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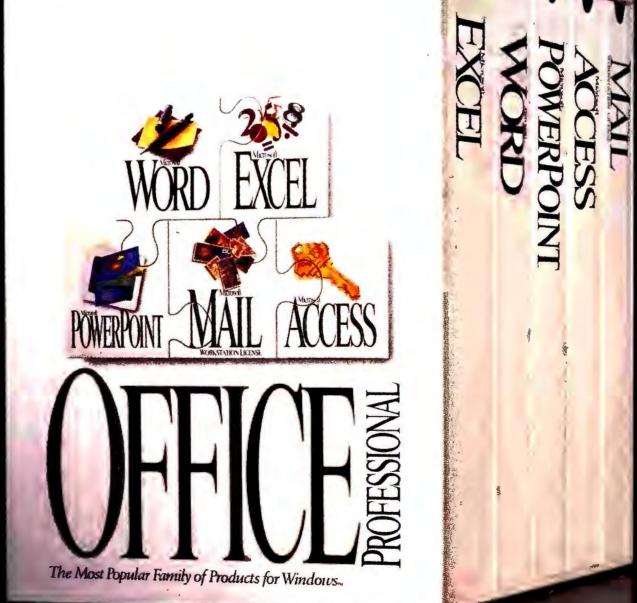
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You have a number of different jobs to accomplish. Every day. So your business software is key to putting together all the right answers.

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This power to work like one program springs from our unique innovations. Take OfficeLinks. Built with the integration standard, OLE 2.0, it lets you drag a chart from your spreadsheet and drop it into your word processor. Then automatically convert everything into presentation slides. Or create custom letters from your database of clients with just a click. All as if you're using one program.

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Together, they're so notably consistent in looks, actions and instincts, there's no question you'll

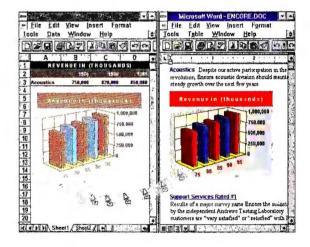
think of them as one program.

And only the Microsoft Office combines it all with unlimited nocharge support. Microsoft just won the ITAA Quality Award* for that support. A singular distinction.



Of course all this "oneness" could only come from the most acclaimed, technically proficient individual programs around—Word, Microsoft Excel, PowerPoint® and Microsoft Access.

We've barely scratched the surface here of what it means for all your programs to work together like one. You'll want to read the reviews



yourself, talk to people who use it, scout around at your nearest reseller. And by all means, call us at (800) 894-6642, Dept. LB8, to find out more. Any questions?





The TipWizard assistant in Microsoft Excel tracks the way you work and offers smart tips on how to save time.

(Upper right) Just click a button on the Microsoft Office Manager (MOM) toolbar and your choice of first-rate programs pops into action.

(Lower right) Need to move information between programs? Just drag and drop it from one place to another. Then edit right in place.



FROM NOW ON, THESE ARE THE QUESTIONS YOU'LL BE ASKING BEFORE YOU BUY SOFTWARE.

- 1. Do your programs work together intuitively as if they were all one program?
- 2. Can you simply drag text, data and graphics from one program and drop them into another?
- 3. Is your software intelligent? For instance, can it handle everyday tasks automatically?
- Are your programs recognized as the best in their category?
- 5. Do your menus, toolbars and other elements look alike and work in the same easy way?
- Oo your programs have no-charge product support? For how long?
- 7. Ultimately, is it worth getting software that doesn't do all these things?

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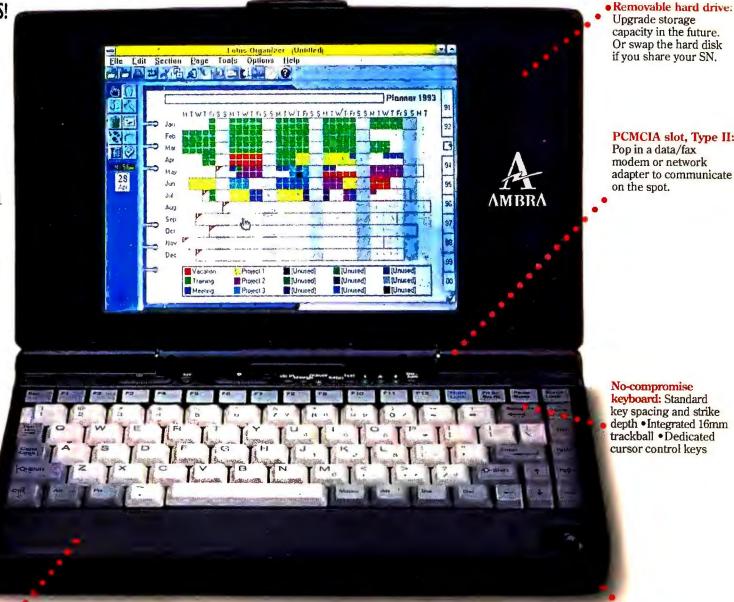
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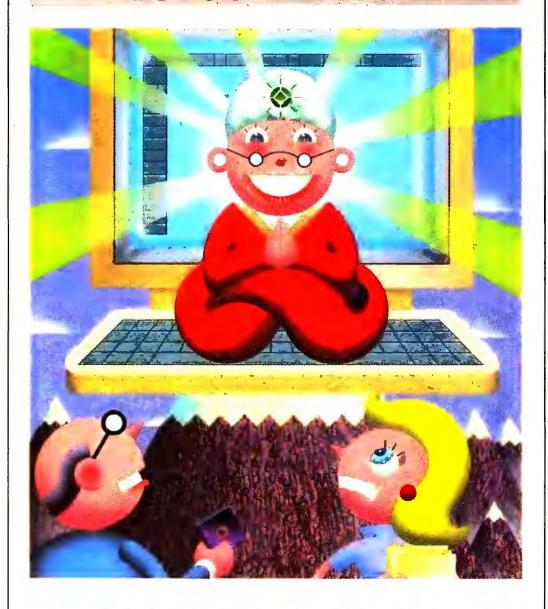
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Lotus: Get the Most From the Lotus Suite

106-L4 Secrets of a Spreadsheet Guru

Users keep stumbling across the same problems in every release of 1-2-3. Here's how to avoid the most common pitfalls.

106-L8 Benchmarking the Data Modeling Contenders

Multidimensional data modeling packages offer tools for analyzing complex data, but some applications are more powerful than others.

106-L15 Present Multidimensional Data in 1-2-3

This release 4.x macro gives your database reports an Improv-like appearance that makes them easier to understand.

106-L1 Editor's Page

106-L27 Macros

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106-L32 Q&A

106-L20 Improving Your Skills

106-L36 Suite Success: Notes

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106-L25 1-2-3 Tips

106-L38 Suite Success: Ami Pro

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Cover Story

112 Are Suites Worth It?

Bulging with applications and priced to sell, Borland, Lotus, and Microsoft office suites promise more than the sum of their parts: trouble-free integration and easy data exchange, with instant access to all key programs. Our team of experts was not impressed by the hype but still found a good reason to buy. Here's why.

Systems

160 Top 20 PCs: Multiple Choices

Decisions, decisions. Keep it simple with our Top 20 charts of the best power and budget PCs. Vying for a spot on this month's charts: a rich mix of new desktop and mobile systems, including the first clock tripled 486, the first 66-MHz Pentium PC, and the first PCMCIA-equipped desktop we've tested.

Word Processing

143 50 Word Processing Tips

Use your word processor like you've never used it before. From keyboard shortcuts and formatting to custom menus and faster printing, our word processing aces spill their secrets for the latest versions of Word, Ami Pro, and WordPerfect.

Top of the News

56 Highway Robbery: Selling the Net

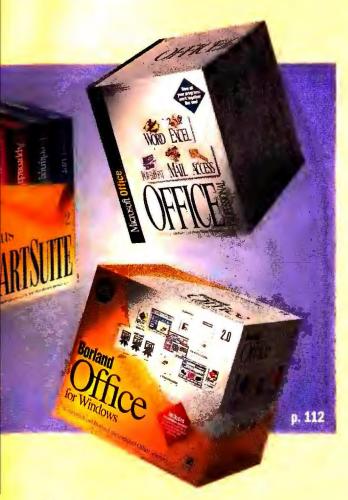
Lavish spending by corporate phone and cable giants may influence legislation about the information superhighway. A *PC World* investigation uncovers the million-dollar money trail. At stake: how you'll access the highway, how much you'll pay, and what you'll be able to do once you get there.

67 Pentiums Speed Up to 100 MHz

Raising the performance bar one more rung, PC makers unveil 90- and 100-MHz Pentiums. We test preproduction 90-MHz models from Micron and Dell.

70 Norton Utilities Tracks Windows INI

The latest version tames Windows' system and configuration quirks while retaining its familiar DOS tools.



Mobile Computing

200 Have Notebook, Will Travel

Tired of hotels that don't know a modem jack from a hole in the wall? More hotels are starting to cater to business travelers with mobile PCs. Here's how to find hotels with the best business services, plus tips to turn your hotel room into an office-on-the-road.

Networking

74-N1 Back to the Office via Remote Control

Today's remote control software packages let you easily access your PC and your net, from home or the road.

74-N3 Buying Tips: Choosing a Backup System

Picking your hardware, software, and strategy in case of a network server crash.

Printers

212 Speed and Style: Laser Printers from \$995

The latest generation of laser printers offers up to 10-page-per-minute performance, high-quality output, plenty of RAM, PostScript, and more—at last year's prices. We put 16 workhorse printers through their paces and pick Best Buys with excellent yet affordable quality.

Reliability and Service Monitor

196 Win a 486DX2-66 PC

How satisfied are you with your PC?
Have you had problems? Or is your PC trouble-free? Tell us about it! Fax in this month's survey for a chance to win an Inmac 466P, a Best Buy PC from this month's Top 20 charts.

New Products

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- 78 AST Advantage EXP/60 Pentium
- 78 Adaptec AMM-1572SCSI Audio Host Adapter
- Packard Bell Multimedia486 and Pentium PCs
- 80 Amdek AM monitors
- Forecast Pro 2.0 and Forecast Pro XE, Benchmarking 1.0 for Windows

- Astound for Windows 1.5 presentation program
- **86** IdeaFisher for Windows
- 88 · UnInstaller 2.0 for Windows
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- 92 PC DOCS Open 2.0 document management program
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- 94 Expert Travel PlannerCD ROM for Windows
- 94 Video Linguist–Spanish CD ROM
- 96 Procomm Plus for Windows 2.0
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-PC World, February 1994



We give you more and more...for less and less! PC World agrees. They awarded ZEOS the January, February and March 1994 Best Buy awards for our 486DX2-66! *PC World* reported the system tested was

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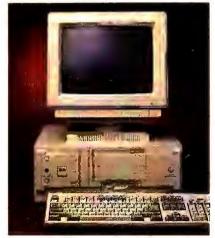
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486DX2-66 Lease \$58/month	\$1595
486DX4-75 Lease \$65/month	\$1795
486DX4-100 Lease \$72/month	\$1995

- **Intel Verified:** for the Pentium[™] OverDrive[™] Processor
- 2MB high-speed RAM
- 107MB local bus hard drive w/32K cache
- 3.5" 1.44MB floppy drive
- Diamond SpeedStar Pro Windows-accelerated local bus video with 1MB RAM
- 14" 1024 NI SVGA color monitor, .28mm dot pitch
- On-board SCSI socket
- Two VESA local bus, five 16-bit and one 8-bit expansion slots
- Six-bay desktop w/2 cooling fans
- 101-key space-saving keyboard
- EPA Energy Star compliant
- MS-DOS 6.2

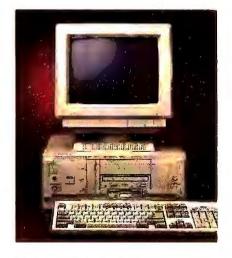


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Lease \$59/month	
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486DX2-50 Lease \$61/month	\$1695
486DX2-66	\$1795
Lease \$65/month 486DX4-75	\$1995
Lease \$72/month 486DX 4-100	\$2195
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4865X-25\$1395

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- Two VESA local bus, five 16-bit and one 8-bit expansion slots
- Six-bay desktop w/2 cooling fans
- 101-key space-saving keyboard
- **EPA Energy Star compliant**
- MS-DOS 6.2, Windows for Workgroups 3.11, Microsoft Mouse



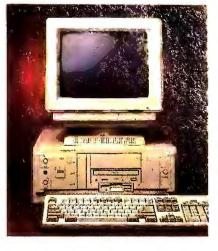
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- 101-key space-saving keyboard
- EPA Energy Star compliant
- MS-DOS 6.2, Windows for Workgroups 3.11, Microsoft Mouse
- Choice of Lotus Application



