the other hand, if disk space is more of a concern, delete the True-Type fonts, which generally take up more room. But before deleting any font files, copy them to a floppy disk; you'll never know when you may need them again.

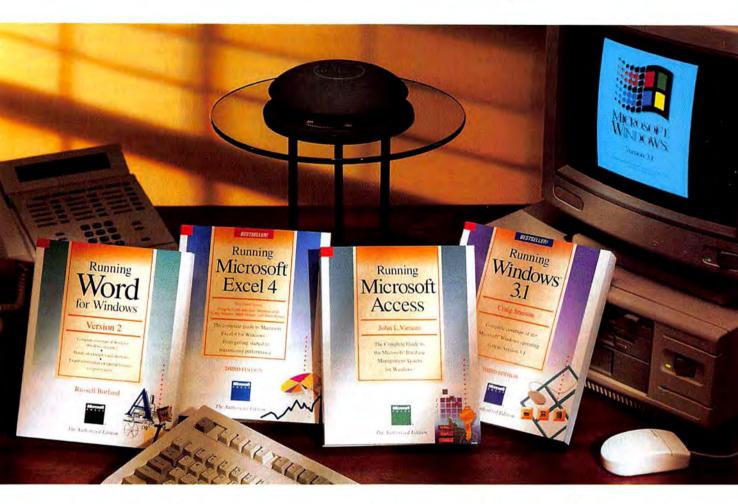
To delete Adobe fonts, start the ATM control panel, select the unwanted fonts, and click Remove. Because this action doesn't erase the font files themselves, you'll have to delete those as well if you want to free up disk space. You'll find the font files (with the extension PFB) in a directory called PSFONTS, and their corresponding

Windows Toolbox



Like the Windows Task Manager it replaces, the icon-studded Metz Task Manager 2.0 helps you switch among, close, and rearrange application windows and icons. But it doesn't stop there. You get drop-down menu access to your Program Manager groups, and push buttons for launching up to nine of your favorite programs. There are file and text search capabilities as well as easy access to a file manager for basic operations (copying, moving, renaming, launching, printing, deleting). This \$49.95 package also has a simple scheduler to launch applications at preset times (either recurring or single event). If you wish, Metz Task Manager can replace Program Manager as your shell. Metz Software, 800/447-1712, 206/644-6026 (fax). Reader service no. 700

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Font	File	
Helvetica	HV	.PF?
	HVO	.PF?
	HVB	.PF?
	HVB0	.PF?
Gill Sans	GN	.PF?
	GNI	.PF?
	GNB	.PF?
	GNBI	.PF?
Times	TIR	.PF?
	TII	.PF?
	TIB	.PF?
	TIBI	.PF?
Times New Roman	MTR	.PF?
	MTI	.PF?
	МТВ	.PF?
	MTBI	.PF?

TABLE 1: DELETE THESE FILES from your PSFONTS and PFM directories to remove unwanted ATM fonts.

metric files (with a PFM extension) in a directory called PFM beneath PSFONTS. Table 1 lists the files you'll want to delete from both directories for the Times and Helvetica fonts you mentioned.

To delete True Type fonts, open the Windows Control Panel, double-click Fonts, select the unwanted fonts, and click Remove. When prompted, check the 'Delete Font File From Disk' box.

Unstacking the Deck

I have used the disk compression utility Stacker since before I installed Windows. I want to create a permanent swap file on my Stacker volume, but the Windows Control Panel insists that I put it on the uncompressed volume, which has only about IMB of unused space. Is there any way I can create the swap file on the compressed portion of the disk?

Ashok Kumar, Northridge, California

A Believe me—you don't want to create a swap file on a compressed Stacker volume; a permanent file won't work at all on a compressed drive, and Stacker will further slow down an already sluggish temporary file. Because your uncompressed drive is too small for a swap file, you will have to shrink the Stacker volume to create more room. You can do this with SDEFRAG,

a disk optimizing utility that comes with Stacker.

Here's how. First, exit Windows completely and change to the directory that contains Stacker and its utilities. Then type SDEFRAG /G at the DOS prompt and press <Enter> (the /G switch is the key to shrinking your stacked volume). At the initial screen, select Continue, and SDE-FRAG will optimize your drive; when it's finished, press <Enter>. At the next screen, type M to 'Make more uncompressed space available'. Follow the remaining screen prompts to enter the amount of uncompressed space you want Stacker to free up. Once you shrink a Stacker volume, there is no way to enlarge it again, so enter the smallest size necessary to create your desired permanent swap file.

When you have finished and Stacker has rebooted your computer, start Windows and the Control Panel. Double-click the 386 Enhanced icon, then click Virtual Memory • Change. Enter your desired swap file size and click OK.

Who Is This Dr. Watson, Anyway?

What's the real purpose of Dr. Watson? I thought it was a diagnostic tool, but after I used it to trap an error, I called Microsoft and found that the Windows Help Line people were no

USER GROUP TIP

Macro Recorder Key

When I use Recorder in Windows, I sometimes need to examine my keystrokes. Here's an undocumented trick that shows you the "macro events"—the keystrokes and mouse actions that make up your macro. With the macro you want to examine highlighted in Recorder, select Macro, and hold down <Shift> while you select Properties. A dialog box will give you a list of every action and even tell you how many microseconds each action takes.

Harriet Serenkin New York PC Users Group help at all. They said that they don't support Dr. Watson and that it's supplied solely as a tool to developers.

Robert J. Schwartz Scarsdale, New York

A Dr. Watson, which comes with Windows 3.1 but isn't discussed in the documentation, is a utility for diagnosing what Microsoft now calls General Protection Faults (they were Unrecoverable Application Errors in Windows 3.0). If Dr. Watson is running when a GP Fault occurs, the utility saves specific information about Windows' internal state, as well as the code instruction that caused the error, to a file called DRWATSON.LOG. The program also prompts you to describe what you were doing when the error occurred.

If you have repeated problems with a particular application, drag DRWAT-SON.EXE from the WINDOWS directory in File Manager to Program Manager's StartUp group, so it will be running when the problems reoccur. After you have a few errors in your log file, you can send it to the application's vendor, where there is bound to be someone who can make use of it (as you discovered, that person is not likely to be a tech support representative). With a little luck, your DRWATSON.LOG will help them discover your problem and fix it in a future release.

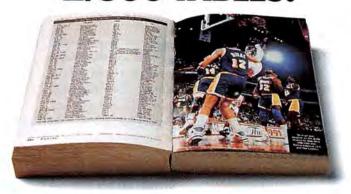
A GP Fault, by the way, occurs when an application writes to a location in memory that it shouldn't have access to. Not surprisingly, this can mess up Windows pretty badly and will often force you to reboot.

By Scott Dunn

Mail your questions to Windows, PC World, 501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Windows; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax). PC World pays \$50 for published questions. Sorry, we cannot acknowledge unpublished materials.

Scott Dunn is coauthor of 101 Windows Tips (Peachpit Press, Berkeley, California, 1991) and a contributing editor for PC World.

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DATA MANAGEMENT Q & A

dBASE Data in Windows

I use Windows and am trying to decide on a database program to use with it. All my existing information is in dBASE III Plus files. Should I stick with dBASE, or is it worthwhile to get one of the new Windows-based programs and convert my databases?

Michael Smith, New York

A You have several alternatives available for using your dBASE files with Windows, and you needn't worry about converting your information to a new file format. One possibility is simply to run dBASE in a DOS session under Windows and use your old data as is. However, many of the new Windows database programs let you access your dBASE data files directly without translation—and most of them offer all the flashy benefits of a graphic interface.

;Change "Invoice #" to your field name invnum = [Invoice #] DO IT! MESSAGE "Printing invoice...please wait" ECHO OFF CLEARALL ;Change "Invlines" to your detail table MENU {Ask} {Invlines} CHECK ;Change "Invoice #" to your field name MOVETO [Invoice #] TYPEIN invnum DO IT! ;Change "Invlines" to your detail table COPYREPORT "Invlines" "R" "Answer" "R" INSTANTREPORT CLEARALL ;Change "Invoices" to your parent table VIEW "Invoices" ;Change "Invoice #" to your field name MOVETO [Invoice #] LOCATE invnum

LISTING 1: PRINT A SINGLE INVOICE during data entry with this Paradox script.

Here's a quick rundown of dBASE-file-compatible Windows data managers to point you in the right direction. Two programs that use the DBF file format as their default, AceFile and Approach, have reputations for ease of use; of the two, AceFile is probably the easier and Approach the more powerful. If you have an investment in custom dBASE applications that you'd rather not throw away, Computer Associates' dBFast is worth looking into.

Finally, two major Windows database products with just about every datamanagement feature imaginable, Paradox for Windows and Microsoft Access, should be shipping by the time you read this. Although neither of them use the DBF file format as their default, both products can read and write dBASE files directly. And I understand that we can expect a Windows version of FoxPro soon.

AceFile 2.0 \$199; Ace Software;
 408/451-0100, 408/437-1018 (fax)

Reader service no. 665

 Approach for Windows \$399; Approach Software Corp.; 800/277-7622, 415/306-7890, 415/368-5182 (fax)

Reader service no. 666

• dBFast \$550; Computer Associates; 800/225-5224, 516/342-5224, 516/342-5329 (fax)

Reader service no. 667

• FoxPro 2.5 for Windows \$795; upgrades \$99; Microsoft Corp.; 800/426-9400

Reader service no. 668

 Microsoft Access \$795; Microsoft Corp.; 800/426-9400

Reader service no. 669

• Paradox for Windows \$795; Borland Int'l; 800/331-0877, 408/438-8400, 408/439-9100 (fax)

Reader service no. 670

Printing During Data Entry With Paradox

A few months ago, you showed how to print an invoice in dBASE without leaving the data entry screen. Is there a way to do this easily in Paradox? I know how to do a query to get the records I want and report on the ANSWER table, but how do I tell Paradox to do all this from my invoice entry screen?

Jim Meyers, Santa Barbara, California

The only way to print a report on part of a table is to do a query and report on the resulting ANSWER table. Luckily, you can automate this cumbersome task with a simple script like the one in Listing 1, which has *Paradox* query for whatever invoice is displayed on the screen, then print the invoice (which could consist of multiple records) in a report. If you like, you can use the SETKEY command to tell *Paradox* to play the script whenever you press the hot key of your choosing during invoice entry.

To create your own script, copy the text in Listing 1 to an ASCII text file called **PRTINV.SC**. If you want, you can use the editor that comes with *Paradox*. If you're using *Paradox 4.0*, you can access this editor with *Scripts*• *Editor*• *New*; for earlier versions, use *Scripts*• *Editor*• *Write*.

With this sample script, I've assumed that your invoice and line item tables are called INVOICES and INVLINES, and that the form you're using is INVOICES' default F form, which contains an embedded form from INVLINES. I've also assumed that your report is INVLINES' default R report, and that the two tables are linked via the Invoice # field in both the form and the report. You'll probably want to substitute these names with those of your actual tables, form, report, and key field. To make that job a little easier, the names you may want to change are printed here in boldface. PRTINV.SC is available on PC World Online

You can tie the new script to a hot key with the SETKEY command in a couple of different ways. To print with <alt><-F7>, the InstantReport key, press <alt><-F10> to show the PAL menu, choose Miniscript, type setkey "Instantreport" play "prtiny", and press <Enter>; do all

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DATA MANAGEMENT Q&A

this before you start entering invoices. Or you can type the same line into your INIT.SC script, which *Paradox* plays automatically every time it's loaded.

If you assign the script to the InstantReport key, you may want to remove the SETKEY assignment when you are finished invoicing so that at other times you can use InstantReport in the conventional manner. To remove the assignment, press -<F10">Alt>-<F10> to show the PAL menu, choose Miniscript, type setkey "Instantreport", and press Enter>. Or, to avoid having to reset the InstantReport key, use a different key to print invoices. Just substitute the ASCII code for the key you want to use in the SETKEY command. For example, to print an invoice when -P">Alt>-P is pressed, use setkey -25 play "prtiny".