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486DX2-66 Lease \$94/month	\$2595
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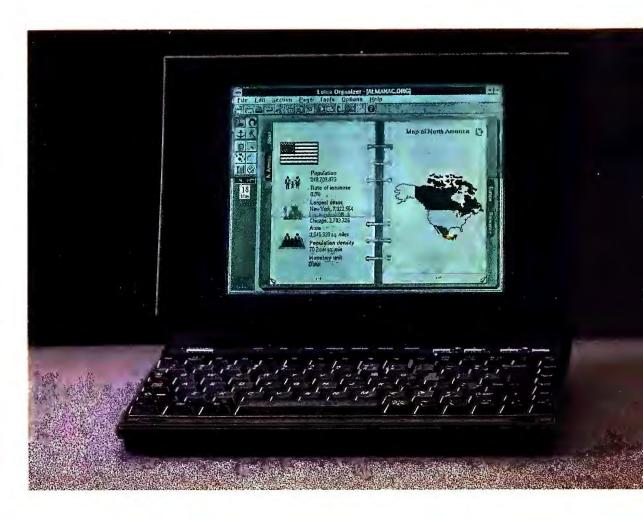
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- Custom nylon carrying case
- MS-DOS 6.2
- Microsoft Windows for Workgroups 3.11

PACKAGE 3

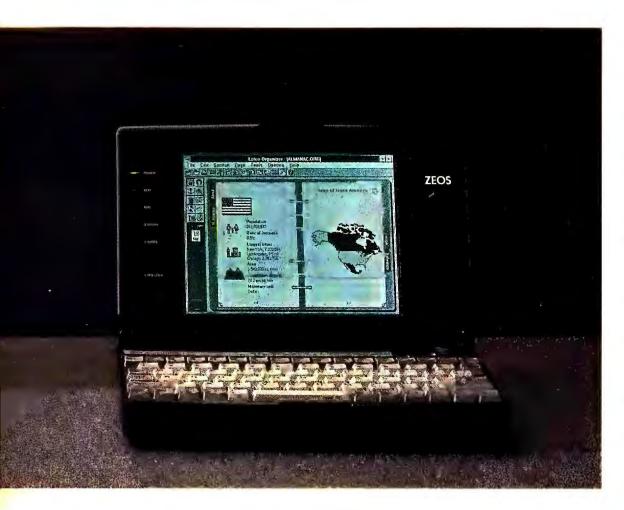
386SL-25: \$1995

486SL-25: \$2195

486SL-33: \$2395 Lease \$87/month

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- MS-DOS 6.2
- Microsoft Windows for Workgroups 3.11

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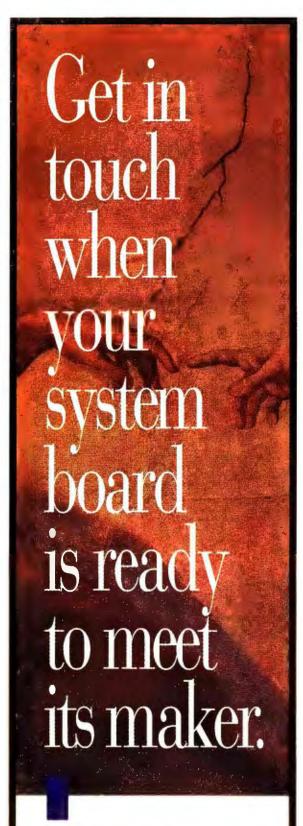
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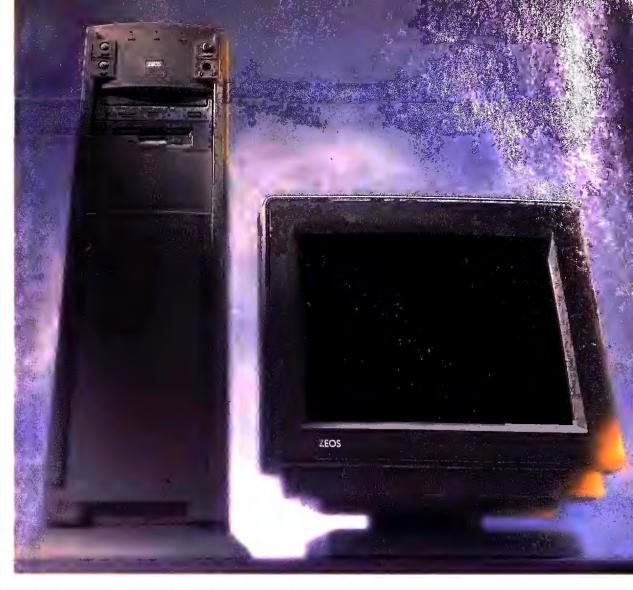
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The Selling of the Superhighway

ccording to *PC World* investigations, massive lobbying efforts now under way will profoundly affect the future of the information superhighway. As proposed legislation comes before the House and Senate, legislators are deciding on two key issues: who controls access to the global network, and who controls content.

More than 30 bills are now circulating through Congress in the most comprehensive revision of communications policy since the Communications Act of 1934. As Senior News Editor Joe Abernathy reports in the story on page 56, excessive spending by the corporate giants who stand to benefit most is speeding the progress of these bills through the legislature. At stake: how you'll access the superhighway, how much you'll pay, and what you'll be able to do once you get there.

The Cost of Doing Business

So much money is flowing into Congress, Abernathy reports, that it may be distorting the political process. The pressure is brought to bear by local phone companies, cable TV providers, long-distance phone companies, and communications equipment manufacturers. All want to own the wires, services, and programming expected eventually to produce huge revenues.

On the surface, it may appear that huge communications and media companies crossing into markets from which they've been barred will surely benefit consumers. The result, backers argue, will be more choices and lower price's.

But, Abernathy reports, the prospect of cable and phone companies' extending their control to the superhighway also has many people concerned. Critics charge that this expansion will stifle competition and limit public sector activities that were part of the administration's original vision for the National Information Infrastructure (NII).

In the face of pending legislation, small businesses are fighting to establish an equitable climate in which they can compete. "While everyone with an original idea today can easily develop and market that intellectual capital using technologies such as the Internet," Abernathy says, "users of tomorrow's Internet may have to pay a heavy tariff to one of a handful of communications titans -if indeed they even are allowed access."

On another front, public interest groups are pushing to create and protect a vital civic sector on the superhighway: widespread access to all levels of government, affordable access for nonprofit organizations, free access for schools.

Those who've had unrestricted access to the Internet find all of these events disturbing. "There's the potential for abuse, unless legislators guard against anticompetitive actions," reports Abernathy, who began work on this story late last year. His passionate interest in the Internet dates back further-to more than five years ago, when he and a friend ran a bulletin board system with links to the Net. A special-projects reporter for the Houston Chronicle at the time, Abernathy followed the emergence of the Net from academia and was the first reporter to establish a cyberspace beat. He watched the Internet community develop a social conscience and gain political clout and credibility with the business world.

What You Can Do

It would be naive to think that money doesn't affect the political process and that big corporations don't grease the wheels of congressional machinery. But



jamming laws through with minimal debate can only be to the detriment of smaller competitors and the public sector.

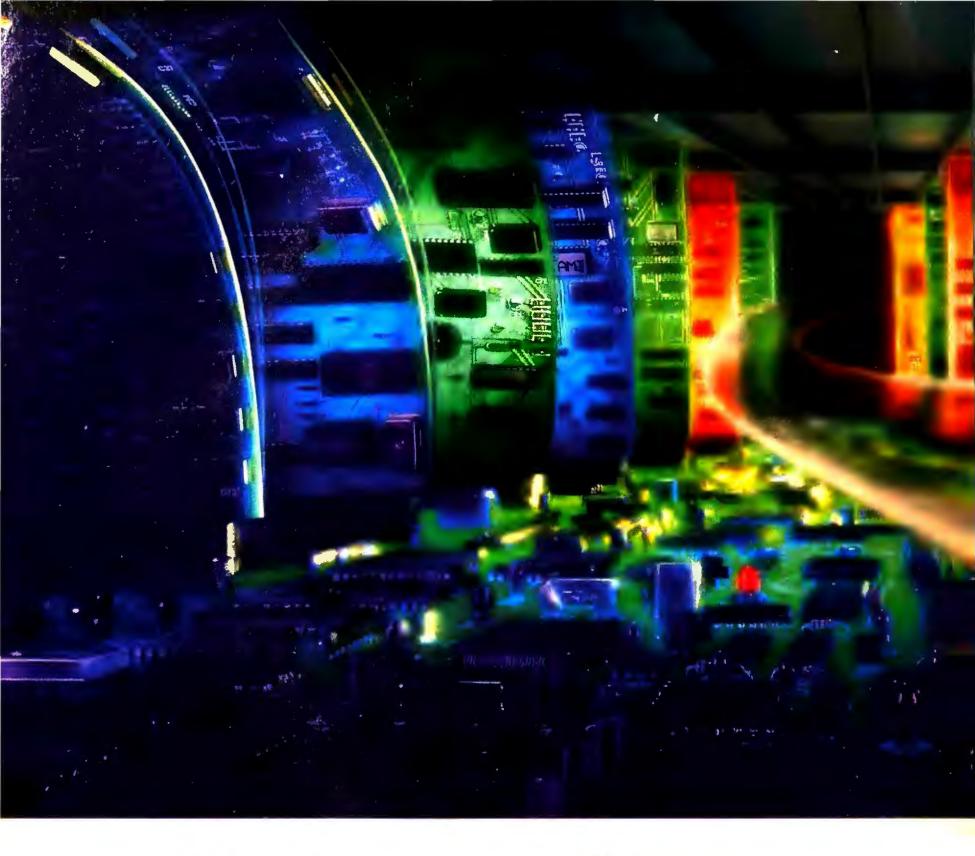
Unless the public gets involved, the policies that

emerge may benefit the few. Business and civic interests must realize that today's policy discussions are tomorrow's regulations. And all regulations have winners and losers. Now is the time to voice your opinions so that public interest—the overriding concern of the NII—takes its place among the winners. Every expert with whom Abernathy spoke made it clear that a vocal electorate exerts enormous influence, even against extraordinary pressure brought by corporate giants.

Write to your representatives and senators today. Follow up with phone calls and letters. Demand equal access for all businesses and a robust civic sector, with guaranteed access for all nonprofit activities and organizations.

Cathryn Baskin, Editor

Joe Abernathy, PC World senior news editor



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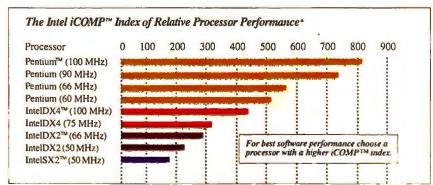
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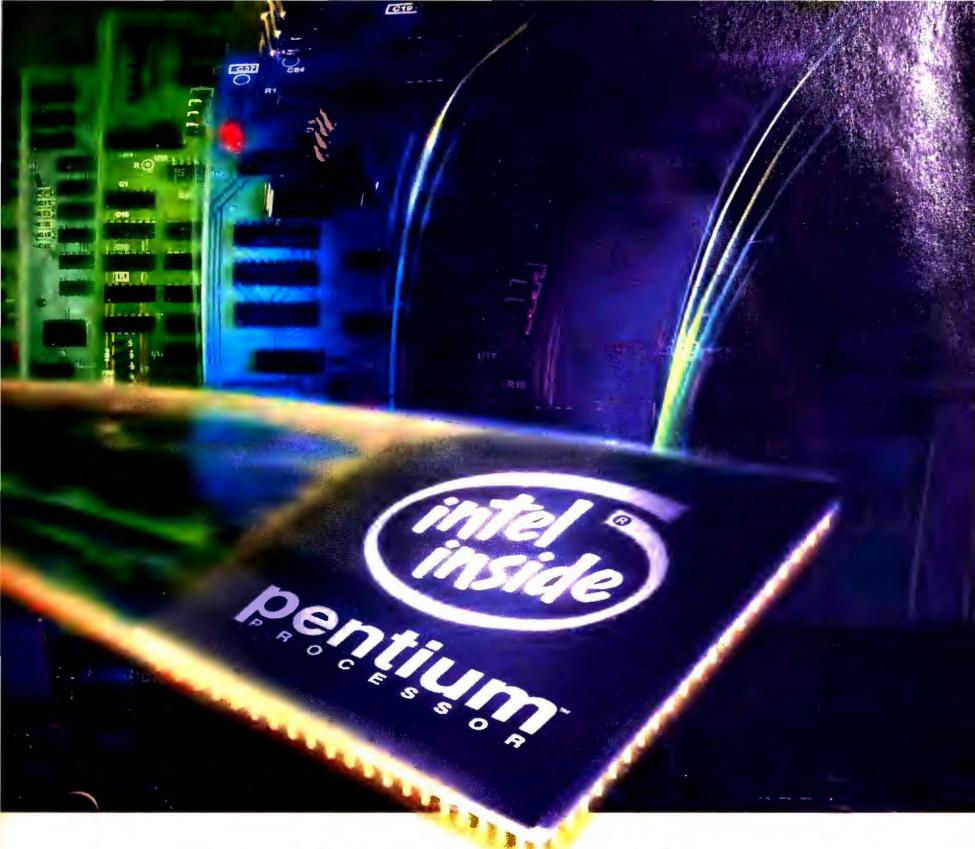
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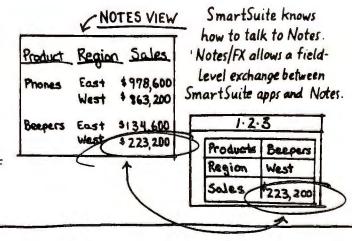
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Brouhaha Over Bugs, Trash the TV, Shareware via Internet

Useful Upgrades Only, Please

Thanks for the overdue article "Are You Being Used to Test Software?" [Top of the News, February]. I'd prefer to have software publishers and vendors extend the upgrade release cycles. Users would benefit by receiving more thoroughly tested software and by not having to shell out money every 12 to 18 months for an upgrade.

Daniel C. Long, San Francisco

Bug Blamefest

Agree with the basic premises of "Are You Being Used to Test Software?" but it placed the blame too heavily on software developers.

This dinosaur—with 32 years of programming, systems analysis, and consulting experience—believes that unsophisticated users often expect too much from a software package. If it doesn't work error-free at all times, they consider it unacceptable.

Two rules govern software development: 1) There's always another bug, and 2) You never know how well a package will work, even if it's been thoroughly tested and debugged, until you've released it for uncontrolled use.

Users should be required—on pain of withdrawal of support—to read the manual and take any included tutorial. Finally, they should use help files before calling for assistance. The fault in "buggy" software is often as much the responsibility of the user as of the software producer.

Paul J. Mulcahy, Clover, South Carolina

Fair Shot for OS/2

consider "OS/2 Without Windows" an unfair write-up [New Products, March]. Randy Ross states that OS/2 for Windows "provides Windows with true multitasking, faster performance on some tasks, and better crash resistance." He then says that one needs 20MB to 40MB of RAM to take advantage of these features. Come on! I run OS/2

every day in 8MB of RAM in a gauntlet of operations that would bring Windows to its knees.

Ross also found "basic navigation to be a pain," partly because the mouse conventions are a little different. In

what way? Left button selects (as in Windows) and right button brings up a menu (as in X-Windows). The average user won't have to change settings in DOS and Win-OS/2 sessions, but if users want to tweak the system, they can. What's so technical about the manual? It walks users through installation and the

basics of the system. And finally, what version of Windows includes an uninstall feature?

OS/2 is not perfect, but it is so far ahead of Windows in features and power, it needs to be given a fair shot. *Ben David, Internet*

Author's response: Due to a miscommunication with IBM during fact-checking, the article confused OS/2 for Windows' 20MB to 40MB disk requirements with its 8MB to 12MB RAM requirements. Nonetheless, OS/2's RAM needs are high. Though OS/2 can run in 8MB RAM, my 8MB system encountered problems such as crashes and slow performance when multitasking Windows applications in separate Windows-OS/2 sessions. In fact, IBM even recommended increasing RAM to as much as 16MB.

To woo the average Windows 3.1 user, as IBM claimed it wanted to, OS/2 for Windows needed to offer benefits without being tricky to install and use. BIOS incompatibilities prevent the product from running on some PCs that run Windows just fine. OS/2's on-screen

navigation differs enough from Windows' to be awkward. Even mouse conventions differ: To move an object in OS/2, you use the right mouse button; in Windows 3.1 you use the left.

Finally, to make a product this com-



plex accessible to the average Windows user, the manual should have been created with those users in mind. (IBM included essentially the same documentation offered in OS/2 2.1.) I still believe that this powerful operating system is best suited for technically advanced users. —Randy Ross

Holodeck Now

he article "PC Meets TV" [February] heightened my conviction that corporations don't have much drive to move beyond cathode-ray-tube technology. Intel's Avram Miller says, "The top of the TV set is the second-most-important piece of real estate, after the top of the desk." To me, this implies acceptance of the TV as we know it, without questioning whether we should even be using this archaic tool. The top of the TV should not exist: What should exist is a flat panel hanging on my living-room wall. Scratch that. What should exist is a living-room wall that can display electronic images, for both work and entertainment.

Daniel L. Williams, Portland, Oregon



Don't Hide the Shareware

The sidebar "Shareware Connection" in "New, Improved Windows" [December] lists the BBSes and online services where the shareware mentioned in the article can be found. However, it does not include any Internet sites. Since I work at a university and have free access to the Internet world (along with 10 million-plus other users), I'm not about to pay to find my shareware.

Maybe PC World could set up an Internet

site where one could obtain shareware mentioned in the magazine. Or why not arrange with one of the larger, anonymous file-transfer-protocol sites to have a directory devoted to PC World with shareware and other useful stuff? Finally, you could simply list an archive site where the files exist.

The latter approach is the one I've had to resort to. By Telnet-ing to the Archie software database, I was able to search for the location of files I wanted. Some were at

popular sites, while others were at obscure foreign locations. Listing the sites or having a PC World forum would certainly please a large and expanding audience.

By the way, I did enjoy the article-Windows is what makes using my work PC tolerable until I get home to my beloved Mac. Michael R. Waisley, Internet

Keep Me Interested

Vour February issue was great, especially the focus on budget systems and power systems. PC World continues to developit's nice to see articles that more of us can relate to. One suggestion: Do something on effective upgrades for 386s. My machine is only two years old and is fine for what I need to do-I don't plan to buy a new one for at least a couple of years. So keep me interested with articles that fit my needs. Dave Greenspoon, PC World Online

CardTalk Talks Back

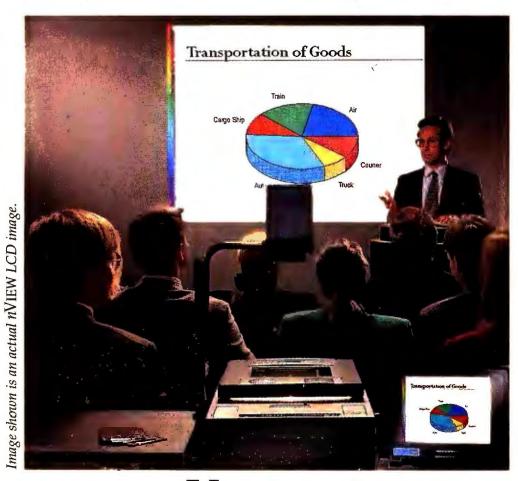
n "A House of Cards? Taking the Guesswork Out of PCMCIA" [Special Report: Mobile Computing, February], Gene Smarte made some errors regarding the Databook CardTalk PCMCIA software. Had a more recent version of the software been used, or the correct operating procedures followed, CardTalk would have tied for the lead in compatibility in every category. Indeed, the article's tests did not reflect fairly on any of the software suppliers.

Most of the cards that "failed" on the CardTalk-equipped platforms are used successfully by Databook's widespread Notebook OEM customer base. The mistaken identification of the cards as failures stemmed from a lack of familiarity with this technology and an apparent lack of contact with the card or platform vendors' tech support staff, who could have explained how to make most of the cards operate correctly.

Due to the fast growth in PCMCIA technology, users must use recent versions of host and card driver software. The "failed" Flash and SCSI cards, for example, are supported in later releases of CardTalk. Use of the proper enabler software for the test systems, which was provided with the LAN cards, would have allowed some cards to pass all your test criteria.

Card, platform, and software vendors have put a great deal of effort into meeting users' expectations for ease of use and relia-

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Circle 176 on reader service card



Remember when color TVs suddenly became affordable? Can you say déjà vu?

nless you still watch a black and white TV and listen to 8-track tapes, price is probably the only thing stopping you from getting a color notebook. In which case, we'd like to introduce you to the Bravo NB. Not just because it's affordable, but also because it has features you normally don't find on notebooks costing hundreds more. Like the most advanced Dual Scan STN technology, which gives you 256 bright, clear colors on a full-size 9.5" screen. To make sure you won't have to wait to see those colors, it has a powerful Intel 33MHz 486SX microprocessor, local bus video and 512KB video memory. It also has 4MB RAM that can be expanded to 20MB and a 200MB hard drive. There's even a Type III PCMCIA expansion slot so you can send or access information from anywhere, as well as enough other features to fill that column to your right. And since our resellers perform as well as our computers, you can get one right away by calling 800-876-4AST.



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bility. If a few basic software configuration issues are addressed, and technical support consulted if necessary, almost all PC Cards intended to work in a given notebook can be made to operate very quickly.

Daniel Sternglass, chair of Databook and member of PGMCIA board of directors

Editor's response: When we encountered problems making an adapter work in our tests, we contacted the adapter, host, and software providers and went to the lengths

that any user would—in some cases more—to resolve the difficulties. Many problems we discovered could be remedied only by software driver revisions, some of which have shipped since we wrote the article.

Our advice remains the same: Use PCM-CIA adapters approved by your notebook's manufacturer; or, better yet, don't buy a new system and cards until your dealer can demonstrate that they really work together.

—Greg Smith, PC World Test Center director

Stressful Uncompress

Brett Glass's article "Is Compression Worth It?" [January] was worthwhile. I had a serious problem with DoubleSpace after I upgraded to DOS 6.2 and decided to uncompress my drive. When the process started, I received a warning that it could take hours. After a while, uncompression was only 5 or 6 percent done. DoubleSpace gave me the option to skip the defrag, so I took it. Later, when it was again defragging, I once more opted to skip the defrag.

After the process returned to uncompression, an error message said uncompress could not be completed and I'd have to run SCANDISK. It dumped me back to DOS, and I tried to run SCANDISK but could not. My DOS, Windows, and other directories had been deleted. System files in the root directory had been removed.

I gave up, reformatted my drive, and reinstalled all my software. A word of caution to DOS 6.2 users: If you choose to uncompress a drive, don't interrupt it—let it finish! Jerry Kelley, PC World Online

Corrections and Clarifications

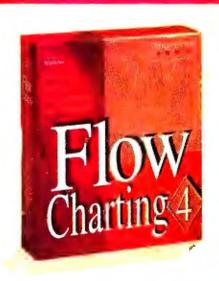
February's *Tip of the Month* requires extra steps to ensure that the macro takes a full-size screen shot. Before launching Recorder, load Paintbrush, select *Options • Image Attributes*, and reset the image size to accommodate your screen shot. After starting to record the macro and pressing **<Ctrl>-O**. After pressing **<Ctrl>-V** to paste the screen shot in Paintbrush, press **<Insert><Ctrl>-N**.

A couple of footnotes were omitted from April's Top 20 Power Desktops and Top 20 Budget Desktops tables in "Top 20 PCs: In the Office, On the Road." The missing information is, the VTech Platinum SMP has two 486DX2-66 chips, and Axik Computer's phone number in California is 408/735-1234. The review also listed an incorrect 800 number for Austin Computer Systems. The correct number is 800/443-7914.

March's *Break Time* gave an incorrect phone number for Oxford University Press, maker of Oxford English Dictionary 2nd Edition on CD-ROM. The correct number is 800/334-4249.

PC World regrets the errors.

PC World welcomes your responses and ideas (see page 12 for contact information).

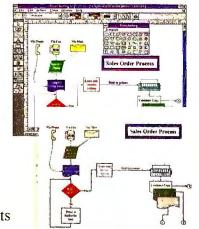


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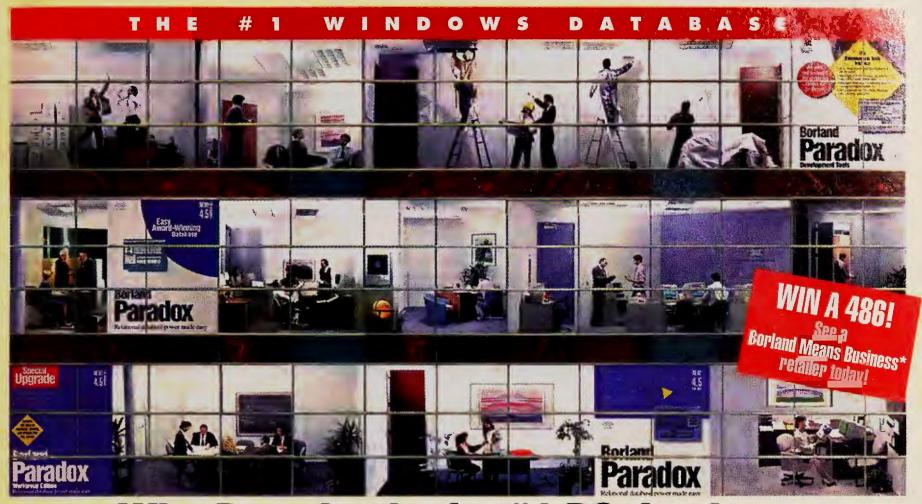
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Circle 233 on reader service card



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High-Tech Help for Missing Children



On October 1, 1993, 12-year-old Polly Klaas was kidnapped from her Petaluma, California, home. The abduction spurred the local community to action: A

storefront was converted into headquarters for the search effort, and a local print shop made and distributed fliers with Polly's photo and a sketch of her abductor. But this search had a high-tech twist: These images weren't just tacked up on telephone poles and copied onto milk cartons; electronic versions were posted online for Compu-Serve's 2 million subscribers to see.