Creating Multirecord Forms in R:BASE

We're using R:BASE 4.0 to enter expense information for events that we produce. I have managed to create a form that includes fields for two tables: Events and Expenses. My problem is how to show

multiple expense records on the same form for one event. Can you point me in the right direction?

Geri Walters, San Mateo, California

A I'm assuming here that your secondary table is called Expenses, and that you've already placed a single row of Expenses fields in your Events form. You now need to go through a few quick steps to create a multirecord area on your form. From the main menu, select Forms • Create|modify • Modify and the form you want to change. Once you're in the forms designer, select Layout • Select table • Expenses, then Layout • Table settings.

In the resulting dialog box, change the answer for 'Do you want to define a region?' to Yes by typing Y, then press <Enter>. R:BASE will bring you back to the form and prompt you to indicate the corners of the region you wish to define. Follow the instructions at the bottom of the screen to "outline" the area for your repeating records, making sure that the region completely surrounds your Expenses fields,

with at least one line above it, several below, and one column each on the left and the right. When you're finished, *R:BASE* will return you to the dialog box. Press **<F2>** to leave it and return to your form.

Once there, press **<shift>-<F10>**, move the cursor to the beginning of the first Expenses field, and press **<Enter>**. Then move the cursor to the opposite end of the Expenses line—the end of the last field—and press **<Enter>** again. *R:BASE* will fill the region with a highlighted area. From then on, this Events form will include a minitable on Expenses.

By Celeste Robinson

Mail your questions to Data Management, PC World, 501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Data Management; CompuServe, 74055,412; MCI Mail, 179-3813; or 415/442-1891 (fax). PC World pays \$50 for published questions and tips. Sorry, we cannot acknowledge unpublished materials.

Celeste Robinson is a contributing editor for PC World.

GREAT THINGS COME IN SMALL PACKAGES

This powerful print server can tackle your biggest network printing problems

- Connects any parallel printer directly to your Ethernet LAN
- Fully Novell Netware 286 and 386 compatible
- Can attach to 8 file servers simultaneously
- Fast and easy to install
- Combines high-speed printing and exceptional printer control
- Supports encrypted passwords, forms, notify, cancel, and others
- Full one-year warranty and unlimited free technical support
- Made in the U.S.A.



Power jack

Make the Rose Connection



Now, other word processors have something they never had before.

Features	Ami Pro 3.0	Word for Windows 2.0b	WordPerfect for Windows 5
True WYSIWYG in all views eliminates guesswork	Yes	No	Nó
Fast Format – quick repetition of text formats	Yes	No	No
SmartMerge step-by-step mail merge guide with a card file data manager	Yes	No	No
Preview of professionally-designed Style Sheets for memos, faxes, letters, newsletters, etc.	Yes	No	No
WYSIWYG preview in File Open to quickly view, print, or extract text	Yes	No	No
Number of import/export filters (word processing, database, spreadsheet, graphics)	45	27	36
Grammar Checker	Yes	Yes	No
On-line Tutorial	Yes	Yes	No
Automatic re-numbering of lists	Yes	No	No
Colorful, customizable, editable, sizable SmartIcons™ for one click access to your most frequently used tasks	Yes	No	No
In-context editing of drawings and charts	Yes	No	No
Laptop Install option for quick and minimal configuration on a laptop	Yes	No	No
Clean Screen option for total workspace customization	Yes	Yes	No

Competition.

Take a look at this chart and you'll see, featureby-feature, just how far Ami Pro® 3.0 has leaped ahead of other Windows™ word processors. Which, not surprisingly, is why it's being hailed as the best word processor for Windows by respected and objective evaluators.

Ami Pro 3.0 takes top honors.

In fact, in recent tests[†] conducted by the National Software Testing Laboratories, Software Digest[®] (Vol. 9, No. 6, Sept. '92) gave Ami Pro 3.0 the highest Overall Evaluation in its category.

Their reason: "Lotus Ami Pro 3.0 offers an unbeatable combination of peerless usability,

top-level features and fastest overall performance".

It also received the highest score ever for a Windows word processor in a recent InfoWorld® review. So it's definitely the word processor to evaluate.

Now that you've seen the evidence, why not prove it to yourself? Call us at **1-800-872-3387**,

ext. 7272 for your free working model or to upgrade from your current word processor for just \$129.*

Ami Pro 3.0. It's the one word processor for Windows that doesn't just invite comparison. It welcomes it.

Lotus Ami Pro 3.0 Word Processor for Windows

PUBLISHING & PRESENTATIONS MAKEOVER

Adventures in the Trade Trade

Creating an industry or trade newsletter is a difficult task: The publication has to convey the image of a serious source of information, yet look interesting enough to read. The key lies in finding a balance between flashy design elements and traditional page design.

This month's make-over candidate proved especially challenging, as its readers are themselves in the publications business. The WPA News is a newsletter put out by the Western Publications Association, a trade organization for publishers in the western United States. The four-page document reaches an audience of more than 1000 publishing professionals each month.

The WPA News's design is functional but unexciting. The name and logo fail to communicate quickly what the publication is about and who it's for, and its drab text-only design makes it a prime candidate for the recycling bin. Our job was to make the publication's design more contemporary without putting a strain on the designer's limited budget.

New Look, New Name

To achieve our goals, we adjusted editorial content as well as design. The biggest change is rechristening the newsletter Current Issue. Besides being a term any publishing pro would recognize, the new title suggests a publication concerned with the vital issues of the day. The use of reverse type in the black-and-white logo, as well as the mix of serif ("Current") and sans serif ("Issue") type, suggest a willingness to look at both sides of every story.

Another editorial change is the use of newspaper-style headlines. Moving from a generic head ("Light at the End of the Tunnel") to a specific one ("Putting a STOP to Magazine Taxes") conveys the story's kernal, and makes the publication seem more relevant.

We retained the original's traditional three-column format, but removed the rules between columns and added more white space by using a ragged right margin, making the text easier to read. We also changed typefaces from a slightly stodgy 10-point Times for body text to a cleaner 9-point Helvetica. Thick horizontal rules help separate text and graphic elements, without cluttering the page.

Picture This

Perhaps the most dramatic design change is that each story now carries an eye-catching graphic-a cropped piece of clip art or a scanned photo. Best of all, we didn't have to hire a photographer; we obtained the image from a stock photo house, which is essentially a clearing house for photographic images. Tell the house what kind of image you're looking for, and the staff researches their archives and sends you a sheet of images that fit your description. Usage fees vary widely. The photo used here would typically cost between \$200 and \$300-far cheaper than paying a professional photographer. To locate a stock photo house, simply look in the yellow pages under Photography.

If there's a drawback to using photos and other graphics in a trade newsletter, it's having less room for text. But that's a small price to pay for creating a visually interesting document that appeals to the toughest audience of all: your peers.

By David Brickley and Daniel Tynan

Send business document and presentation make-over candidates, preferably clean and unfolded, to Publishing & Presentations, Make-Overs, PC World, 501 Second St. #600, San Francisco, CA 94107. Mail your publishing and presentations questions to us at the above address, or send them electronically to PC World Online, Publishing & Presentations; MCI Mail, RJANTZ; or 415/442-1891 (fax). PC World pays \$50 for published questions and make-overs. Sorry, we cannot acknowledge unpublished materials.

Daniel Tynan is a contributing editor for PC World. The redesign was performed by David Brickley, a designer based in Moss Beach, California.

- We replaced the original's out-ofdate "WPA News" title with a striking CorelDraw graphic. We created it by drawing two boxes—a long rectangle and a smaller black box with a beveled edge—and laying the smaller box over the large one. We used reversed 42point Times in the black box and similar-size Helvetica in the white portion, saved the image as an EPS file, and imported it into PageMaker.
- We pulled the identifying slogan out of the reversed text bar and spaced it across the page, using 7-point Helvetica in all capitals. The date, now centered and all caps in the enlarged black bar, emphasizes the publication's timeliness.
- 3 A strong headline grabs readers' attention and leads them to read on. Besides rewriting the heads, we enlarged them to 22-point Helvetica with 25-point line spacing.
- 4 A sans-serif typeface like Helvetica is cleaner and more enticing than the original's serif Times.
- 5 We breathed air into the page by removing the rules, setting the text ragged right, and increasing the space between columns.
- 6 We took an image of a fountain pen from CorelDraw's clip-art library, added a shadow, laid them on top of a simple grid created in Corel, and exported the image to PageMaker as an EPS file.
- We scanned a stock photo and imported it into PageMaker as a TIFF file, then put it at the bottom of the page to avoid competing with the banner. A two-line caption explains the photo and draw readers into the story; a 4-point rule separates the caption from the body text.

Putting a STOP To Magazine Tax

4

After a protracted and often frustrating battle against a California sales tax on magazines there is, at last, light at the end of the tunnel.

In late January, the State Senate passed a bill that would repeal the tax on all magazine subscriptions. A comp-arable bill still must pass the Assembly.

and the bit is an into pass are Assembly, but given the momentum behind the repeal effort, such a victory is likely.

Credit for this success must go to the STOP (Stop Taxation Of Publications).

Coalition, that has been spearheaded...

by Norman Ridker, publisher of Fancy Publications. Ridker was outraged by this proposition of celete the sand-diseased. the imposition of sales tax and directed his anger toward a solution. He re-cruited support from some of the state's magazine publishing power-houtes-Petersen Publishing, Miller Freeman and Time Warner among

them-and used the political system to educate lawmakers about the industry. "The effort has taught me a valuable lesson about our government," Ridker says. "You really can make a difference. It's a cliche, but it's true." The group hired a professional San Francisco based loobyist to represent the industry in Sacramento. The coal-time also welched with a LISC reference.

tition also worked with a USC professor to prove that the sales tax effort would not generate the revenue that was ex-pected. Lawmakers first ostimated that the tax would raise \$55 million, but the tax would raise \$55 million, but Flidker says the actual revenue projec-tions were closer to \$6 million. Among other things, lawmakers faeled to take into account that the state's own library system would also be required to pay the taxes. "It was a case of robbing Pa-ter to pay Paul." Ridker says. The coalition also proved that the tax would be devastating to the state's publishing community. Although the tax would raise only \$6 million, STOP esti-(continued on page 2)

(continued on page 2)

The urgency to generate more tax revenues for California has driven state lawmakers to assail

LA Gears Up for Pub Week 1992

Only a few weeks remain before Los Angeles Magazine Publishing Week '92, the West's largest and most excit-ing magazine publishing event. The confer- ence is sponsored by the WPA, the Mag- azine Publishers of America



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extremely competitive publishing envi

- · Learn new desktop publishing solu-
- Learn new desktop publishing solu-tions and ideas;
 Leading agency media executives talk about selling ads from the agency and client perspective;
 A VIP Reception, at which industry
- challenges will be explored by Marshall Freeman, President and CEO of Miller Freeman, Inc.; Peter Shea, President and CEO of Entrepreneur; and Christopher Little -Precident of Cowles-Magazines ----

-bdfk, Precident of Cowles Nagoanesy-viset the informative Exhibit Hall, where you can talk with suppliers to see what's new and compare quality, teatures and prices; in addition, the conference features more than 25 seminars-more than three dozen of which are brand new for 92. Come hear publishing professions at from the West's leading magazine's including Health, Buzz, Texas Monthly, The Hollywood Reporter, The Los An-The Hollywood Reporter, The Los An-geles Times Magazine, California Law-yer, Personnel Journal, Bon Appetit, Sunset, Modern Maturity, Strings, San Francisco Focus, the publishing arms at Time Warner, Disney and more.

Last, but far from least, join us for the West's most prestigious event, the an-(continued on page 2)

BEFORE



The Rescietter of the Mestern Publications Associ

From the President

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Light at the End of the Tunnel

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For a limited time, when you upgrade to 1-2-3 for DOS Release 2.4 or 3.4, you'll get the Starter Edition of the Norton Desktop free inside.

Strip off the plastic wrapper, rip open the box, and inside you'll find something almost as exciting as a secret decoder ring or mini-magnifying glass, and certainly worth a lot more: the Starter Edition of Symantec's Norton Desktop™ for DOS (a \$99 value*).

The Starter Edition includes the Norton File Manager and the Norton AntiVirus. Critics have praised the Norton File Manager for the way it swiftly organizes huge amounts of files. With its visual "drag-and-drop" interface, you can delete files, copy or print files, view multiple directories, or



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backup and scan files for viruses. All with the point and click of a mouse. And the acclaimed Norton AntiVirus detects and eliminates over 1000 known

viruses. Viruses that have been known to cause some major headaches in corporate America.

Of course, The Norton Desktop Starter Edition is only part of a bigger reward: 1-2-3* for DOS Release 3.4.

Introducing Release 3.4. The spreadsheet that moves as fast as you do.

If you're looking for a spreadsheet that can keep pace with your workload, consider the new 1-2-3 for DOS Release 3.4. This advanced DOS spreadsheet takes analyzing numbers to a new level. Release 3.4 is 22% faster overall. It loads faster, prints faster, recalculates faster and displays your work faster. All of which means you can work faster.

Plus, we've made it easier than ever to use—with over 75 SmartIcons which give you one-click shortcuts to your most commonly used spreadsheet commands. And, the only true 3D DOS spreadsheet, 3.4 makes it simple for

you to organize and consolidate data. Plus, with DataLens* you can use familiar 1-2-3 commands to access external databases.

Why 1-2-3 is the leading DOS spreadsheet.

Only 1-2-3 for DOS offers true compatibility with all other versions of 1-2-3 across all major platforms.

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importantly, 1-2-3 for DOS is used and trusted by 18 million people worldwide.

How to get your free prize.

To take advantage of this special offer from Lotus* and Symantec*—two leading companies dedicated to making the most of your DOS

computer—visit your Lotus Authorized Reseller or call

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ext. 7269 by March 31st, 1993.

And get in on what may be the second most popular free offer in history.

Lotus 1-2-3 for DOS

COMMUNICATIONS Q & A

E-Mail Overload

How do you suggest a busy executive deal with E-mail overload? In the office where I work, some executives already feel overburdened. They receive junk mail along with valid, but often misdirected, questions or information from all levels of the company. Are there alternatives to having a confidential secretary screen E-mail?

Doug Simpson, Hartford

A I sent your question to various overburdened executives, including Bill Gates, at various software companies. Bill didn't respond, but he does claim to welcome E-mail from any employee at Microsoft. Philippe Kahn of Borland replied, "I get, read, and answer about 150 to 200 messages a day. Three hours of every day are dedicated to E-mail. It's not overload. It's my job!"

Until you become a software mogul with the time to answer 200 messages a day, there are strategies that can make life easier. Your company should establish a policy that discourages frivolous E-mail, especially when addressed to large mailing lists. When you do need to send a message to a mailing list, use the blind copy feature. This lets you address your message so recipients can't reply to everyone on the list; in fact, they won't even know the message was sent to a group. This makes it difficult for E-mail comedians to impose their witty responses on everyone. If some people enjoy frivolous E-mail, set up a bulletin board where they can chat.

If you can afford it, consider deploying BeyondMail, a network E-mail system that runs on Novell LANs, Banyan VINES, and networks that use Message Handling Service (MHS)—the standard format for information exchange between networks. It can automatically sort, forward, and act on your mail, even when you're out of the office. For instance, you can instruct it to delete any message with the subject "Office Football Pool," or put it in your urgent folder, depending on your prior-

ities. BeyondMail is available from Beyond Inc.; 617/621-0095, 617/621-0096 (fax). Cost starts at \$995 for ten users.

If it's any consolation, consider Bob Mahoney, proprietor of Exec-PC, the world's biggest BBS. He personally answers all E-mail from customers and says he recently spent two weeks on replies. He has 1300 messages to go.

Do I Need Synchronous?

Many modems are said to support both asynchronous and synchronous modes. What's the difference?

Wendell Craven, Birmingham, Alabama

A If you're a typical PC user, chances are you'll never need a modem with a synchronous mode.

In async communications, the lingua franca of the PC world, data is sent one bit at a time in a continuous stream. To regulate the flow, data is broken into

data bytes of 7 or 8 bits each, with start and stop bits signaling the beginning and end of each byte.

Synchronous modems are used in

high-speed connections between mainframes. Throughout a synchronous data link, the sending modem broadcasts a clocking signal to the remote modem to time and regulate the flow of data. No stop or start bits are used.

Trading on Line

Are the on-line stock brokerages
I've noticed a good deal?

Anna Luciani, Chasm Falls, New York

A In the past they haven't been. Investors found it easier to navigate the telephone service of brokerages than the menus of CompuServe and GEnie. Plus, the commissions of online brokerages haven't been as low as those of some deep-discount brokers. Charles Schwab and Fidelity offer 10 percent commission reductions if you trade with them on line, but even those

rates are high compared to off-line deals with other discount brokers. And you also have to consider on-line charges.

Things are starting to change, however, as a few deep-discount brokers pop up on line. E-Trade, available on CompuServe and America Online, offers deep-discount rates.

Fidelity's new Fidelity Online Xpress service is a terrific deal if you're a heavy trader who can qualify for a Spartan Account; you need \$20K in funds and securities and must place a minimum of four trades a month. If you qualify, commissions are among the cheapest you'll find on or off line.

Is on-line trading reliable? Bill Porter, president of TradePlus, which provides software and servicing for on-line brokerages, says, "Between 200,000 and 300,000 trades have gone through, and there has never been an error."

On-line brokerages claim it takes less

Until you become a software mogul with the time to answer 200 E-mail messages a day, there are strategies to make life easier.

than a minute to execute an order placed on line, except for options orders, which may require 2 to 3 minutes.

Be aware, though, that some on-line brokerages have limitations, such as special order conditions, no intra-day trading, and no bonds or option trading.

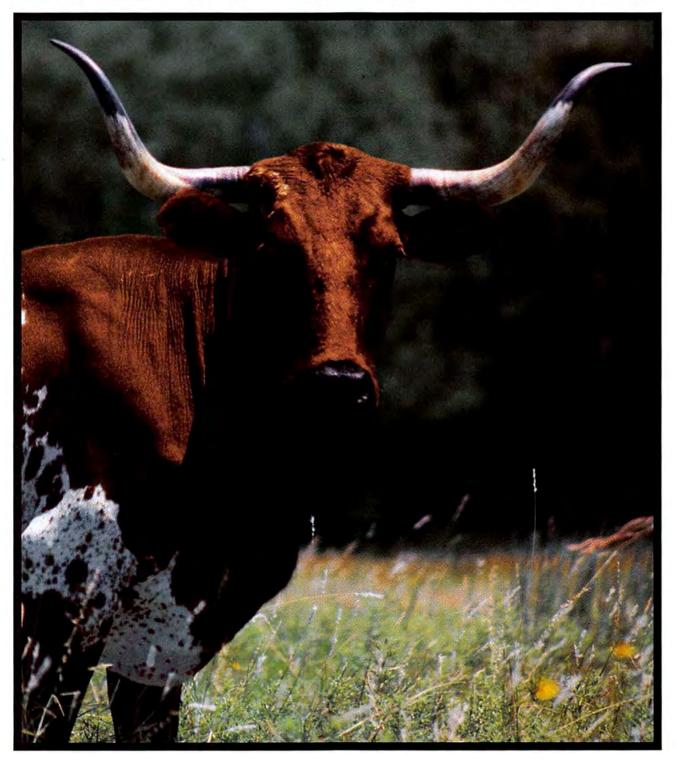
By Judy Heim

Mail your communications questions to Communications Q&A, PC World, 501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Communications; CompuServe, 75300,713; MCI Mail, 312-7737; Internet, 3127737@mcimail.com; GEnie, JUDY.HEIM; or 415/442-1891 (fax). PC World pays \$50 for published questions. Sorry, we cannot acknowledge unpublished materials.

Judy Heim is a contributing editor for PC World.



NEW BREED



AND PUT THE OLD BREED OUT TO PASTURE.

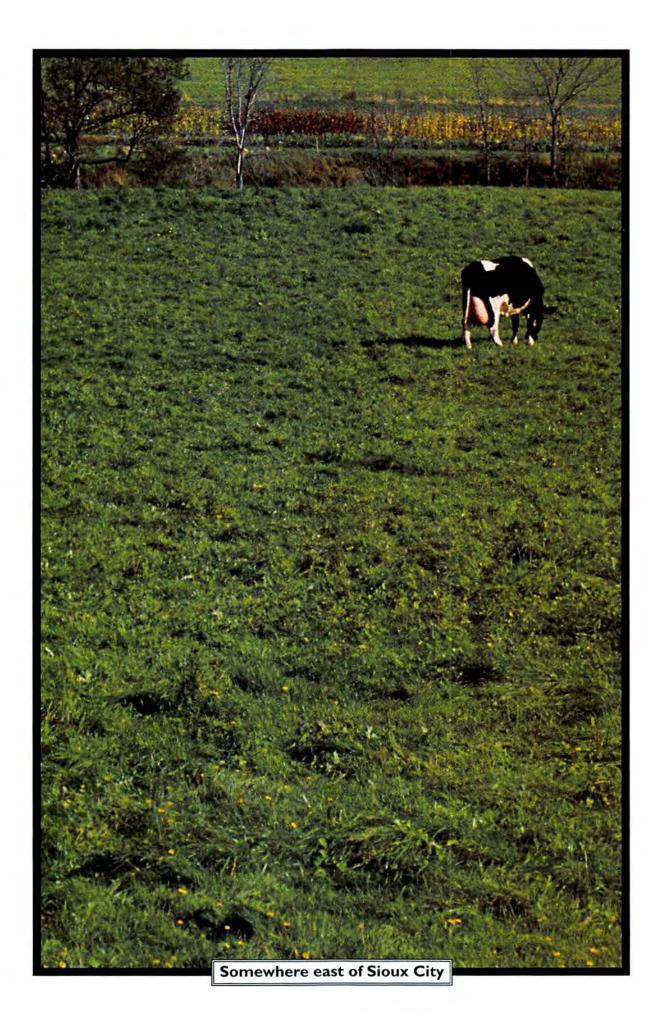
Every cow has its day. But it's time to put that milker out to pasture and make way for the Hyundai 486 stampede. It's time to Do Something New Breed®.

Say goodbye to "cow-shed" engineering and mother-board-of-the-month manufacturing. At Hyundai, we're doing *U.S.-based*, end-to-end, value engineering and manufacturing. That means benchmark-blasting power from the new Hyundai family of 486 Systems.

And with up to 32 Winmarks of Windows processing power, Hyundai's bulletproof, 32-bit 486 Systems are designed and engineered for your high-throughput applications. For instance, Local Bus Graphics are standard on every system, from our entry-level computers up through our top-of-the-line desktops. You'll tear through Windows with our razor-sharp, 32-bit processing. Plus, up to 32 Megapixels of mind-bending GUI acceleration is standard with every New Breed 486 from Hyundai. And here's more New Breed value engineering. Our expandable, "warpspeed" L2 cache architecture is standard on every Hyundai 486 system.

Made-in-America engineering excellence is coming through the gates with the backing of a global high-tech leader. Now Do Something New Breed. And turn the page....







486 STAMPEDE



That thunder you hear on the PC prairie is the New Breed Hyundai 486 stampede. The hardest-charging, price-lean, MIPS-mean herd of computers you'll ever see. We're bringing everything from powerful 66MHz 486DX2 machines to Overdrive-Upgradable 486SX-25 computers. And with our 50MHz 486DX2 desktop PC and 486DX-33 blasters, you can handle today's demanding applications.