Getting the Word Out

Today you can log on to any major online service and find pictures and information about hundreds of abducted children. CompuServe, America Online, and Prodigy all have "missing children" forums. One Internet provider, Electronic Marketing Services, is also participating in the effort, with other providers expected to follow. It's just one way the high-tech community is locating missing children.

The online effort to find Polly Klaas was instigated by Los Angeles Times computer columnist Larry Magid, a San Francisco Bay Area resident who heard about the abduction over his car radio. He thought about driving to Petaluma, but soon decided that he could help more by using high-tech tools to get the word out. Using Farallon Computing's Replica software, he "published" an electronic version of a Polly Klaas poster and posted it on Farallon's Compu-Serve forum; others involved in the search sent the file to copy shops and volunteer groups around the country.

Unfortunately, even these measures

By Roberta Furger

weren't enough to help Polly, whose body was found several weeks after her abduction. But in the hope of helping to locate the thousands of other missing children, Magid and others initiated a more systematic approach to getting information online. Magid contacted the National Center for Missing and Exploited Children (NCMEC) in Arlington, Virginia. The center spearheads national efforts to locate missing and abducted children and raises awareness of ways to prevent child abuse.

CompuServe's public forum went online last December. In many cases, its images not only show the child at the age when he or she was abducted, but also include a computerized "aging" of the child, who may have been missing for years. "You don't want people looking for a 2-year-old if the child is now 5," says Bob Thomas, NCMEC's director of information systems.

The center uses sketches from police artists (based on photos of siblings and parents) and PhotoSketch, Infotec's image editing software, to simulate the aging process visually. The resulting images have turned out to be remarkable likenesses of the children, according to Thomas.

Besides the databases on missing chil-

dren, the online forums include a wealth of information for parents, teachers, child care professionals, and law enforcement agencies: Eight of the NCMEC handbooks are available online and contain everything from child safety tips to advice on how to cope with child abductions. Perhaps as important, the forums also provide areas where people can share experiences, offer advice, and help others suffering in similar circumstances.

The potential for these online services is tremendous: In one E-mail message, for example, a social worker with Heathrow Travel-Care at London's Heathrow Airport offered to "keep an eye out" for any missing children who might pass through that airport. Likewise, police officers regularly log on to the forums to share information with the parents or family members of missing or abducted children.

Tracking Calls

The online efforts are just one example of the critical role PC technology plays in locating missing children, says Thomas. NCMEC's hot line logs some 600 calls a day, including reports of new abductions and leads on existing cases. Tracking all those calls—a huge task—

Lots of news on the ergonomics front... In what's believed to be the first lawsuit related to repetitive-strain injuries (RSI) that has come to trial, Compaq Computer Corporation of Houston won a case in which a legal secretary said her wrist ailments were caused by her PC use and argued that Compaq should

have known its products would cause injury. Experts disagree as to whether this initial verdict is the harbinger of others to follow....California's Occupational Safety and

KEEPING UP



Health Administration officials heard from hundreds of workers, suffering from a host of work-related RSIs, during a series of hearings in late February. It is now reviewing proposed ergonomic standards that, if approved, would require employers to train and educate employees about work-related RSIs. If the

guidelines are adopted, California will be the first state to formalize ergonomic guidelines. The Clinton administration is considering similar changes on a national level.



BUG WATCH

Word 6.0 for Windows

Microsoft Corporation has announced the availability of a Word 6.0 for Windows maintenance release. It corrects

a number of problems, including disk errors that occur when you are moving and saving embedded objects, 'not available' messages that appear for Adobe Type 1 fonts that are in fact available, the lack of kerning support for these fonts, and several general-protection fault errors. The release also replaces the Word for Windows EquationEditor 2.0 with version 2.0a.

The 6.0a upgrade is available from the Microsoft Download Service (206/936-6735), CompuServe (GO MICROSOFT), and other online services. Users can also order the patch free of charge from Microsoft sales (800/426-9400).

According to a company spokesperson, Microsoft will include Word 6.0a for Win-

dows in Microsoft Office 4.2 for Windows, the company's suite of business applications.

Novell NetWare 3.12 and 4.x

Users of NetWare 3.12 and 4.x are reporting problems with Novell's CD ROM NetWare Loadable Module (NLM). Problems reported in Novell's NetWire forums for these NetWare versions include slow or impossible mounts and spontaneous dismounts.

While cautioning that a number of factors, such as bad drivers, could cause such problems, Novell said an update to the CD ROM NLM, undergoing field tests, would be posted in the NetWire forums when ready. No specific dates were available at press time.

-Shane Rau

Have you run into a software bug or hardware incompatibility? Call us at 415/978-3253 with the details. We'll investigate problems and report on those with the broadest interest.

Shane Rau is a PC World assistant technical editor.

has become much more efficient in recent years. Thomas cites a dramatic improvement in the time required to follow up on reports and to distribute information to law enforcement officials and state clearinghouses that rely on the center.

"The first 48 hours after an abduction are critical," says Ben Ermini, director of case management for the center. A few years ago the center had to shut down its entire computer system twice a day to print out new case reports. "It took three to five days just to get the relevant information out to all the law enforcement agencies," says Ermini. "Now it's a matter of minutes." The reason? A new online database tracks every lead on every case the center has on file.

Multimedia tools are also integral to the center's efforts. Last November the center installed a multimedia kiosk in the main terminal at the Washington, DC, National Airport. The self-running presentation includes posters of missing children, along with information on how and when they were abducted. Center staff members operate the system remotely from Arlington, Virginia, and insert new pictures as cases are

reported. "Our goal is to have kiosks in major airports and shopping centers," says Thomas. IBM donated the first unit, and Thomas is hoping to interest other corporate sponsors.

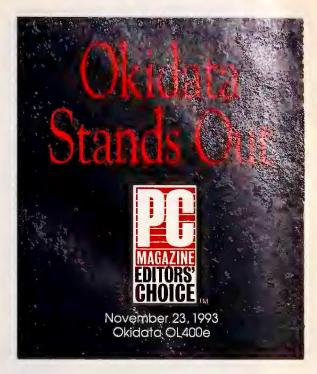
Thomas says there's no question the high-tech efforts are paying off, noting that the recovery rate has increased 20 percent over the last four years.

The key to all the center's efforts is getting the word out fast—and often, says Thomas: "Every time the picture of a missing child goes before the public, we get leads; every time we get leads, kids get recovered. It's that simple. Whether it's a TV show, CompuServe, or an airport kiosk, someone sees a picture of a kid, and kids get found."

Shop Talk

Truth in Advertising

A Tektronix ad that ran in the December 1993 issue of *PC World* states that for the list price of \$3695, you get a color Phaser 200 printer that is networkable and has separate paper and transparency trays. In fact,



If you don't believe Okidata 400e-Series printers can make you stand out, read some of the reviews we've been getting.

OL400e "...if you want laser quality, you won't find a better bargain." "During testing, it beat many of the more expensive models with 4-ppm engines."

—PC Magazine, 11/23/93

"...OL400e is breaking new ground..."

—U.S. News & World Report, 9/13/93

"...Small, Fast, and Inexpensive. Offers better performance and one of the lowest prices around. OL400e printed a sample newsletter in about a third less time (than the LaserJet® 4L)."

-PC World, 11/93

"...Laser output at unlaserlike price."

"Okidata's OL400e...may remove the last obstacle for true laser quality to permeate the budget-mindful small business."

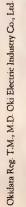
-Byte, 9/93

OL400e "...the bargain of the year."

—PC Week, 12/20/93

OL410e "The affordable choice for users requiring 600 dpi resolution."

—HFD, 11/15/93



CONSUMER WATCH

the only Tektronix printer that lists for \$3695 is not networkable, and a dual-input tray costs an additional \$495. Moreover, the printer pictured in the ad lists for \$5995. Finally, Tektronix doesn't make a 200 printer. It makes a 200e and a 200i—two completely different printers.

Chris Cowen, Minneapolis

Editor's note: We contacted Tektronix about the ad in question. Jim Engiles, marketing communications manager for Tek-

tronix and the ad's designer, responded, "Taking another look at the ad, I must say that I see [Cowen's] point. My concern in creating the ad was to address the features of the product family as a whole, while at the same time emphasizing the low price of the base model. In retrospect, I think emphasizing that our Phaser 200 line *started* at \$3695 would have forestalled any confusion." Tektronix has changed the ad for its new line of printers.

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Into the Night

bought a Flexnote 386SXL laptop computer from USA Flex in July 1992. When I decided to upgrade the memory, I contacted USA Flex, which told me to contact the laptop manufacturer, Vinsotech. When I couldn't get any response from Vinsotech, I called USA Flex again, and the rep informed me that Vinsotech had gone out of business. I paid over \$2000 for this computer, which carries the USA Flex name, not Vinsotech. I feel that USA Flex has a responsibility to find a solution.

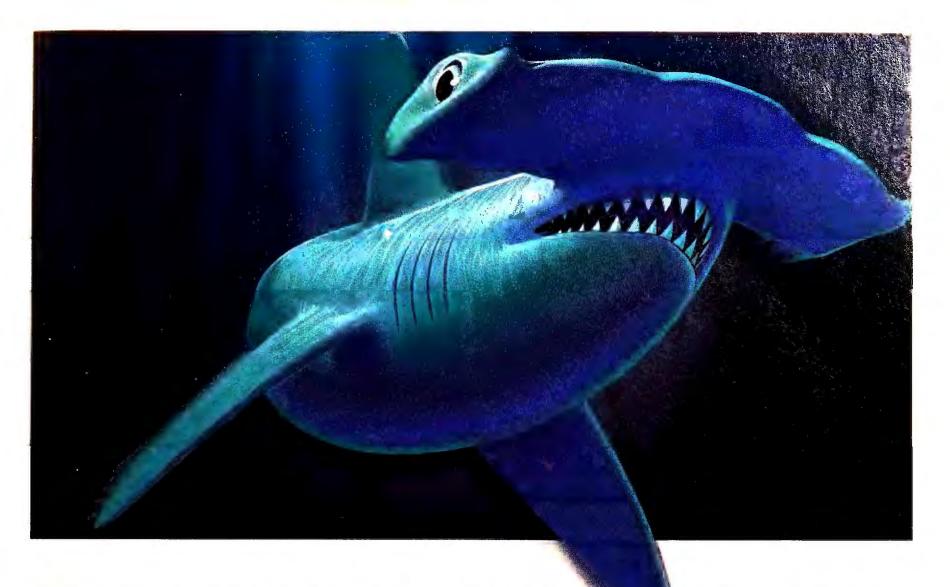
Aley El-Din El-Shazly, Dallas

Editor's note: We contacted USA Flex about El-Shazly's complaint and discovered that Vinsotech had closed its doors without warning last September. Vinsotech's owners took with them not only their own inventory but all the computers USA Flex had sent for repair. Since that time, according to a USA Flex spokesperson, the company has made every effort to resolve not only El-Shazly's problem but those of other customers who bought Vinsotech laptops. USA Flex has been scrambling to find parts and keep its customers happy, going so far as to disassemble all remaining FlexNotes so their parts could be used in repairs.

Is this an isolated incident? Maybe not. Many notebooks sold today are manufactured by third parties. But according to Mark Van Scoter, product marketing manager for USA Flex, things are better than they were. "Two to three years ago, laptops were in such high demand that companies bought them from anyone who could make them. Most name-brand companies now either build them themselves or hire very reputable companies to build them. And most laptops are PCMCIA compatible now, so upgrading is less of a problem." USA Flex now sells laptops from Toshiba, Texas Instruments, IBM, Compaq, and other leading manufacturers.

But with notebooks, proprietary parts are still the norm. Most notebooks—no matter who makes them—have unique parts that could be hard to get in just a couple years.

What can you do to protect yourself? Van Scoter suggests buying from a company with a solid reputation for service. That way even if the company runs into supplier problems, it will do whatever is necessary to make sure customers are satisfied. If you are buying a new notebook, ask if the compa-



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CONSUMER WATCH

ny you're buying from builds it. If not, check to make sure it's made by a company with an established reputation. And you might think about buying a couple of spare parts to squirrel away for future use: a power supply and an extra battery, for example.