WINMARKS 40 30 20 10 Standard HYUNDAI VGA Local Bus

Do something "Longhorn" Local Bus.

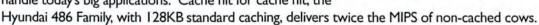
That flash you see on the graphics horizon is the image of our Windows processing power triggering the Hyundai 486 stampede.

Your 486 processor was meant to run today's applications. So why rein in all that power? That out-to-pasture, 16-bit VGA card can only deliver 2 Megapixels at best. That's already dated technology. Let her rip with 32-no-blink-bits of "Longhorn" Local Bus video acceleration. And with up to 32 Megapixels standard, believe it, you'll see an incredible difference in Windows performance.

Do something thunderbolt.

Lightning-fast "warpspeed" L2 caching is another max-performance feature that's designed into every Hyundai 486. Thunderbolt write-

back operations blast your DOS, Windows, or OS/2 data into a box canyon of ultra-fast SRAM. Start out with 128KB standard (more than the cow computers), then expand to 256KB to handle today's big applications. Cache hit for cache hit, the



Do something upgradable.

The Hyundai 486 New Breed Family is designed in Silicon Valley, U.S.A., to out-perform the herd.

All of our systems are *CPU-upgradable* through a single chip via a *ZIF or Overdrive socket*, so the New Breed lets you double your speed. We won't let tomorrow's 32-bit operating systems blast a hole in your productivity. Just upgrade your Hyundai 486 to any higher-speed Intel 486 CPU in the future.



486SX/33-\$1999

This Hyundai 486SX-33 can out-muscle those barnyard bovines of cow country. But you be the judge.

Our 32 Megapixel "Longhorn" Local Bus?... or a 1 Megapixel moo cow? Our "faster-than-a-blink" Windows accelerator video processing tied to the speed of your 486 CPU?... or an old-fashioned bottleneck? Our IMB VRAM controller producing 1024 x 768 ultra-high, non-interlaced resolution?... or their tired cow VGA? Clearly, the prize goes to the Hyundai New Breed.

Compare our standard 128KB of zero-wait state cache with non-cached cows. And don't forget, the Hyundai

433S flexes its processing muscle up to 256KB of cache expansion. This system runs at the head of the stampede!

And we don't just drive the Hyundai stampede, we overdrive it! Double your speed by simply snapping in the Intel Overdrive™ Processor. And our advanced "warpspeed" L2 cache and "Longhorn" Local Bus graphics engine give your upgraded system the 32-bit video and fast SRAM

Add-In

Hyundai 433S

- · 33MHz 486SX w/ 8KB integrated cache 32-bit VESA local bus UVGA graphics w/IMB VRAM
- 128KB "warpspeed" write-back 20ns SRAM L2 cache (expandable to 256KB)
- Upgradable to 486DX power via Intel "Overdrive" socket
- 4MB system memory expandable to 64MB on system board
- 170MB 19ms IDE HDD, 32KB disk buffer
- 1.44MB 3-1/2" and 1.2MB 5-1/4" FDDs. (2.88MB-ready FDD interface)
- · 14" non-interlaced, ultra-high resolution, .28 dot pitch, 72Hz refresh rate, flickerfree, color display w/1024 x 768 resolution, tilt and swivel base
- 25/1P, integrated PS/2 mouse port
- 5 external drive bays, 2 internal
- 7 expansion slots, including 1 VESA local bus slot
- 200 watt power supply
- 101 keyboard, 2 button mouse
- Built-in virus protection, front keylock, 2 level password
- MS DOS 5.0 and MS Windows 3.1

king of PC country.



Want to talk add-ins? We test our 486 systems with literally hundreds of industry-standard cards and software applications. We test software compatibility on Novell (we're fully certified and a Novell Alliance Program member), Banyan Vines, 0S/2 2.0, LAN Manager, and SCO UNIX, plus hundreds of programs running under Windows and MS DOS.

STREET, ST

Trouble on the data frontier? Relax. The Hyundai 433S is loaded. A beefy 170MB superfast hard disk, two floppy drives, five external/two internal drive bays, and seven expansion slots mean you won't go hungry for performance. And dressed up with our 14" flickerfree, non-interlaced, color display, the New Breed 433S is the new





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E

We'll give you more than you bargained for. When you go with the 486

stampede, from our 425SP to our powerhouse 466D2TE, we give you exclusive *low prices on software*. Our size and reputation allow us to forge alliances with all the major players in the industry, which means we can bring you software specials from firms like Microsoft, Borland, Lotus, and Symantec.

Do something safe.

The PC range war can shake everybody's confidence. Except ours. We're a \$50 billion global company, which means we have the resources to guarantee outstanding service and support. When you buy New Breed technology, you get New Breed service from a world-wide leader.

In addition to our service and support, we have a TQC (Total Quality Care) program that makes us the double-safe buy. Our 18-month warranty on all systems is a soft ride in the saddle.

The bottom line is your satisfaction. Buy the Hyundai 486 stampede, and you get more than New Breed technology. You get New Breed Service that leaves that old breed behind.

NEW BREED SERVICE AND SUPPORT



- One-year, next-business-day, on-site service with all direct orders, followed by 6-month, ship-in warranty on parts and labor.
- 30-day, no-risk, money-back guarantee on anything you buy direct from Hyundai.
- 48-hour turnaround on ship-in repairs.
- Beginners Help Line: 800-933-9917.
- Product spec fax: 800-723-4843.
- · 7-days-a-week tech support:
 - -24-hour lifetime tech support: 800-289-4986.
 - -24-hour tech fax: 800-283-4986.
 - -24-hour tech bulletin board: 800-955-5432.
 - —Tech support through CompuServe access.

24 HRS.
7 DAYS.

Great deals on optional software!

Hyundai 466D2TE New Breed Power Server

- . 66MHz 486DX2 CPU w/8KB integrated cache
- 128KB high-speed L2 cache
- · 32-bit EISA architecture

NORTON

Aldus PageMaker

- 8MB RAM standard (expandable to 32MB on system board and 96MB via memory expansion board)
- · 32-bit caching SCSI host adapter
- 360MB 12ms SCSI HDD, 256KB disk buffer
- 1.44MB 3-1/2" and 1.2MB 5-1/4" FDDs
- · SVGA graphics card
- 14" interlaced, ultra-high resolution, flickerfree, color display with 1024 x 768 resolution, .28 dot pitch, 72MHz refresh rate
- · Seven 32-bit EISA slots, one ISA slot
- . 5 external and 2 internal drive bays
- . 300 watt power supply
- Built-in virus protection, front keylock,
 2 level password
- · 101 keyboard, 2 button mouse
- . MS DOS 5.0 and Windows 3.1

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intel inside



RFU



Hyundai

- 25MHz Intel 486SX w/8KB integrated cache
- 32-bit YESA Local Bus UVGA graphics w/IMB VRAM
 128KB "warpspeed" write-back 20ns SRAM L2 cache (expandable to 256KB)
- Upgradable to 486DX power via Intel Overdrive™
- 4MB system memory expandable to 64MB on board
- . 80MB 17ms IDE HDD, 32KB disk buffer
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 5 external drive bays, 2 internal
 7 slots incl. 1 YESA Local Bus slot

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- Built-in virus protection, front key lock, 2 level password
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- Other hard drive, video, memory, and monitor options available



Hyundai 450D2

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- 32-bit VESA Local Bus UVGA graphics w/IMB VRAM
- 128KB "warpspeed" write-back 20ns SRAM L2 cache (expandable to 256KB)
- · Processor upgradable via ZIF socket
- . 8MB system memory expandable to 64MB onboard
- . 200MB 12ms IDE HDD, 256KB disk buffer
- 1.44MB 3-1/2" and 1.2MB 5-1/4" FDDs

- 14" non-interlaced, ultra-high resolution, .28 dot pitch, 72Hz refresh rate, flicker-free, color display w/1024 x 768 resolution, tilt-and-swivel base
- 2S/IP, integrated PS/2 mouse port
 5 external drive bays, 2 internal
- . 7 slots ind. I VESA Local Bus slot
- . 200 watt power supply
- . 101 keyboard, 2-button mouse
- Built-in virus protection, front key lock, 2 level password MS DOS 5.0 and MS Windows 3.1
- Other hard drive, video, memory, and monitor options available



Hyundai 466D2

- 66MHz Intel 486DX2 w/8KB integrated cache
- 32-bit VESA Local Bus UVGA graphics w/IMB VRAM
 128KB "warpspeed" write-back 20ns SRAM L2 cache (expandable to 256KB)
- Processor upgradable via ZIF socket
 8MB system memory expandable to 64MB on board
 360MB 12ms IDE HDD, 256KB disk buffer
 1.44MB 3-1/2" and 1.2MB 5-1/4" FDDs

- . 14" non-interlaced, ultra-high resolution, .28 dot

pitch, 72Hz refresh rate, flicker-free, color display w/1024 x 768 resolution, tilt-and-swivel base

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- · 5 external drive bays, 2 internal
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Real Problems, Real Solutions (page 35)	0	0	0	0	0	0	0	
Top of the News (pages 42–56)	0	0	0	0	0	0	0	
Whole World in His Windows (page 42)	0	0	0	0	0	0	0	
Improv: A Financial Modeling Tool (page 46)	0	0	0	0	0	0	0	
Local Bus: Not Just for Video (page 47)	0	0	0	0	0	0	0	
High Quality From a Small Printer (page 48)	0	0	0	0	0	0	0	
WordPerfect Enters Groupware (page 52)	0	0	0	0	0	0	0	
PC Tools 8.0 (page 54)	0	0	0	0	0	0	0	
Acer's Easy-to-Adjust 76i (page 56)	0	0	0	0	0	0	0	
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DIALOG BOX TIPS

Usurping Upper Memory

MS-DOS 5.0's LOADHIGH and DEVICEHIGH commands work with Microsoft's EMM386 memory manager to let you load TSRs and device drivers into "upper" memory—the unused area above 640K between the video adapter and the ROM BIOS. Unfortunately, if you install EMM386 in the default manner, you lose some of this valuable address space. That's because EMM386 uses 64K of upper memory to emulate expanded (EMS) memory, an old-fashioned standard that fewer and fewer programs need.

If you need more room to load programs high, and don't have any programs that use expanded memory, try placing the parameter **FRAME=NONE** on the DEVICE=EMM386 line in your CONFIG.SYS file. This tells the memory manager not to grab the 64K area (known as a "page frame") for expanded memory functions.

George Ringer, Hoople, South Dakota

Editor's note: Here's another parameter that will turn off EMS and give you that 64K back: NOEMS. NOEMS is more limiting than FRAME=NONE since it disables VCPI extended memory as well as expanded memory. On the other hand, because NOEMS turns off VCPI and a few of EMM386's other features, it causes fewer conflicts with some programs. Which of these switch-

es should you use? Experiment with both and find out.

If you decide to use FRAME= NONE, check to make sure there isn't already a FRAME= parameter on your DEVICE=EMM386 line. If there is, replace it with FRAME=NONE; you don't want to give EMM386 two FRAME parameters.

Reverse Printing for WPWin

In the March 1992 issue of PC World, you offered a macro for printing Word-Perfect documents backwards—a useful trick if your printer outputs paper page up rather than page down. While the macro works in the DOS version, the automatic macro conversion utility in WordPerfect for Windows can't translate it. The [SYSTEM] command has no WordPerfect for Windows equivalent.

I therefore created a WordPerfect for Windows macro that performs the same function as the DOS macro [Listing 1]. To use it, type the listing into an ordinary WordPerfect file called REVERSE.WCM, and place the file in the macro subdirectory specified on the Preferences menu. You can then compile and run it with the Macro•Play command.

Patrick A. Knight Manhattan, Kansas

Editor's note: If you subscribe to PC World Online, you will find RE-VERSE.WCM in the archive file JAN_DIAG.ZIP.