On-Site Service Disappointment

When I saw your "486 Face-Off: Local Heroes or Little-Town Blues?" [November 1993], I was surprised to read that

Blackship's service and support policies are decent. Compared to whose?

I bought a computer from Blackship Computer Systems in March 1993. Since I had a shiny new toy, I decided to push the envelope a bit and install a better fax-modem and cross-platform (Mac-to-PC) network hardware and software. IRQ problems abounded. Knowing that I had a year of "free on-site service," I called Blackship technical support.

Blackship contracts with GE Onsite Service to handle its repairs, but GE will dispatch a repair tech only if a Blackship tech gives the okay. If you have a problem with your computer, you call Blackship technical support. If its tech can diagnose the problem over the phone, you qualify for a visit by the GE on-site technician.

If I can describe the problem well enough for someone on the other side of the country to figure out, I can understand it well enough to solve it.

Beth A. Rose, Elmhurst, Illinois

Editor's note: Rose has discovered one of the dirty secrets in computer shopping. Onsite service sounds like a great deal—just like calling a plumber when your sink is clogged. You pick up the phone and a trained repair person comes to your business or home and fixes your machine. But in the real world, on-site service—whether from Blackship or almost any PC company—falls short of the ideal.

Here's how it really works: You call your PC company's technical support department. A technician diagnoses the problem over the phone and, if it turns out to be a faulty component, dispatches an on-site repair person with the part. On-site technicians only do as they are told by the computer manufacturer—they change parts. They don't diagnose problems and don't come with a truckful of spares. On-site service may be better than doing it yourself, but it's not like calling the plumber.

Blackship general manager Rajeev Kumar says on-site service is marketing hype: "We have to offer it because our competition does. But we do all the troubleshooting."

Before paying for on-site service, find out how it really works. Does it mean—if you bought your computer at a store—that you can't carry it in for service? And what does it cost? Maybe—like Rose—you feel confident enough to change the parts yourself once tech support has diagnosed the problem. If that's the case, maybe you can do without—and pay a little less for your PC.

Shop Talk is written and researched by PC World assistant editor Christina Wood. Think you've gotten a raw deal—or a great one? Consumer Watch wants to hear the details. We'll investigate complaints and publish letters with the broadest interest. See page 12 for contact information.

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March 1994

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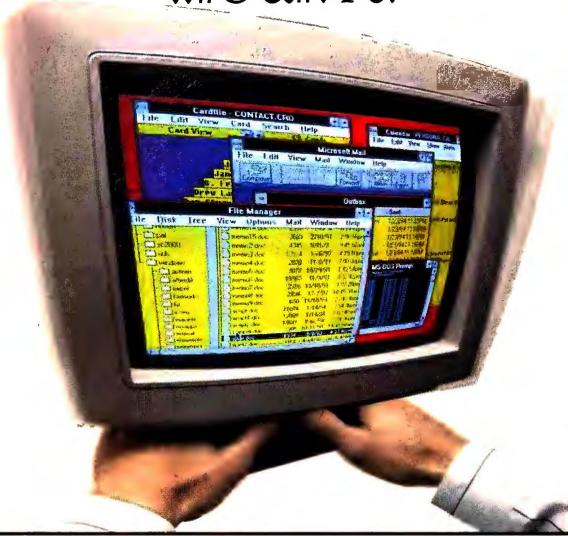






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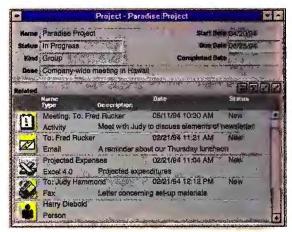
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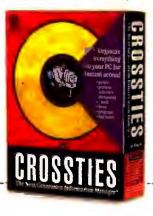
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Online Commuting: Big Benefits for Business and Employees

n the aftermath of the Los Angeles earthquake, many companies are taking a serious look at telecommuting and other options that help employees avoid the traffic problems caused by the ubiquitous 9-to-5 workday. Luckily, PCs have given workers a high degree of independence, allowing them to work at alternative locations and unusual times of day.

Even in cities that have not been hit by natural disasters, employers are finding that offering flex time and telecommuting options helps them retain employees whose outside obligations may make a 9-to-5 day at the office difficult. But creating a successful companywide flex policy isn't easy. At Harris Bank, Chicago's fourth-largest commercial bank, managers and employees worked hard to develop a program that satisfied everyone. This month Kimetha Firpo, the bank vice president who implemented Harris's Alternative Work Arrangements (Work/Life) program, tells us what it took to create a more flexible work environment. —Ed.

Work to Live or Live to Work?

At Harris Bank, many of our 4200 employees are responsible for children, elderly parents, or both. Not long ago the pressure of working full-time and caring for dependents was proving too much for some employees—our most important resource. In the absence of any alternative work policy, employees sometimes felt forced to leave.

Resignations affect our company in several important ways. First there's the bottom-line expense of teaching new employees; it costs nearly \$250,000 to train a commercial lending officer. And there are additional, "below the line" costs: The quality of customer service might decline as a new employee gets up to speed. Other employees would have to pick up the slack, and morale could suffer.

Surveying the Land

In 1991 the bank conducted a Work and Family Needs Assessment survey. anonymous survey consisted of 50 questions ranging from "How much time do you spend during work hours attending to personal/family concerns?" to "If Harris Bank could make one change regarding work and family policies, what could they do to help you?" Overwhelmingly, employees responded that they wanted more flexibility so they could bal-

ance their jobs and their lives.

Given the survey response, we began to look to our computer technology to help give our employees what they wanted. As it happens, 75 percent of our staff already use computers. Many employees already own home PCs and printers, some equipped with fax cards and modems. Others have terminals at home that let them work as if they were at the office. Almost everyone uses one of our E-mail systems. All we needed was a policy that allowed people to take better advantage of the technology.

Drafting the Policy

We knew what we were after: a policy that offered several options to employees, including the ability to work off-site (flex place) and the option to choose their own hours in a 40-hour work week (flex time). We also wanted to offer a compressed work week so employees could work 40 hours in three or four days. We even considered part-time or job-sharing options.

Our biggest challenge was to make the policy amenable to both employees and managers; the latter were pretty



nervous about the whole idea. Managers wondered how they would be able to oversee off-site employees. If one employee were allowed to work at home part-time, would the whole department

want to as well? And would the policy mean more paperwork?

Our draft policy required employees to present a convincing case and to earn the right to work an alternative schedule by producing demonstrable results. Each filled out a form detailing the proposed arrangement, the tasks to be completed, the anticipated benefit, and how success would be measured.

The draft policy also required that the request be feasible for the bank. For example, when an employee must have daily face-to-face contact with other people or needs to work with documents or equipment that can't leave the building, a flex arrangement won't work. Manager and employees were required to meet regularly to evaluate the arrangement; either party could terminate it at any time.

Vice President
Kimetha Firpo handles work/life issues
for Harris Bank.

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The Pilot Program

While we were drafting the formal policy, a few innovative managers set up their own pilot programs that worked well. Because most people in these departments already owned modem-equipped PCs or had terminals installed at home it was a small matter for employees to work off-site. Employees working from home usually installed a second phone line for E-mail. Those who needed fax machines bought them; in some cases, the bank reimbursed employees for equipment. Often, employees who worked at home had fewer distractions and became more productive.

Contrary to early fears, there wasn't a flood of requests; most employees preferred to work in the office to maintain social interaction. We also found that some managers became more effective, as they were forced to track results rather than keep a close eye on staff. On the other hand, some managers found it hard to set up meetings with offsite employees, so they stipulated that people be in the office on certain days.

The Rollout

In August 1993, we rolled the policy out to the entire company. The first step was to introduce the plan to all the bank's managers. We provided comprehensive support material designed to spell out the policy and gave the managers three weeks to discuss the program before we announced it to everyone in the company.

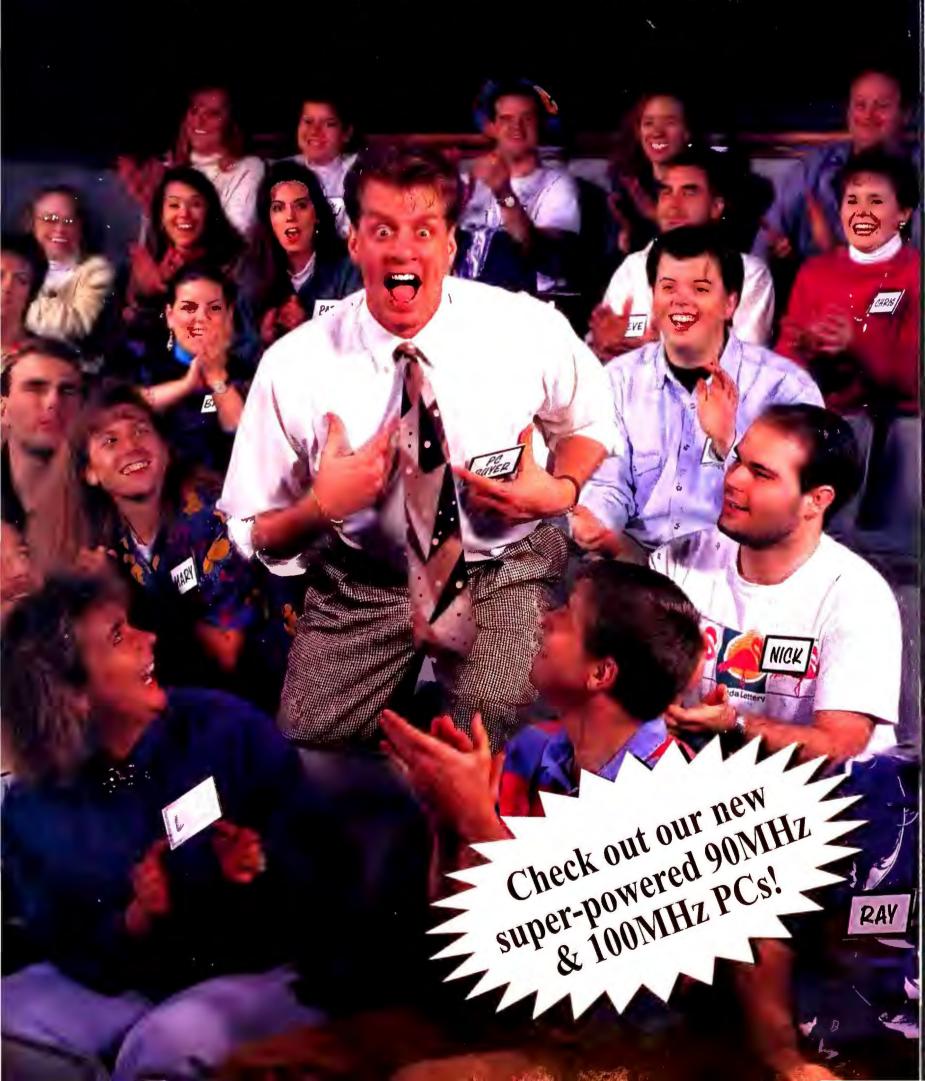
The response was predictable: Employees were thrilled. Just knowing that the policy exists has raised morale. By January 1994, in addition to those in the pilot departments, 81 employees were participating in the program. Four of these workers have chosen to telecommute; 19 chose flex time; 53 went for a compressed work week; and 5 chose to work part-time.

Harris Bank's ability to compete in the marketplace depends on how well we anticipate and adapt to employee needs. Thanks in part to our new Work/Life policy, our employees seem to think we're adapting very well—and they're choosing to stick around.

Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. If you use PCs to manage people and other resources, we want to hear from you (see page 12 for contact information).

PC Buyer C'mon Down!



Get A Fort

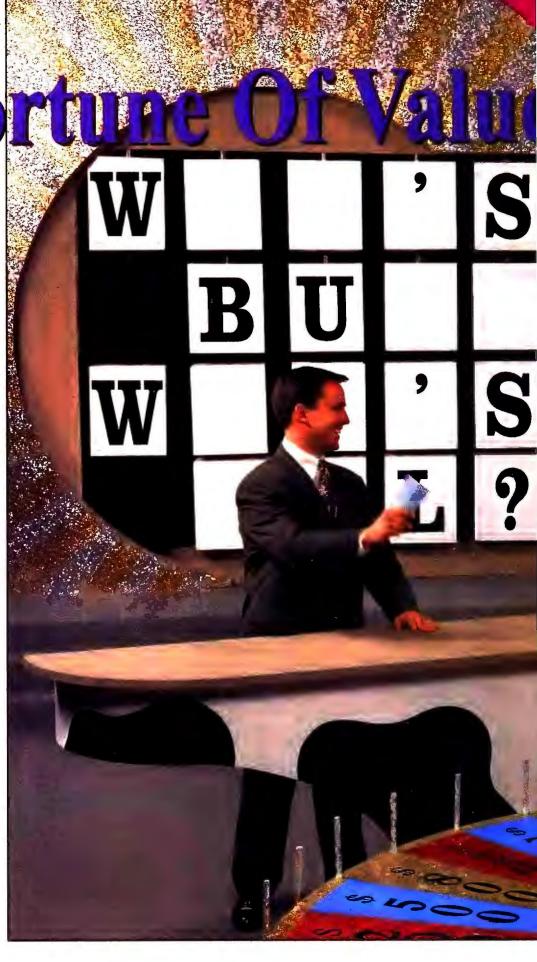
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Introducing the **ColorBook DX4-75** with a faster-than-ever processor! The substantial power boost of the 75MHz processor has made this model the fastest 486 portable available today. And that's not all. For your extreme viewing pleasure, an extra-huge 10.3-inch dual-scan VGA color screen is standard on the DX2-50 and DX4-75 models. You won't find anyone else with a 10.3-inch screen at a better price.

All ColorBook models — 4SX-33, DX2-40, DX2-50 and DX4-75 — have a host of great features. At less than 5.7 pounds and measuring an ultra-thin 1.77 inches, the ColorBook supports simultaneous video; has an easy-to-use, built-in trackball; two PCM CIA Type II slots; great battery life; and a suspend/resume feature so you can stop work anytime and resume later without losing data or restarting the system.

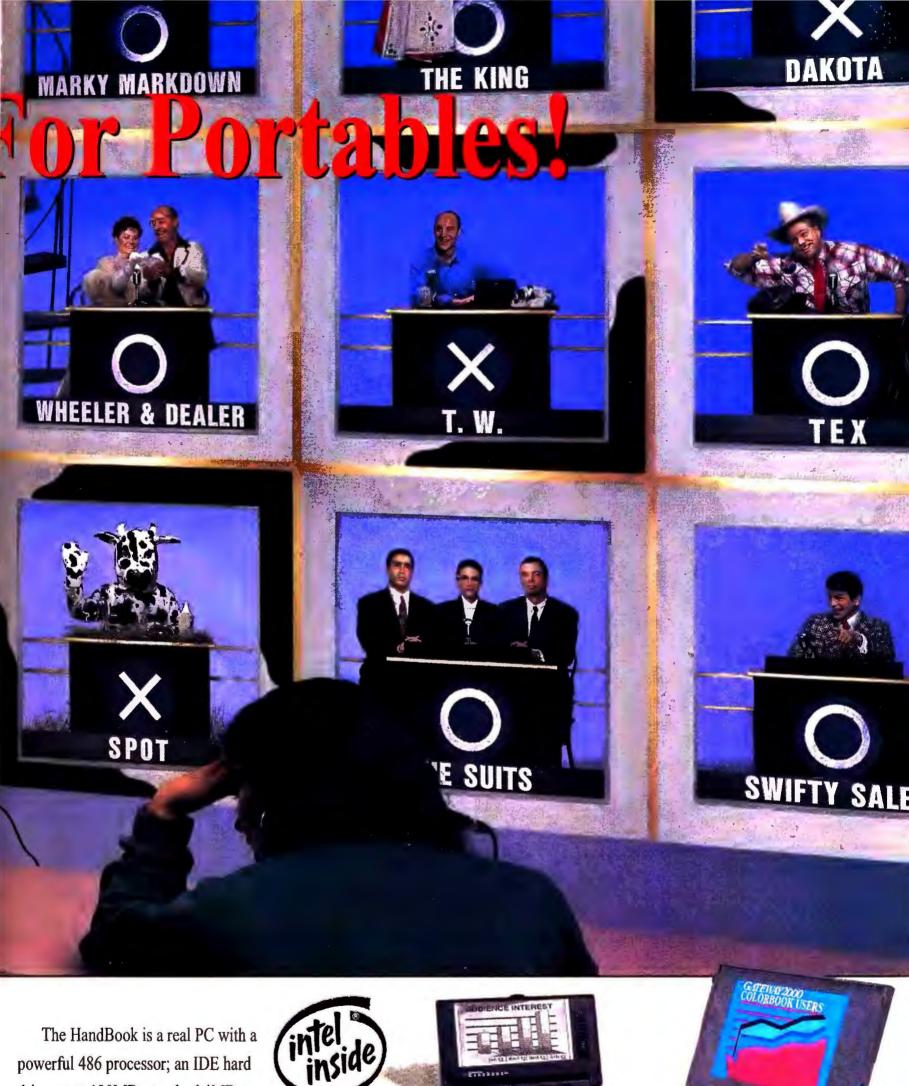
GATEWAY2000 H A N D B O O K® 486

The revolutionary Gateway HandBook 486 is perfect for all your worldly travels. This powerful little performer will forever change the way you use a PC. And you won't have to think twice about taking it with you – no matter where you



go. It's a no-brainer. The HandBook is so small (about the size of a day planner) and so lightweight (it's less than three pounds) that you'll never want to be without it!

Unless you mind all the extra attention; as described by a leading columnist: "I almost got mobbed the other day on the train. I was doing what I usually do on the commute: writing on a notebook computer. The only difference was that I was using a Gateway 2000 HandBook 486 ... I can't wait until everyone has one. Then they'll leave mine alone."



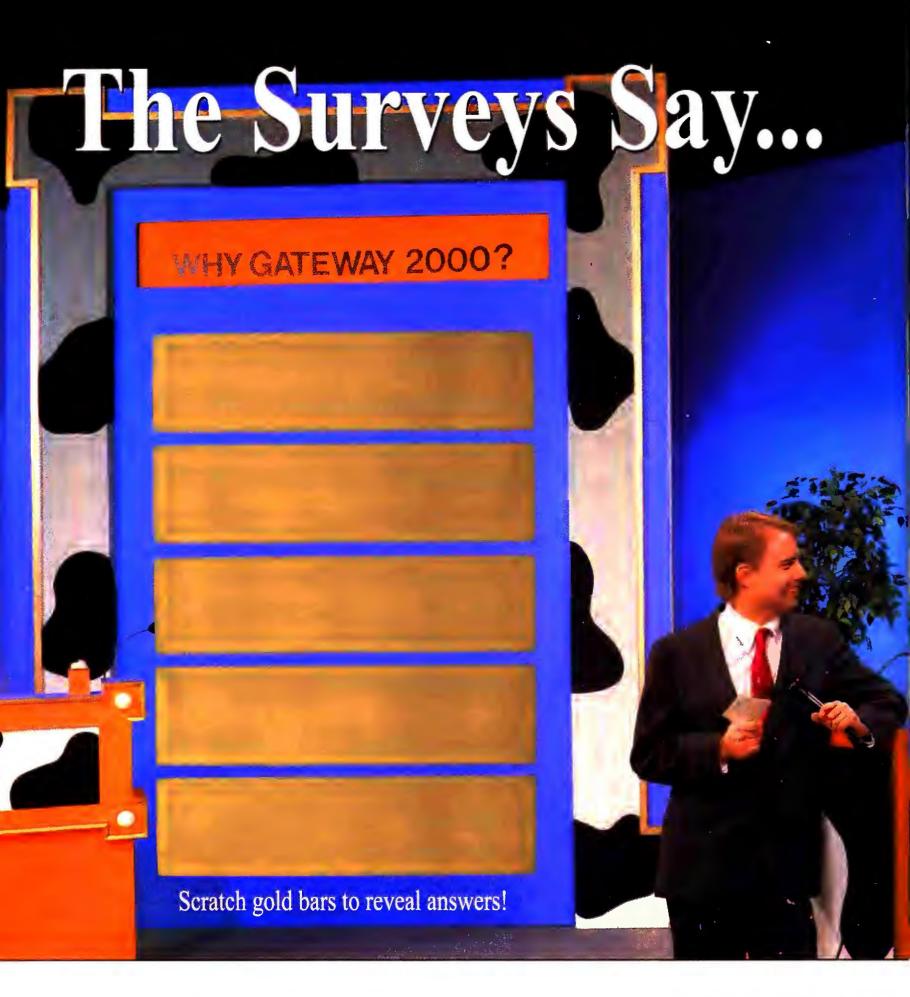
powerful 486 processor; an IDE hard drive up to 130MB; standard 4MB or

8MB RAM upgradable to 20MB; a 7.9-inch bright, backlit VGA display screen; 78-key keyboard; EZ Point™ integrated pointer; excellent battery life; and suspend/resume feature.

Looking for a square deal on the best portables around? The odds are stacked in your favor with Gateway's ColorBook and HandBook portable PCs.







Gateway 2000[™] is the name of the game when it comes to the best service and support. The Gateway family is made up of hard-working Midwesterners who are dedicated to satisfying our customers. And although we're a Fortune 500 company, we haven't forgotten our simple philosophy of providing an honest value, a superior product and the best service possible. In return, Gateway's loyal customers are always there to cheer us on. But you don't have to just take our word for it. The surveys prove it!

Hands Down Winner in Service and Reliability

A big thank you to readers of *PC Magazine* who responded to a Service and Reliability survey with impressive results: "In our latest survey, only Gateway 2000 gets our highest rating in both the desktop and laptop categories." The survey covered reliability, satisfaction with repair experience, satisfaction with technical support, and the likelihood of buying new PCs from the same vendor again.



World Class Winning

PC World's 1993 World Class Awards found readers honoring fateway 2000 with top honors in five categories including Best ervice and Support (for the second year in a row!) and Best Mail Order Company. Thank you, PC World readers!

Jesse Berst, editor of Windows Watcher vas quoted in PC World: "Gateway has iscovered an amazing secret, give people nore for less and they are going to like you."

Ve knew our secret wouldn't be safe for long!



Good Answers!

PC vendors." Thanks Shopper readers!

Computer Shopper summarized its readers' responses best:

"Gateway, dominator of Best Buy balloting for the past three years, is your choice as Best Overall Supplier of computer systems ... For state-of-the-art PCs at bargain prices, North Sioux City is where Shopper readers look first." And "...Gateway 2000 has inspired a high degree of confidence and brand loyalty among Shopper's readers, who continue to rank Gateway's service and support as the best of all direct-channel

Ready For Action

Gateway 2000's friendly employees will take care of you from your first phone call throughout the life of your system with lifetime technical support. We've also made it easy for you to buy one of our world-famous PCs.

transactions, you get a variable interest rate of 13.9% APR and a low \$18 annual fee.*

*Cash advance fee is \$1 plus 2% of the amount of the cash advance, but not less than \$5 nor more than \$10. Financing is available on approved credit with the Gateway DuoLine MasterCard, issued by Dial National Bank, Des Moines, Iowa.

Internationally Known

Gateway 2000 also makes it easy for our neighbors in Canada and Puerto Rico to buy Gateway systems. You get awardwinning technical support, CSA approvals, and on-site service that is available in most Canadian and Puerto Rican locations. Our international shipping rates are some of the most competitive in the industry. Canadian and Puerto Rican customers can reach us toll free at 800-846-3609. All other international customers can call us at 605-232-2000.

Our Family PC comes with a 14-inch color SVGA monitor, 101-key keyboard, double-speed CD-ROM, sound card, speakers, joystick, fax/modem and mulitmedia software. You choose one software option from five great Family PC multi-title packages.



Easy Payment Options

Gateway accepts most major credit cards and C.O.D. terms, with net 30-day terms and leasing options available to qualified commercial customers.

You can also apply for our new

Gateway 2000 DuoLine MasterCard® Card, issued by Dial National Bank, which lets you make purchases from Gateway and

anywhere else MasterCard is accepted by giving you two lines of credit — one for Gateway purchases and one for all other purchases. For Gateway purchases, the card has no annual fee and a low variable interest rate of just 12.9% APR. For other





HANDBOOK® 486

- Weight: 2.94 Lbs.
- Dimensions: 9.75" x 5.9" x 1.6"
- SL Enhanced Intel® 486 or DX2 Processor
- 4MB or 8MB RAM (expands to 20MB)
- 80 to 130MB IDE Hard Drive
- 7.9" Backlit VGA Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 1 PCMCIA Type II Slot
- EZ Point™ Integrated Pointer
- 78-Key Keyboard
- Parallel, Serial & PS/2 Ports
- MS Works for Windows™ 3.0
- MS-DOS 6.2, WFW 3.11 & Serial Transfer Cable

HANDBOOK

4SX-25

With 25MHz 486SX CPU, 4MB RAM and 80MB Hard Drive

\$1495

\$1595

HANDBOOK 4DX2-40

With 40MHz 486DX2 CPU. 8MB RAM, 130MB Hard Drive, Extra NiMH Battery and Leather Carrying Case

\$2295

(with 130MB Hard Drive) HANDBOOK 4SX-25

With 25MHz 486SX CPU, 8MB RAM, 130MB Hard Drive and Leather Carrying Case

\$1895

PORTABLE OPTIO

PCMCIA Cards:

- TelePath [™] 14400/14400 fax/ modem. \$249
- 9600/2400 fax/modem. \$149
- Ethernet adapter. \$149
- Token Ring adapter. \$449
- HandBook VGA adapter. \$229 Batteries:
- 2.2Ah NiMH batteries. \$89
- Alkaline battery pack. \$29 Diskette Drive:
- HandBook external 1.44MB. \$99
- ColorBook \$49, HandBook \$55 Extended VIP Warranty:
- We'll ship a replacement within 24 hours during warranty. Point of sale only. \$100

COLORBOOK™

Weight: Under 5.7 Lbs.