Merging Macros in WordPerfect

If you write WordPerfect 5.1 macros, you've probably been frustrated by the macro editor's inability to insert all or part of one macro into another. Fortunately, there's a way it can be done.

First, create a new keyboard layout by pressing <Shift><F1> (Setup), K (Keyboard Layout), and C (Create). Type TEMP and press <Enter> twice. This will bring you back to the Setup menu. Press K again, select the new layout if it isn't already selected, and press E (Edit). This will bring you to an empty list of macros. Press R (Retrieve) and type <Ctrl>0 (don't worry if you already use the combination elsewhere—this is only temporary). Next, enter the name of the macro you wish to copy and press <Enter>; it will appear on the list of macros. Press <FI> (Exit) to return to the list of keyboard layouts, then E again to return to the macros inside TEMP.

Now you're ready to create your new macro. Press **C** (Create), then **<Ctrl>N**, and optionally give your new macro a description. This will bring you to the macro editor, where you can enter text and commands for your new macro. When you come to the point where you want to insert the old macro, press **<Ctrl>V** followed by **<Ctrl>O**. Voilà—the first macro will be inserted into the second. Once you exit the macro editor, you can use the **S** (Save) command to save the **<Ctrl>N** macro to a file.

Charles Hoyle, Brussels, Belgium

Editor's note: If you insert a long macro into another using Mr. Hoyle's technique, you'll find that the line breaks in the inserted macro are not preserved; the whole macro will be brought in as one long line. This won't affect the macro's performance, but it will make it harder to read. Nonetheless, this is the easiest way to merge macros in WordPerfect.

Reduce Your Waste

The MS-DOS file system doesn't always use space efficiently. In fact, on many systems, it wastes an average of 4K of disk space per file-more if you have many small files. This is because DOS allocates hard disk space in clusters of 2, 4, or even 8K. Thus, in some systems, a 1-byte file wastes more than 8000 times as much space as it uses. Here's a program that shows you how much space DOS is wasting, in everything from a single file to across your whole disk, and tells you if it's worth trying to recover some of this "slack" space by reformatting or using a compression utility.

LISTING 1: USE THIS WORDPERFECT FOR WINDOWS macro to print a document in reverse.

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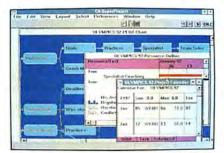
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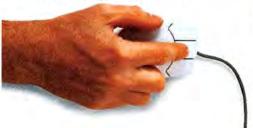


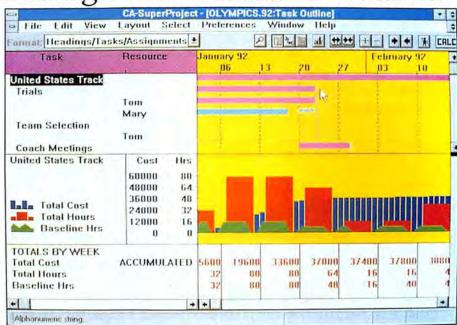


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DIALOG BOX TIPS

```
DEFLNG A-Z
REM ** GET THE CURRENT DRIVE
SHELL "CD > STEMP.TXT": OPEN "I", #1, "STEMP.TXT"
LINE INPUT #1, DRIVES
DRIVES = LEFTS(DRIVES, 1)
CLOSE
REM ** OBTAIN USER INPUT
INPUT "Files [<Enter> = entire current drive]: ", D$
IF D$ = "" THEN
D$ = DRIVE$ + ":\*.*"
SS = "Y"
FLSE
IF MIDS(DS, 2, 1) = ":" THEN DRIVES = LEFTS(DS, 1)
INPUT "Search subdirectories [N/y]: ", S$
END IF
IF SS = "Y" OR SS = "y" THEN DS = DS + " /s": SB = 1
REM GET SIZE OF ALLOCATION UNIT
SHELL "CHKDSK " + DRIVE$ + ": > $TEMP.TXT"
OPEN "I", #1, "$TEMP.TXT"
DO WHILE NOT EOF(1)
LINE INPUT #1, UNIT$
 IF RIGHTS (UNITS, 5) = "space" THEN S = VAL (UNITS)
 IF RIGHTS (UNITS, 4) = "unit" THEN EXIT DO
LOOP
CLOSE
IF S = -1 THEN GOTO FINISH
B = VAL (UNITS)
SHELL "DIR " + D$ + " /a-d > STEMP.TXT"
OPEN "I", #1, "STEMP.TXT"
A = 0: U = 0
```

```
DO WHILE NOT EOF(1)
LINE INPUT #1, FS: X = 0
IF RIGHTS(FS, 5) = "bytes" AND SB < 1 THEN EXIT DO
 IF LEFTS(FS, 6) = "Total " THEN EXIT DO
 IF RIGHTS(FS, 1) = "a" OR RIGHTS(FS, 1) = "p" THEN
 D = VAL(MIDS(FS, 13, 10))
 IF D < B THEN
  A = A + (B - D): U = U + B
 ELSEIF D >= B THEN
  X = D MOD B: A = A + X: Z = ((D \setminus B) * B)
  U = U + Z
  IF X > 0 THEN U = U + B
 END IF
 FND IF
LOOP
REM PRINT TOTALS
IF SB > 0 THEN LINE INPUT #1, F$
T = VAL(FS): CLOSE
PRINT " Total files: "; T
PRINT "Bytes occupied: "; U
PRINT "
                 of: "; S
PRINT " Cluster size: "; B
PRINT " Slack bytes: "; A
IF U > 0 THEN
 PRINT * Percent Slack: ";
 PRINT USING "##.##"; ((A / U) * 100#);
END IF
FINISH: ON ERROR GOTO DONE
KILL "STEMP.TXT"
SYSTEM
DONE: RESUME NEXT
```

LISTING 2: USE THIS QBASIC PROGRAM TO DETERMINE how much disk space DOS's allocation scheme is wasting.

WASTE [Listing 2] runs under DOS 5.0's QBASIC. It reports the amount of space used by the files you specify, the amount of space on the disk, the cluster size, and the percentage of slack space. Emmett Dulaney, Muncie, Indiana

Editor's note: To create this program, enter Listing 2 into an ASCII text file called WASTE.BAS. To run it, simply type QBASIC /RUN WASTE at the DOS prompt. You'll be asked which directories and files you want checked; press **<Enter>** for your whole disk.

If the amount of wasted space reported seems large, you have two options. You can use a disk compression utility like Stacker or SuperStor to eliminate slack space from your system. Or you

can repartition and reformat your disk to use smaller cluster sizes. To obtain a cluster size of 2K, back up your disk, use FDISK to divide it into partitions larger than 16MB but smaller than 128MB, and restore your data. This technique won't eliminate slack space, but will typically reduce it to an average of 1K per file. If you subscribe to PC World Online, you will find WASTE.BAS in the archive file JAN_DIAG.ZIP.

Clearing Killer Keystrokes

When you use a familiar program or batch file, you may find yourself typing information before you're prompted for it. This is handy if you've correctly anticipated the next prompt, but if you haven't, or if something goes wrong, you could lose data. So I wrote a program, CLRBUFR.COM, that clears the keyboard's type-ahead buffer.

To create the program, copy these lines into an ASCII text file called CLRBUFR.SCR:

```
n clrbufr.com
e 100 b4 0c b0 00 cd 21 c3
rcx
8
w
```

Then type DEBUG < CLRBUFR.SCR at the DOS prompt. CLRBUFR.COM will appear in the current directory.

In order to use CLRBUFR.COM in a batch file, place the command CLR-

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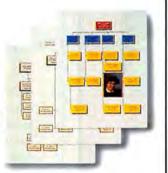
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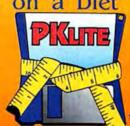
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DIALOG BOX TIPS

BUFR on a line by itself before any command that prompts for user input. This command will prevent any characters that you may have typed earlier from being read by a DOS command.

Jeffrey Carlyle, Bowling Green, Kentucky

Editor's note: If you use a batch file to delete files, format disks, or perform other potentially destructive operations, it's a good idea to add CLRBUFR before critical prompts. If you subscribe to PC World Online, you will find CLRBUFR.COM in the archive file JAN DIAG.ZIP.

Put a Hex on Your Keyboard

Every month, your magazine offers one or more great little DEBUG scripts that make life easier-or at least more fun. Unfortunately, when I have entered these programs into my computer, I have found that switching between the numeric keypad (which I use for digits) and the alphabetic keys (which I use for the hexadecimal digits A through F) has caused me to make mistakes. And any mistake in a DEBUG script can produce a COM file that will cause the system to crash.

To eliminate mistakes, I created two batch programs [Listings 3 and 4] that create

RECHO OFF ECHO < ESC > [224:82:65p ECHO <ESC>[224:71:66p ECHO < ESC > [224;73;67p ECHO < ESC > [224;83;68p ECHO <ESC>[224;79;69p ECHO <ESC>[224;81;70p ECHO Hexpad is now ready...

LISTING 3: HEXPAD.BAT turns the <Insert>-<Page Down> block on a 101-key keyboard into the letters A through F, for typing hex.

@ECHO OFF ECHO <ESC>[224;82;0;82p ECHO <ESC>[224:71:0:71p ECHO <ESC>[224;73;0;73p ECHO <ESC>[224;83;0;83p ECHO <ESC>[224;79;0;79p ECHO < ESC > [224;81;0;81p ECHO Cursor keys are restored...

LISTING 4: NUMPAD.BAT reverses the effects of HEXPAD.BAT.

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DIALOG BOX TIPS

a hexadecimal keypad. When you're about to enter hexadecimal code, first type HEXPAD at the DOS prompt. After the batch file responds, 'Hexpad is now ready', use COPY CON or EDLIN to enter the script. When finished, type NORPAD at the DOS prompt to restore your original keypad settings.

When HEXPAD is active, the number keys on the keypad work in the usual way, but you can use the block of special keys on a 101-key keyboard (<Insert>, <Delete>, <Home>, <End>, <Page Up>, and <Page Down>) to enter the hex digits. The batch file assigns them as follows:

```
Insert = A Home = B Page Up = C
Delete = D End = E Page Down = F
```

With this batch file, you can type DEBUG scripts much faster and without errors.

Brian R. Brown, Madrid, Iowa Editor's note: While these batch files will always affect keyboard behavior in COM-MAND.COM, DEBUG, and EDLIN, the new key assignments won't always work when you enter your text in a screen-oriented editor.

To use this tip, you have to load ANSI-.SYS, with the /X parameter, in your CON-FIG.SYS file. The /X switch tells the driver to distinguish between the block of six cursor keys and their equivalents on the numeric pad.

Note that in the listings, the boldfaced <ESC> represents an Escape character (AS-CII 27), which must be entered differently in different text editors. If your text editor doesn't allow you to enter an Escape character easily, and you have DOS 5.0, you do have another option: Enter the listings as shown, with the string <ESC> for the Escape character, and save your files with the extension DAT rather than BAT. Then run the DAT files through MAKEESC.BAS, the QBASIC program in Listing 5. MAKE-ESC.BAS converts each occurrence of the characters '<ESC>' into an Escape character. To operate MAKEESC.BAS, type QBASIC /RUN MAKEESC at the DOS prompt.

```
' Converts the string "<ESC>" (must be
  uppercase) in the input file to an
  escape character (ASCII 27).
ON ERROR GOTO OOPS
INPUT "File to convert: ", I$
IF IS = "" THEN GOTO DONE
OPEN "I", #1, I$
INPUT "Output file name: ", O$
IF OS = IS THEN
PRINT "Output file must be different"
IF OS = " THEN GOTO DONE
FND IF
OPEN "0", #2, OS
DO UNTIL EOF(1)
LINE INPUT #1, L$
 P% = INSTR(1, L$, "<ESC>")
 IF P% < 1 THEN EXIT DO
 NL$ = LEFT$(L$, P% - 1) + CHR$(27)
 LS = NLS + RIGHTS(LS, LEN(LS) - P% - 4)
 LOOP
PRINT #2, L$
LOOP
DONE: CLOSE
SYSTEM
OOPS: PRINT "Can't open file": GOTO DONE
```

LISTING 5: MAKEESC.BAS replaces each '<ESC>' string in an ASCII file with a real Escape character.