- Dimensions: 11.7" x 8.5" x 1.77"
- SL Enhanced Intel 486, DX2 or **DX4 Processors**
- 4MB or 8MB RAM (expands to 8, 12 or 20MB)
- 3.5" 1.44MB Diskette Drive
- Removable 120 to 250MB IDE Drive
- 10.3" or 9.4" VGA Dual-Scan STN Color Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 2 PCMCIA Type II Slots
- Integrated Trackball (2 buttons)
- 85-Key Keyboard
- Parallel, Serial & PS/2 Ports
- External VGA Port
- MS Works for Windows 3.0
- MS-DOS 6.2 & WFW 3.11

COLORBOOK DX4-75

With 75MHz DX4 CPU, 8MB RAM, 250MB Hard Drive and 10.3" LCD

\$3495

COLORBOOK 4SX-33

With 33MHz 486SX CPU, 4MB RAM, 120MB Hard Drive and 9.4" LCD

\$1995

COLORBOOK DX2-40

With 40MHz DX2 CPU. 4MB RAM 250MB Hard Drive and 9.4" LCD

\$2495

COLORBOOK PACKS

Traveler's Packs:

- Case, extra battery & PCMCIA 9600/2400 fax/modem. \$279
- Case, extra battery & PCMCIA TelePath fax/modem. \$369

COLORBOOK DX2-50

With 50MHz DX2 CPU, 8MB RAM 250MB Hard Drive and 10.3" LCD

\$2995



SOFTWARE & EXTRAS

If a system comes with "choice of application software," choose one of the following packages:

- Microsoft Excel for Windows™
- Microsoft Word for Windows™
- Microsoft Word and Bookshelf,® **CD-ROM Edition**
- Microsoft PowerPoint for Windows™
- Microsoft Project for Windows[™]
- Microsoft Access[™] for Windows
- Publisher's Pack (CD-ROM only; includes CorelDRAW 3,™ ArtShow, MS Publisher 2.0 & MS Design Pack)

- The Entrepreneur Pack (Works,™ QAPlus Diagnostics Publisher,™ Money™ & games) ■ Gateway Computer Glossary
- Borland Paradox® and Quattro® Gateway Mouse Pad Pro for Windows spreadsheet Systems with CDs also include:
- Borland Paradox® and C++ (CD-ROM only)

With desktop and selected portables you also get the following software and extras at no additional charge:

- MS-DOS 6.2 & Windows for Workgroups 3.11
- CoSession™ Host Remote Diagnostics (with all modems)

- Gateway System CD
- On-Line User's Guide Gateway Mall On-Line Catalog

SERVICE

Every Gateway system is backed by:

- 30-Day Money-Back Guarantee
- One-Year Limited Warranty Lifetime Toll-Free Technical
- Support On-Site Service Available To Most Locations
- Lifetime BBS Membership
- FaxBack Automated Fax Service

Our money-back guarantee does not include shipping. On-site service is provided at no charge during warranty if our technicians determine it is necessary. If you'd like to read our warranty and guarantee policies, please call for a free copy.









INTEGRATED SYSTEMS

4SX-33*/4DX-33*

- Intel® 33MHz 486SX or DX CPU
- 4MB RAM
- 340MB 13ms IDE Hard Drive
- Local Bus Graphics with 1MB
- 3.5" Diskette Drive
- 14" Color CrystalScan® 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 101-Key Keyboard & MS Mouse
- MS-DOS[®] 6.2 & WFW[™] 3.11
- MS Works for Windows™3.0
- EPA Energy Star Compliant

4SX-33 \$1295 4DX-33 \$1495

4SX-33*FAMILY PC ™

- Intel 33MHz 486SX CPU
- 4MB RAM
- 340MB 13ms IDE Hard Drive
- Local Bus Graphics with 1MB
- Double-Speed CD-ROM, 16-Bit Sound Card & Speakers
- 2400/9600 Data/Fax Modem
- 3.5" Diskette Drive
- 14" Color SVGA Monitor
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 101-Key Keyboard, MS Mouse & **Joystick**
- MS-DOS 6.2 & WFW 3.11
- Choice of Family PC Software
- EPA Energy Star Compliant

\$1495

4DX2-66* FAMILY PC

- Intel 66MHz 486DX2 CPU
- 8MB RAM, 128KB Cache
- 340MB 13ms 1DE Hard Drive
- Local Bus Graphics with 1MB
- Double-Speed CD-ROM, 16-Bit Sound Card & Speakers
- 2400/9600 Data/Fax Modem
- 3.5" Diskette Drive
- 14" Color SVGA Monitor
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 10I-Key Keyboard, MS Mouse &
- MS-DOS 6.2 & WFW 3.11
- Choice of Family PC Software
- **EPA Energy Star Compliant \$1995**

MULTIMEDIA KIT

Here's everything you need to add multimedia to a Gateway desktop PC that has a CD-ROM drive. You won't find a better price anywhere!

- Gateway 2000 16-Bit Sound Card, Sound Blaster-™Compatible
- 2 Labtec® CS-180 Speakers
- Microsoft Encarta & Corel Photos CD Software

\$132 (with system purchase)

Get the multimedia kit with a CD-ROM drive for \$299 (with system purchase).

486 PCI SYSTEMS_

P4D-33*

- Intel 33MHz 486DX CPU
- **8MB RAM, 128KB Cache**
- 540MB 13ms IDE Hard Drive
- PCI Fast IDE Interface
- PC1 Local Bus Graphics with 1MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 14" Color CrystalScan 1024NI
- Baby AT Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- AnyKey® Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- MS Works Multimedia Edition 3.0

P4D-66'

- Intel 66MHz 486DX2 CPU
- 8MB RAM, 128KB Cache
- 540MB 13ms IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with IMB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Color CrystalScan Monitor
- Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.1I
- Choice of Application Software

P4D-100

- Intel 100MHz 486DX4 CPU
- 8MB RAM, 128KB Cache
- 540MB 13ms IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Color CrystalScan Monitor
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.I1
- Choice of Application Software

PENTIUM SYSTEMS -

P5-60

- Intel 60MHz Pentium[™] CPU
- 8MB RAM, 256KB Cache
- 340MB 13ms IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Color CrystalScan Monitor
- Baby AT Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- MS Works Multimedia Edition 3.0

\$2495

P5-66

- Intel 66MHz Pentium CPU
- 8MB RAM, 256KB Cache
- 540MB I3ms IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 2MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Color CrystalScan Monitor Baby AT Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- Choice of Application Software

P5-66 BEST BUY

- Intel 66MHz Pentium CPU ■ 16MB RAM, 256KB Cache
- 540MB 13ms IDE Hard Drive
- PCI Fast IDE Interface
- High-Performance PCI Local Bus Graphics with 2MB VRAM
- Double-Speed CD-ROM
- 16-Bit Sound Blaster-Compatible Sound Card & Yamaha Speakers
- 3.5" Diskette Drive
- 15" Color CrystalScan Monitor
- Baby AT Case
- **4** 1SA, 2 PC1 & 1 PCI/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- Choice of Application Software

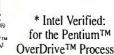
- Baby AT Case

P5-90

- Intel 90MHz Pentium CPU
- 16MB RAM, 256KB Cache
- 540MB 13ms 1DE Hard Drive
- PCI Fast 1DE Interface High-Performance PCI Local Bus
- Graphics with 2MB VRAM Double-Speed CD-ROM
- 3.5" Diskette Drive
- 17" Color CrystalScan 1776LE
- 4 ISA, 2 PCI & I PCI/ISA Slots
- AnyKey Keyboard & MS Mouse ■ MS-DOS 6.2 & WFW 3.11
- Choice of Application Software \$3995

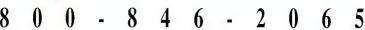
Tower Case





OverDriveTM Processor









Extra Winnings

You'll score bonus points with the peripherals listed below, sold only with the purchase of a system. Call our special component add-ons division at 800-846-2080 for our complete line of extras for Gateway customers.

Multimedia

Multimedia Kit

Here's everything you need to add multimedia to a Gateway PC that has a CD-ROM drive:

- Gateway 2000[™] 16-bit CD-quality sound card, compatible with Sound Blaster[™] cards, with MIDI/game port, mic in, stereo line in/out
- 2 Labtec[®] CS-180 speakers
- Microsoft® Encarta Multimedia Encyclopedia
- Corel Professional Photos CD Sampler \$132 (with system purchase)

Get the multimedia kit with a CD-ROM for \$299 (with system purchase).

Yamaha® YST-M10 Multimedia Speakers

The small speakers that sound big and come with a tiny price! This free-standing, self-powered speaker set is a great value! \$75

Altec Lansing ACS-300 Multimedia Speakers

Get superior stereo sound with these top-rated Altec Lansing ACS-300 speakers with separate powered subwoofer. \$219

Communications & Storage

TelePath™ II Fax/Modem

Internal fax/modem, 14,400bps modem, V.32bis, with 14,400bps fax capability. Package includes data and fax communication software, plus a CompuServe® trial membership. \$149

Colorado Memory Systems® TBU

250MB internal automatic tape backup unit copies up to 9.5MB per minute. Comes with MS Windows[™] and DOS[®] software, one tape and cable. \$159

Networking

Intel EtherExpress™

A 16-bit Ethernet adapter from a world leader in networking. **\$105** Twisted Pair or BNC

Ethernet Adapter from 3Com®

Manufactured by 3Com for Gateway.

\$105 Twisted Pair **\$125** BNC

Token Ring

IBM® 16-bit ISA Token Ring card. \$429

Monitors

CrystalScan® 17-Inch Monitor

Non-interlaced color monitor with intelligent multiscanning analog color display capable of ultra-high resolution up to 1280 x 1024 in non-interlaced mode and .26mm dot pitch.

Upgrade from a 14-inch monitor \$430

Upgrade from a 15-inch monitor \$350

(Prices good only for upgrades at the time of system purchase.)

Printers

Epson® Stylus 800 Ink Jet Printer

Great laser quality at an ever greater value. Measuring only 17 inches by 10.5 inches, the Stylus 800 has seven different typefaces and prints an extra-quiet 150 characters per second at 360dpi. Parallel cable included. \$289

Epson ActionLaser 1500 Laser Printer

The ActionLaser delivers professional-quality printouts. Fast six-page per minute speed, 14 resident fonts, 300 x 300dpi, and 1MB memory expandable to 5MB. Parallel cable included. \$669

Home Office Pack

Add these peripherals to your new Gateway desktop, and you have everything you need for an efficient home office.

- Epson Stylus 800 Ink Jet Printer
- TelePath II Fax/Modem
- 1 Parallel Cable \$399

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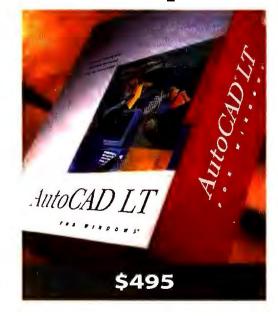
The success of AutoCAD has inspired dozens of cheap imitations.

If you need a CAD package but don't need all the sophistication of AutoCAD® software, don't settle for a cheap imitation. Get new AutoCAD® LT for Windows.™ Unlike those "bargain" packages, it's based on the world standard—AutoCAD—and gives you features the others can't duplicate. Like more accurate 2D drawing tools

yourself with a question, you'll have access to on-line help as well as free 90-day product support. And since AutoCAD LT reads and writes data just like AutoCAD software, your work will be compatible with over a million AutoCAD users worldwide. Chances are your clients and colleagues are among them. So beware of cheap imitations. Visit your

for designing And one inexpensive one. Authorized

discrete parts. 3D design and layout tools and full support for layers and blocks. And drawings you can link, so changes on the master are automatically reflected in other drawings. What's more, making these drawings is as easy as using a few simple icons and tools. But if you do find



AutoCAD Dealer or leading retail software store. Or, for a free demo disk, call 1-800-228-3601 and ask us for Demopack A216. Outside the U.S. and Canada, fax 415-491-8311.