The program will prompt you for the names of the input and output files, then create a new file with the Escape character. For instance, the first time you run MAKEESC, enter HEXPAD.DAT as your input file and HEXPAD.BAT as your output file. If you subscribe to PC World Online, you'll find all these files in the archive file JAN_DIAG.ZIP.

By Brett Glass

Have a macro, batch file, short program, or general tip you're proud of? Mail your tips to Dialog Box, PC World, 501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Dialog Box; Internet, rogue@well.sf.ca.us; MCI Mail, PC World Editorial; CompuServe, 74055,412; or 415/442-1891 (fax). PC World pays \$25 to \$200 for each tip used. Sorry, we cannot acknowledge unpublished materials.

Brett Glass is a contributing editor for PC World.

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MOUSELESS WINDOWS

Most people mouse their way through Windows. But keeping your hands on the keyboard is often faster. And sometimes, using the keyboard and mouse together is fastest. The keyboard techniques shown here will help you manage your programs and data more effectively and efficiently and learn new Windows programs more easily (even though some versions of some Windows programs don't support all of Windows' keyboard conventions).

Note: Key commands apply to the active window, which is the document window (a window within a program) or program window whose title bar is highlighted. Keys to be pressed are in boldface. Keys to be pressed simultaneously are joined by hyphens. A bullet (*) separates menu, option, and button names.

BASIC WINDOWS KEYS

These hot keys are common to most Windows programs, including Program Manager and File Manager. Also see the "Dialog Boxes" section for more common hot keys.

Switch to another document window within same program window

Hold down <Ctrl>, <F6>, or <Tab> until title bar is highlighted (without releasing <Ctrl>, hold down/release <Shift> to cycle backward/forward): or <Alt>Window • number

Switch to another running program (also see the "Task List" section)

Hold down <Alt>, <Tab> or <Esc> until name appears (without releasing <Alt>, hold down/release <Shift> to cycle backward/forward)

BASIC WINDOWS KEYS (continued)

Paste item from Clipboard to cursor

position

Undo last action

Get help

Copy active program window to Clipboard

Copy entire screen to Clipboard

<Ctrl>-V; <Shift>-<Insert>; or

<Alt>Edit · Paste

<Ctrl>-Z: <Alt>-<Backspace>: or

<Alt>Edit • Undo

<Alt>-< Print Screen>

<Print Screen>

TASK LIST

Open Task List

Switch to another running program

Cascade running program windows

Tile running program windows

Arrange icons of running programs in row at bottom of desktop

Close program

<Ctrl>-<Fsc>

Open Task List, select list item.

<Enter>

Open Task List, Cascade

Open Task List, Tile

Open Task List, Arrange Icons

Open Task List, select list item.

End Task

Return to previously active document windov

Return to previously active program window

Open active document's Control menu

Open active program's Control menu

Minimize window into icon

Maximize program to fill screen or document to fill program window

Restore maximized window to original size

Activate/deactivate menu bar

Open menu

Select menu option

Cancel menu without selecting option

Open stored document

Save active document Close active document and its window

Close active program and its window

Cursor backward/forward to beginning of word

Select text

Copy selected item to Clipboard

Cut selected item to Clipboard

<Ctrl>-<Shlft>-<F6> or <Ctrl>-<Shift>-<Tab>

<Alt>-<Tab>

<Alt><Minus>

<Alt><Space>

Open Control menu, Minimize

Open Control menu, Maximize; or double-click title bar

Open Control menu, Restore or <Enter>; or double-click title bar

<Alt> or <F10>

Activate menu, type menu's underlined letter

Open menu. Type option's underlined letter; or highlight option, <Enter>

<Alt>: <F10>: or <Esc><Esc>

<Alt>File • Open, change directory, drive, or file type as necessary, type or select document name, <Enter>

<Alt>File · Save

<Ctrl>-<F4>; <Alt><Minus> · Close; or <Alt>File · Close

<Alt>-<F4>; <Alt>-<Space> • Close; or <Alt>File • Exit

<Ctrl>-<Left>/<Ctrl>-<Right>

Hold down <Shift>, move cursor

<Ctrl>-C: <Ctrl>-<insert>: or

<Alt>Edit • Copy

<Ctrl>-X; <Shift>-<Delete>; or <Alt>Edit • Cut

DIALOG BOXES

Move forward/backward to text boxes. list boxes, check boxes, and buttons

Move to specific text hox, list hox. check box, or button

Open selected drop-down list box

Select list item

Use cursor keys or type item

<Tab>/<Shift>-<Tab>

name's first letter until desired item is highlighted, <Enter> or

Hold down <Alt>, type item

name's underlined letter

Page through list items

Scroll through list items

Move to first/last text box character Check/uncheck selected check box

Cancel dialog box

<Page Up> or <Page Down>

Hold down <Up> or <Down> <Home>/<End>

<Space>

<Esc> or <Alt>-<F4>

Tips: When you're not in a text or list box, you can move to a dialog box's text box, list box, check box, or button by pressing the Item's underlined letter without holding down <Alt>. Cut, copy, and paste hot keys are often valid in text boxes.

WINDOWS PROGRAMS

In addition to the basic Windows key conventions, most Windows programs have their own hot keys, which are often listed to the right of their menu options.

DOS PROGRAMS IN WINDOWS (ENHANCED MODE ONLY)

Toggle between window and full screen

<Alt>-<Enter>

Change windowed DOS program's font

<Alt>-<Space>Fonts, select font

<Alt>-<Space>, Edit • Mark,

size. <Enter>

Copy DOS text to Clipboard Paste text from Clipboard

to DOS program

select text, <Enter>

<Alt>-<Enter> to put DOS program in window, position cursor, <Alt>-<Space>Edit • Paste

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MOUSELESS WINDOWS

PROGRAM MANAGER

Program Manager is Windows' administrative center, the place from which you start programs and manage your work environment. In Program Manager, document windows are called groups. You can create your own groups and put related program and document icons into each group. If you keep Program Manager well organized and can readily employ its functions, it will help instead of hinder your productivity.

Run Windows tutorial

document window

<Alt>Help • Windows Tutorial

Learn to use Windows Help system

Select and open group or

<Alt>Help • How to Use Help

Hold down <Ctrl>, <F6> or <Tab> until title bar or icon name is highlighted (without releasing <Ctrl>, hold down/ release <Shift> to cycle backward/ forward), <Enter> if icon. Or <Alt>Win dow . number or More Windows, select group name, <Enter>

Select icon in active group

Use cursor keys or type first letter of name until desired icon is highlighted

Run program or load document into associated program

Select program or document icon. <Enter> or <Alt>File • Open; or use

Run program/load document minimized

shortcut key

Select icon, <Shift>-<Enter>

FILE MANAGER (continued)

Select directory or file

Move to directory or file pane; <Up>, <Down>, <Page Up>, <Page Down>, or repeat first letter of name until

selected. Or click name

<Enter> or <Plus>

<Shift>-<Asterisk>

<Ctrl>-<Gray Asterisk>

<Fnter>

Open selected file

Expand directory pane's selected

directory one level

Expand directory pane's selected directory completely

Expand all directories of active drive

Collapse subdirectories of directory pane's selected directory

Select adjacent subdirectories and files in file pane

Select separate files/subdirectories in file pane

Select/deselect all files and subdirectories in file pane

<Enter> or <Minus>

Select first file/subdirectory, hold down <Shift>, select last file/subdirectory

Select first file/subdirectory. <Shift>-<F8>, cursor to next file/subdirectory, <Space> to select, <Shift>-<F8> when done; or hold down <Ctrl> and click names

Move to file pane. <Slash>/<Backslash>

Assign shortcut key combination to icon

Select icon: <Alt>-<Enter> or <Alt>File • Properties; <Alt>-Shortcut Key, type character or function key (<Ctrl>-<Alt>is added automatically), <Enter>

Move selected icon to other group

F7>, select group, <Enter>; or drag icon with mouse into other group window

Copy selected icon to other group

<F8>, select group, <Enter>; or hold down <Ctrl> and drag icon copy with mouse into other group window

Create new group window

<alt>File • New • Program Group <Enter>, type name for group's title bar, OK

Create new program or document icon in active group

<alt>File • New • Program Item <Enter>; type icon name; <Tab><Alt>-Browse; select or type program's BAT, COM, EXE, or PIF file name or document's file name: if desired, type Working Directory/Shortcut Key, check Run Minimized box, and/ or change icon; OK. Or open File Manager, drag program or document file name with mouse into Program Manager group

Delete icon or empty group window Exit Windows

Select icon or empty group, <Delete> Close Program Manager, <Enter>

FILE MANAGER

You use File Manager to create and manage directories, move and copy files, start programs, print documents, and associate documents (data files) with programs. In File Manager, document windows are called directory windows. By default, File Manager displays a single directory window containing two panes topped by a panel of drive icons. The left (tree) pane displays the current drive's directory tree; the right (file) pane lists subdirectories and files.

Move forward/backward to drive panel, directory pane, or file pane

Change directory window's current drive

<Tab>/<Shift>-<Tab> or <F6>/<Shift>-<F6>

<Ctrl>-drive letter; or move to drive panel, type drive letter

Search for files/subdirectories by name

<Alt>File • Search, type name (* and ? global characters allowed), enter Start From directory and check/uncheck Search All Subdirectories box if needed,

Select/deselect files/subdirectories in file pane by name

<Alt>File • Select Files. Type name (global characters allowed), <Enter>/ Deselect, repeat as necessary. Close

Delete selected files/subdirectories in file pane (caution: see note below)

Open another directory window

Copy selected files/subdirectories in file pane to another drive/directory

< Alt>Window • New Window <F8>, type target drive/directory path.

<Delete><Enter>Yes/Yes to All

<Enter>; or open source and target directory windows and drag files to directory in tree pane (hold down <Ctrl> if same drive)

Move selected files/subdirectories in file pane to another drive/directory <F7>, type target drive/directory path, <Enter>; or open source and target directory windows and drag files to directory in tree pane (hold down <Alt> if different drive)

Refresh active directory window

<F5>

Note: If File Delete box in the Options . Confirmation dialog box is not checked, you will be asked to confirm the deletion only once.

PROGRAM MANAGER AND FILE MANAGER

Tile open group/directory windows

<Shift>-<F4> or <Alt>Window • Tile

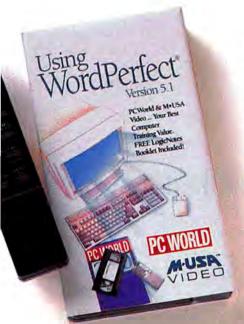
Cascade open group/directory windows

<Shift>-<F5> or <Alt>Window • Cascade

Save window and icon arrangement without exiting

<Shift>-<Alt>-<F4>

Tip: To preserve Program Manager's and File Manager's saved arrangement (the size and position of their program and group/directory windows and the position of their group/directory icons), uncheck Save Settings on Exit in their Options menu.



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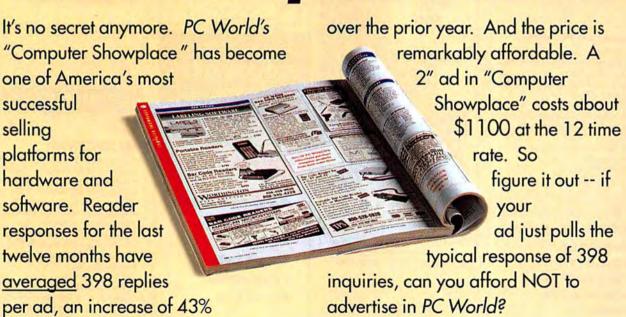


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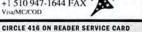
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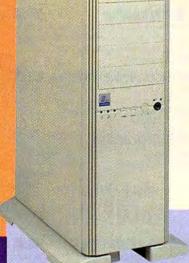
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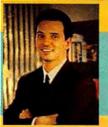
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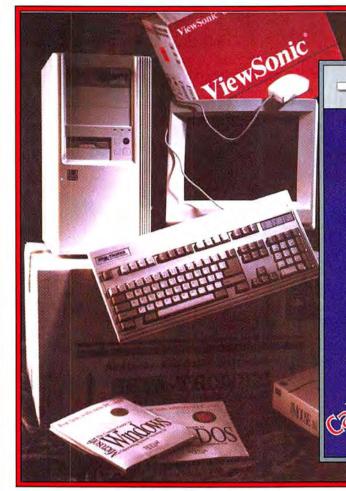
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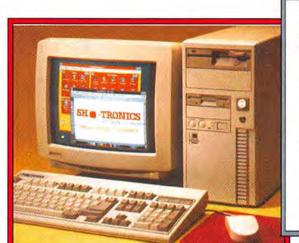
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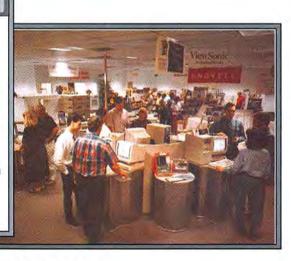
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Diving for PC Pearls

n a typical month, hundreds of products pass though PC World's portals; inevitably the occasional pearl slips by. That's where I come in. Every month I'll comb over a selection of new wares, both hard and soft, aimed at the business market. Specifically, I'll evaluate hardware and software that arrived too late to be included in a regular PC World review, as well as examine shipping versions of products that PC World staff editors reported on in prerelease form. My goal will be to answer a couple simple questions: Is this product worth using? Will it do the job better than the product I have now?

As a systems consultant, programmer, and one-time host of an award-winning national computer talk show, this sort of endeavor comes naturally to me. For this month's column I worked hands-on with *CorelDraw 3.0*, Maxtor's Cheyenne 7213 hard drive, and the DECpc 325P notebook.

CorelDraw 3.0

Unless you really crave *CorelDraw 3.0*, you're not going to want to install it. Why? Even a minimal "custom" installation from floppy disks consumed more than 12MB of hard disk space (Corel claims only 10MB). A more lavish installation from CD ROM required 26MB. Some of this space is taken by the 104 TrueType font files (from Aardvark to ZurichCalligraphic) and 11 import/export filters that Corel installs by default for *Windows 3.1*.

But if you want the most comprehensive package of graphics software on the market, you will want CorelDraw. In one box you get four major applications: A vector-based drawing package (CorelDraw itself), a charting-graphing module (CorelChart), a bit-map editor (CorelPhoto-Paint), and a graphics presentation application (CorelShow). Add

By Thom Foulks

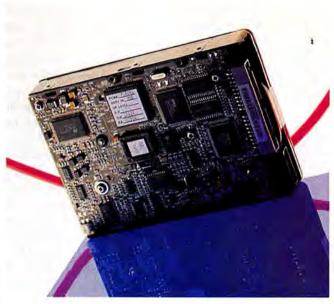
to this collection a graphics file manager, a screen-window image capture utility, an image-tracing utility, as well as hundreds of other items, and you have a product of startling scope.

The magnitude of the numbers involved with such a product jumps right out at you. As an example, the CD ROM disk included with each *Corel-Draw* package has 11,623 files. Hundreds of them contain hun-

dreds of clip-art images (Corel claims more than 14,000 pieces—a count we won't try to challenge). The book provided to display the thousands of images, which lacks page numbers, is nearly an inch thick. Paula Abdul would probably like a recasting of her image, however, and one has to wonder how useful a Paul Tsongas image is.

The CorelDraw package, released in May 1992, has already seen its share of revisions. I was playing with revision B of version 3.0, which incorporates various fixes and some substantial enhancements over the original release. Maybe the most significant added feature is the capability to run the applications from a CD ROM drive, but functional speed will depend upon your drive's data transfer rate (mine is slowww). Users without a CD ROM drive can still make use of more than 4400 clip-art images and more than 150 TrueType fonts on the 11 1.44MB floppy disks.

A cautionary note: Probably the fastest way to hate *CorelDraw* is to try to run it on inadequate hardware. Even my 486 Cheetah Gold 425 with 8MB of RAM and a Weitek video accelerator stammered while importing several complex clip-art images. This is *power-*



hungry software.

CorelDraw's greatest strength is ease of use, in the form of "roll-ups," a new style of menus. You can stash rolled-up menus anywhere on your work screen, ready to roll into action (like Lotus's SmartLcons). The on-line tutorial isn't just a slide show but a Windows help file that tells you only as much as you want to learn.

Were I designing tools for a machine shop, the

CorelDraw module would not be my choice of applications; I'd have to give the nod to *Micrografx Designer*. But CorelDraw eases the tasks of integrating color and text destined for a page or poster layout.

If you compare CorelChart with Harward Graphics, Corel emerges again as easier to learn. CorelChart handles data from spreadsheets and provides its own minispreadsheet input screen. With Windows 3.1's OLE (Object Linking and Embedding) capabilities, Corel-Chart is a bulwark of data display for

Foulks's Favorite:
Maxtor's silent-running Cheyenne 7213
hard drive walked
off with this
month's prize. It
took to my BBS like
a cat to catnip.

BUSINESS FIXTURES

CorelDraw and CorelShow. As an example, clicking on a CorelChart display within CorelShow brings up the CorelChart module for editing. In the initial release, text lost its kerning in such linked files; thankfully, Corel has resolved the problem in revision B.

Despite its links to the other modules, CorelShow is the weakest of the four major applications. It is essentially a slide handler, with creative functions delegated to other OLE-compliant applications. It offers only four slides for a demonstration, which does little to trigger the imagination. CorelShow provides only 25 sample slide backgrounds, compared with more than 100 in Microsoft PowerPoint. Also missing is anything comparable to PowerPoint's outlining and text output functions, although revision B does offer a standalone player for its slide presentations.

CorelPhoto-Paint is in a class by itself: No other product can match its image editing powers for close to this price range. A licensed version of ZSoft's *PhotoFinish*, it may lack the professional editing nuances of Aldus's *PhotoStyler* or Micrografx's *Picture Publisher*, but it also lacks their steep prices. Plus, it can challenge them for functionality while not overwhelming a rank beginner.

All in all, at a \$595 suggested retail price (roughly \$400 on the street), you could spend more and not match *Corel-Draw*. If you have a CD ROM drive and a thirst for clip art, you can't beat it.

Maxtor Cheyenne 7213 Hard Drive

If densely packed Windows programs like CorelDraw make you long for the great, wide open spaces—in the form of an uncluttered hard drive—there's a new low-cost solution.

Hard disk drive maker Maxtor says its Singapore production facility can produce a new drive every 8 seconds. That's one reason the Cheyenne 7213 drive has a suggested retail price of only \$490, and Maxtor says its 212MB model is designed to be the lowest-cost, highest-volume product in its class.

The street price bears out the claim: I found one listing for the 7213 at \$395—less than \$1.90 per megabyte. What did you pay, per disk, for your last batch of

31/2-inch 1.44MB floppy disks?

My evaluation unit was a 7213A, the A indicating an IDE controller interface (a SCSI model is also available), appropriate for the Sensor Samsung SP286 that serves my BBS. A BBS that's constantly on line, with random access to files and data within files, quickly puts a hard disk through its paces. (A 10MB drive, which succumbed in 1990 after seven years of BBS usage, is enshrined on a plaque in my office. It cost \$340.)

My Samsung is a low-profile, smallfootprint machine, yet it had no trouble accommodating the 1.2-pound, halfheight drive (its actual dimensions are

1 by 5½ by 4 inches). The 7213A contains only two platters and four data heads, with 1698 tracks per surface. Via the IDE interface, it masquerades to DOS

as a drive with 16 heads and 683 tracks (or cylinders)—thereby avoiding the 1024 "gotcha" cylinder limit of DOS. I pitted the 7213A (with Micro House's *DrivePro*) against a mundane Seagate ST157A drive; the Maxtor gave me an average throughput nearly three times as fast as the Seagate's.

Much of that speed can be attributed to a 15ms seek time and a 64K on-board cache. Maxtor lists a mean time between failure (MTBF) rating of 150,000 hours; that converts to 17 years of use. But there's one thing I may appreciate even more: In an office where seven hard drives normally run 24 hours a day, the 7213 is the quietest. It can't be heard even when it's the only drive running.

DECpc 325P Notebook

I've yet to find a trackball with which my thumb—either hand—will communicate, which is part of the reason the DECpc 325P notebook appeared so attractive when I removed it from its shipping box. Taking a cue from Apple's PowerBook series, the 325P's trackball is mounted centrally, though it's positioned above the keys instead of below them. It's easy to reach with your index or middle finger and has left-right mouse buttons to each side.

My evaluation model of this machine is a \$2820 powerhouse, including a 120MB hard disk and 2MB of RAM packed into an 8.7-by-11.7-by-1.7-inch case weighing just under 6 pounds. It also contains a 3½-inch 1.44MB floppy drive and an internal 2400/9600-bps fax-modem. At its heart is a 25-MHz 386SL processor, with a 16K RAM memory cache. DEC lists charge life of the nickel metal-hydride battery at about 3 hours; mine lasted just over 2 hours when I moved my files to the 325P.

On the back of the 325P, there's a VGA port (a software utility sets the machine for external or combined oper-

CorelPhoto-Paint is in a class by itself: No other product can match its image editing powers for close to this price range.

ation with the 325P's crisp LCD screen), along with standard serial and parallel port connectors. Of more interest is a RAM card slot that accepts cards with 2MB, 4MB, or 6MB of additional memory. (In the base configuration, you get 2MB.) Beneath that is a 180-pin AT bus connector that accepts a \$589 docking station. Other ports accommodate an RJ-11 telephone plug, a mouse, an external keyboard, and the obligatory AC/DC adapter-charger.

The trackball remains, however, the DECpc 325P's signature feature. In another couple months or so, I may even get used to it. The problem is that the ball—at approximately 1/16 inch in diameter—is simply too small, with a tendency to overspin. Nice try, DEC, but a cat's-eye marble might have been a better choice.

· Maxtor 7213A/S

Maxtor Corp. 800/262-9867, 408/432-4510 (fax)

Reader service no. 675

• CorelDraw 3.0

Corel Corp. 800/836-3729, 613/728-9790 (fax)

Reader service no. 676

DECpc 325P

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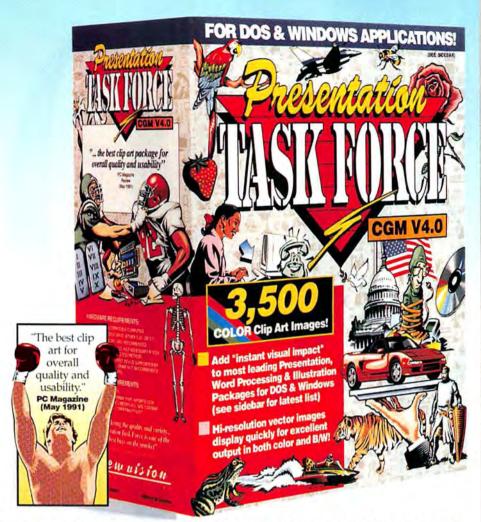
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Of Dungeons, Dragons, and B-17s

ike most role-playing adventure games, the *Ultima* series owes a huge debt to J.R.R. Tolkien's *Lord of the Rings. Ultima I* even gave you the option of playing as a "Bobbit," only one letter removed from Tolkien's Hobbit. The latest installment is *Ultima VII—The Black Gate.* It's a huge advance in graphics, interface, and sophistication over that now-crude original, but it maintains the basic format: You and a crew of jaunty comrades must a-questing go in a land filled with wizards and warriors, seeking ultimate wisdom.

The toughest battle in The Black Gate may be scrounging up 560K of base RAM so the game will run-and like most contests in this exciting adventure, the winning strategy isn't obvious. I thought I'd achieved victory when I loaded DOS 5.0 into high memoryuntil I tried to use my soundboard to hear the sound effects, music, and speech. The sound driver ate just enough kilobytes that I felt myself sinking back beneath the brackish waters of RAM Cram Bog-until I hacked out a series of DEVICEHIGH and LOAD-HIGH commands with my fabled broadsword AUTOEXEC. That produced enough free RAM to run the soundboard and the game-but it was a mighty battle, comrades!

Slay Monsters, Sway Politicians

Once the game loads, you'll find yourself playing the lead in a cross between a pulp magazine whodunit and a dungeons and dragons adventure. You are The Avatar, returned to the realm of Brittania to defeat the latest incarnation of Evil. In the process you must slay monsters, sway politicians, grope your way out of dangerous dungeons, and solve a series of increasingly intricate puzzles. The game is immensely complicated, with many places to visit and

By Michael Goodwin

numerous perils to survive.

Instead of the crude arcade-style ideograms that sufficed for *Ultima* versions I through V, *The Black Gate* features stunning 256-color graphics. The 3-D interface places you floating above the action, looking down on a world of houses, stables, and towns. You drive the action entirely by mouse, clicking and dragging to move,

talk, fight, and collect useful objects. This beats hell out of the clumsy interface in the earlier *Ultimas*, where you cursored around a stylized battlefield, met CGA icons, and either slaughtered them or engaged in dumb keyboard conversations like: "Your interest?" "Sword!" "I can't help you with that."

The new interface has a few problems, though. Like most adventure games, part of the strategy and fun is collecting useful objects and stashing them in your trusty pack. (Hmmm, 1 know this left-handed waffle-bender will save my life when I reach the Intergalactic House of Pancakes.) Fine-until you need to pull something out of the pack. There's no list of what you're carrying; and if you're schlepping around more than ten items, you'll see a pile of shimmering pixels that looks like melted candy canes-a "graphic" view of the items you've squirreled away. If you need the lock picks you found in the stable, it may take several tedious minutes of random clicking and dragging to find them.

Despite these few awkward features (and a bit too much pulpy dialogue), Ultima VII—The Black Gate is probably the ultimate fantasy adventure. Swords and sorcery are not everyone's cup of mead, but if you need to slay a few



monsters after your next board meeting, you'll find a fine collection of fiends here—and none of them can fire you.

Arghh! I'm Hit!!

Most flight simulator games are a bore, whether you're flying a space-fighter or a P-38: You try to stay in the air until you've got the enemy in your gun sights, and then you blast 'em out of the sky. Big deal. If you're much older than 16, it's

only fun once. Maybe it's fun twice.

B-17 Flying Fortress, a highly detailed, action-packed bomber simulation from MicroProse, is a significant variation on the genre. It has to be, because the legendary World War II warplane took ten crewmembers to fly. No, even if your real-life job entails doing ten things at once, B-17 Flying Fortress doesn't expect you to be pilot, navigator, and gunner at the same time. Instead the computer provides a cooperative crew, and they fly the plane with you performing your chosen duty.

You can take on whatever assignment seems like fun to you. Want to drop the

You must explore
the Fellowship Hall
in Ultima VII—The
Black Gate; it's the
HQ for a powerful
organization that
may help you escape
from Trinsic.



B-17 FLYING FORTRESS gives you computerized crewmembers to help you fight the Nazis.

bombs? Go ahead—and let the rest of the crew fly you through the flak and fight off the Nazis. Of course, the crew is only human—and if the attack is particularly

heavy, or the navigator loses the rest of the formation, you may find yourself trying to complete the bomb run while your B-17 is being shot to pieces around you by the Luftwaffe. You can assume any role: pilot, ball-turret gunner, bombardier, navigator, radio operator, and more—and switch assignments midflight if you get bored with your current position.

The graphics could be better—smoke and flames from a crashed B-17 look more like a big, black, bouncing beach ball than a burning airplane. And when every crewmember who takes a bullet whines, "Arghh! I'm hit!" it's pretty hard to keep from looking around for Terry and the Pirates. Still, if you're a World War II buff or a fan of classic aircraft, you'll be in seventh heaven. You even get to choose the pinup on the plane's nose!

• Ultima VII—The Black Gate \$79.95; Origin; 800/999-4939

Reader service no. 673

• B-17 Flying Fortress \$69,95; MicroProse Software Inc.; 410/771-1151

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Michael Goodwin is a contributing editor for PC World. He can be reached on PC World Online (see page 8 for more information).

COMING UP

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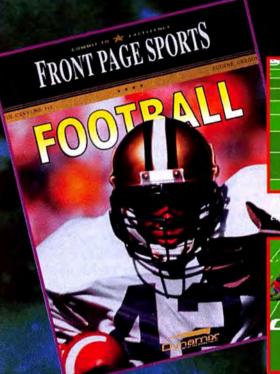
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Let Your Fingers Do the Talking

bad keyboard can leave your fingers feeling like an over-worked contortionist, and DOS wondering what you meant by 'DEL 8.8'. There are a lot of bad keyboards around, yet most people never think of looking for something better. That's too bad, because a really good keyboard makes typing a pleasure, and most are amazingly cheap.

It's easy to find a keyboard with a touch and layout that fit like a glove. But a straw poll of the Pasadena IBM Users Group revealed that many keyboards fit more like an outgrown baseball mitt: About 38 percent of the people responding didn't like their keyboard and were considering an upgrade.

Feel Versus Layout

You've got two questions to ask yourself if you're thinking of buying a new keyboard: Do I want a different feel, and Do I want a different layout. If your current keyboard has a standard 101key layout and you're happy with that, your choices of boards with a good touch are nearly limitless. (What's a good touch? You have to decide that for yourself.) Try out some of the nameless keyboards available at local retailers; you may be in for a pleasant surprise. In Pasadena, for instance, I found three great no-name boards, each under \$50; two with a silent, positive touch, the third offering a mechanical snappiness.

If you don't like the 101-key layout, a little more money will buy you a keyboard with function keys on the side, a unique cursor-key layout, or even a built-in pointing device. The alternative keyboard market is dominated by brand names, and among the most popular models are IBM/Lexmark's Enhanced 101-Key Keyboard With Integrated 25mm Trackball—a very nice keyboard despite its cumbersome name—and the Maxi Switch MaxiPRO-II.

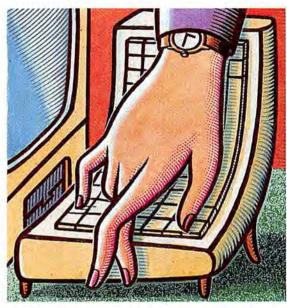
My personal favorite? Northgate's OmniKey/Ultra-T. Every part of it is well thought out, and if there's something I don't like, I can probably change it. And for a street price under \$100, it's a bargain.

Not only does the Omni-Key/Ultra-T have mechanical keys with a solid touch, giving me a snappy, clicking response, but it comes with two sets of function keys—something I never knew I wanted until I tried it—a full set on the left and another across the top. Both sets can be used as standard F-keys, but what's really neat is, the OmniKey gives me the option to redefine the top set as <Ctrl>-, <Alt>-, or <Shift>-Fkey combinations.

Other less obvious touches in the layout make the OmniKey a pleasure to use. It's designed with an extra-wide <Backspace> and a large, L-shaped <Enter> that my klutzy fingers hit on the first try. The asterisk (which works shifted and unshifted) and backslash keys are both clustered near the period key, ideally positioned for typing DOS commands. The <Ctrl>, <Alt>, and <Shift> are color coded for WordPerfect, and for \$10 more, you can get extra F-key keycaps imprinted with Word-Perfect commands (most of which I still can't remember).

Who Needs Semicolons?

I'm finicky about how keys should work, and the OmniKey indulges me. For example, I rarely use semicolons (much to my editor's chagrin), so I've configured the keyboard to give me a colon without using the <Shift> key. I've also locked out the < and > symbols, so I no longer hold the <Shift> key down and accidentally type "U>S>A>". Many keyboards let you swap the <Ctrl> and <Caps Lock> locations, but Northgate includes switchable keycaps along with a handy puller tool.



And listen, if you're pretty happy with your keyboard but would still like to remap some of the keys, you can do a lot of it with softwarecheap software at that. I've collected a bunch of shareware and public domain keyboard utilities and put them together in KEY-BOARD.ZIP, which is available on PC World Online and PIBMUG's BBS.

The final analysis: Keyboards are a dime a dozen, and some feel that way. But for less than \$100, you don't have to be stuck with a keyboard you don't like.

WHERE TO BUY

Enhanced 101-Key Keyboard With Integrated 25mm Trackball \$149; Lexmark Int'l; 800/438-2468, 800/522-3422 (fax) Reader service no. 637

Keyboard Utilities free; PIB-MUG BBS; 818/332-6580

Reader service no. 638

MaxiPRO-II \$125; Maxi Switch Inc.; 602/294-5450 Reader service no. 639

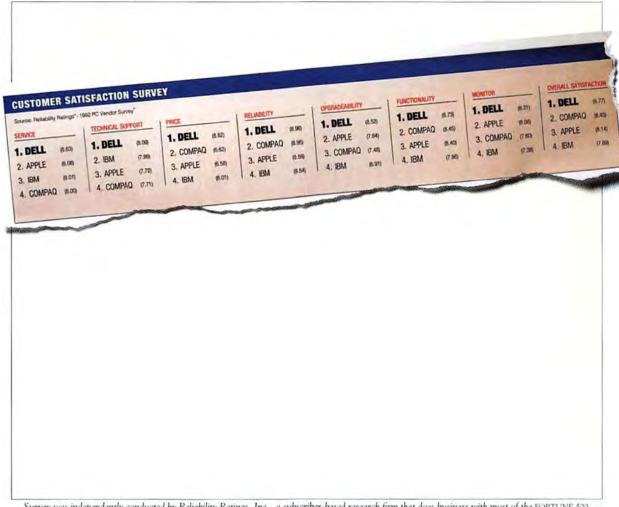
OmniKey/Ultra-T \$129; Northgate Computer Systems; 800/526-2446, 612/ 943-8181

Reader service no. 640

Contributing Editor Steve Bass is the president of Pasadena IBM Users Group. He can be reached on PC World Online (see page 8 for more information).

by Steve Bass

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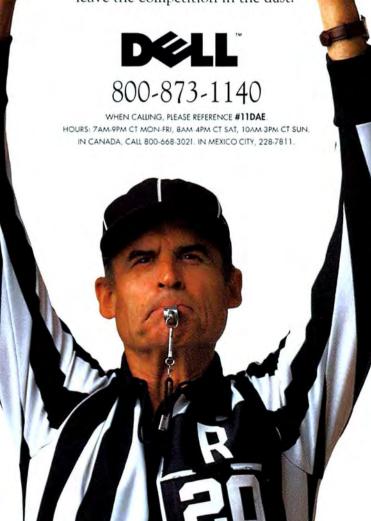


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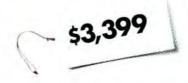
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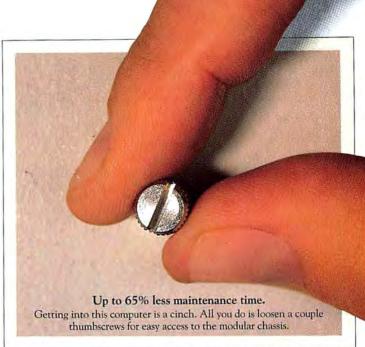




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