A Bucket of Bolts or the Next Killer of Apps



I'm beginning to think of it as the software industry's version of Frankenstein's monster: an overwhelming undertaking that has largely been kept secret; that

even its creators don't really seem to understand; and that, if brought to life will threaten to change everything we know about desktop software. Oh yes, and it just might destroy its creators.

What I'm describing is OpenDoc, a badly misnamed effort started by Apple and aimed at replacing today's monolithic applications with small, specialized software components that fit together like so many Lego blocks. The name OpenDoc refers to the technology's ability to support "in-place editing," allowing parts of, say, a spreadsheet to be embedded in a word processing document so you don't have to fire up the spreadsheet every time you need to make a change.

If you know much about Microsoft's Object Linking and Embedding technology, OLE 2.0, this may sound familiar. The difference is that OpenDoc takes the next logical step and assumes users focus on accomplishing tasks rather than on using a spreadsheet or word processor. And we want to use the best computer for the job, whether it be a PC, a Mac, or a Sun workstation.

Unfortunately, today we're herded into fairly rigid application categories and forced to cut and paste data between programs to get the task done. If developers follow the OpenDoc paradigm, we'll be able to shop for software tools that will reside on our desktop to be taken down as we need them.

It looks likely that OpenDoc will enjoy wide support among developers. Already, Apple has teamed up with

OpenDoc in WordPerfect 7.0), Novell (OpenDoc will be in its AppWare development environment), and IBM.

WordPerfect (which is planning to use

Mary Shelley Software Inc.?

In the meantime, what are we to make of the posturing which has already begun? Are we in for yet another meaningless war between standard-wannabes, or worse, is the software market about to fracture along the lines of UNIX? I think it's just healthy competition—Microsoft versus everyone else. But here are some points to consider:

- 1. The goal is to turn today's application suites into component stacks; you'll buy a text editor, a math engine, a database engine, a mail engine-you get the idea. They'll reside on your desktop, something like the pegboard you may have in your garage for tools. OLE or OpenDoc, or both, will grab the tool you need and ensure that data manipulated by one tool can be interpreted by other tools and retain its integrity.
- 2. The components, or tools, will use OLE and OpenDoc to talk to one another and interact with the operating system. The ease with which you'll be

able to hop from one task to another will mask a very complex process.

3. Microsoft is going for incremental advantage—witness OLE 2.0. Apple et al. are going for the big win and want OpenDoc to cross operating systems and make component architectures the standard desktop environment.

Tools for the Task

By creating components that can be used with one another, perhaps across operating systems, developers will spend more time adding value and less time futzing with infrastructure. Networked and interlocking applications should become easier to build and much more stable. You'll be able to customize the desktop for the task at hand. You'll have more choices and be able to select very specific tools for specific jobs. Companies, too, will be better able to customize all their users' desktops.

Applications as we know them will cease to exist. Instead of firing up a spreadsheet or a word processor, you'll approach a task with tools from a variety of vendors. It's just odd that the inventors of these software creatures may come to rue them as monsters.

Spring brought lots of changes, but have you noticed the release date for Windows 4.0, aka Chicago, always seems to be eight months away? It's been that way for more than a year now. Maybe tomorrow really never does come...If you

could replace your Intel-based Windows machine with a PowerPC, would you? Job One for Apple is making the PowerPC Macintoshes so transparent to Windows and Net-Ware that end users get a choice of platforms... About the time I'd given Polaris Software up for dead (due to self-inflicted shots

LOOKING AHEAD



to the foot), the company releases a new, less expensive version of Pack-Rat called Advantage, and life looks better... Everyone around office really likes 7th Level's TuneLand and Broderbund's Myst. Boring guy that I am, I've

been updating my mailing list using Group One's AccuMail for Windows to give me ZIP-Plus-Four and standardized addresses. Yes, that is what I do on warm spring nights... Where are all those Internet books going? You know that all those people buying them can't really be on the Net.

By David Coursey



IF AN URGENT E-MAIL LANDS IN YOUR MAILBOX AND YOU'RE NOT THERE TO READ IT, DOES IT MAKE

ANY NOISE? YOU BET. IT'S THE SAD SOUND OF DEADLINES BREAKING, THE BALL DROPPING, HAIR BEING

PULLED OUT BY THE ROOTS. IT'S THE GIANT SUCKING SOUND OF YOUR CAREER GOING DOWN THE TUBES.

WELL, MAYBE IT'S NOT THAT BAD.

BUT IT WOULD STILL BE PRETTY GREAT

TO BE ABLE TO CHECK YOUR E-MAIL

FROM ANYWHERE. AND NOW YOU CAN.

INTRODUCING CC: MAIL® MOBILE FOR

WINDOWS ** - IT'S THE SAME PRODUCT

AS THE CC:MAIL YOU HAVE ON THE

LAN — SAME POWERFUL FEATURES, SAME

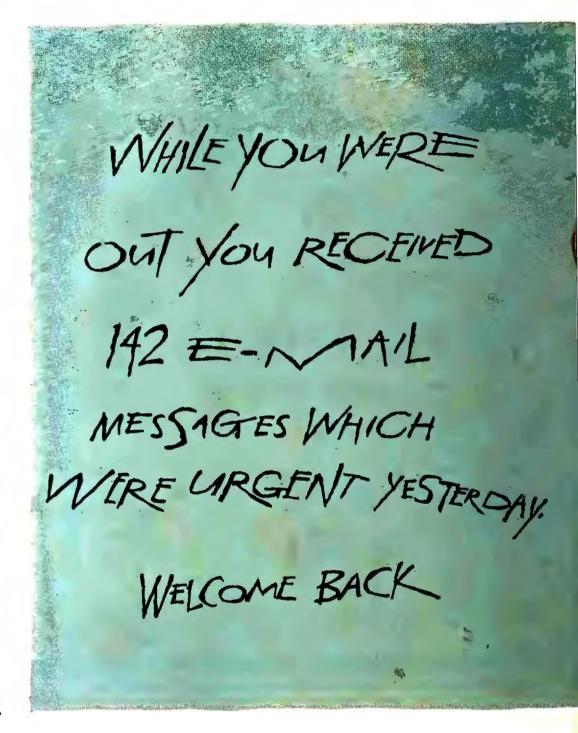
FRIENDLY INTERFACE — WITH THE ADDED

BENEFIT OF GOING 'EVERYWHERE YOU GO.

SO THE URGENT MESSAGE YOU RECEIVE

MONDAY MORNING GETS READ MONDAY

MORNING — WHETHER YOU'RE IN TOPEKA,



TASMANIA OR ANYWHERE IN BETWEEN. YOU DON'T MISS A THING. AND THEY DON'T CURSE YOU BACK AT THE HOME OFFICE.

BECAUSE YOUR TIME IS PRECIOUS ON THE ROAD, LOTUS* CC:MAIL MOBILE FOR WINDOWS LETS YOU BE MORE SELECTIVE ABOUT

THE MESSAGES YOU VIEW. AN AUTOMATED MESSAGE SUMMARY DIALOG BOX LETS YOU SEE THE AUTHOR, DATE, TIME, SUBJECT,

SIZE AND ESTIMATED DOWNLOAD TIME OF EVERY MESSAGE, SO YOU CAN ACCEPT ONLY THE MESSAGES YOU NEED RIGHT NOW.

AND YOU CAN PRE-CONFIGURE CC: MAIL MOBILE TO SIMPLIFY YOUR MOBILE MESSAGING. ESTABLISH LOCATION PROFILES FOR THE PLACES YOU FREQUENT — WITH ONE CLICK YOU'RE SET TO CALL IN FROM THE FIELD OFFICE.

ANOTHER CLICK, YOU'RE RECONFIGURED TO CALL FROM HOME. CC: MAIL MOBILE EVEN HAS A WIRE-LESS SETTING SO YOU CAN KEEP SENDING

AND RECEIVING MESSAGES EVEN
WHEN YOU'RE NOT WITHIN REACH

OF A PHONE.

YOU CAN FURTHER AUTOMATE YOUR

CC: MAIL TO SEND AND RECEIVE MESSAGES

AT A SET TIME OR A REGULAR INTERVAL.

LOTUS CC: MAIL MOBILE FOR WINDOWS

EVEN LETS YOU STORE MULTIPLE MESSAGES

IN THE OUTBOX AND SEND THEM ALL AT

ONCE, REDUCING YOUR CALLING COSTS.

BASICALLY, LOTUS CC: MAIL MOBILE

FOR WINDOWS IS THE COMPREHENSIVE

A BIG PROBLEM - HOW TO STAY IN TOUCH

WITH YOUR BUSINESS WHEN YOU'RE OUT OF THE OFFICE - AND IT'S AVAILABLE RIGHT NOW (THERE'S ALSO A

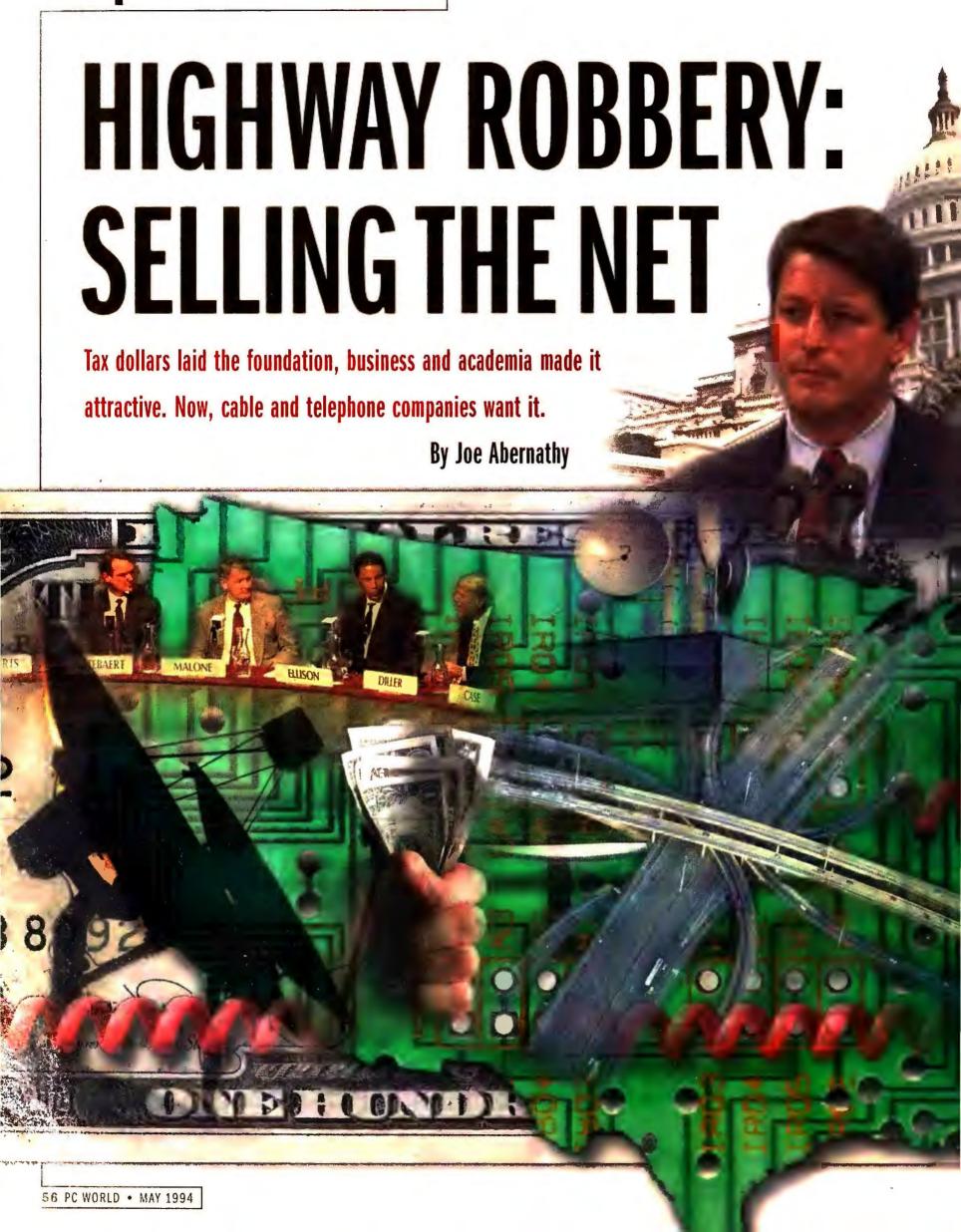
DOS VERSION AND ONE FOR THE MAC® AS WELL). JUST STOP BY YOUR LOTUS AUTHORIZED

LOUS
Working Together

RESELLER OR CALL 1-800-448-2500 FOR MORE INFORMATION.

SOLUTION TO

Top of the News



Edited by Russell Glitman

ntense lobbying, including lavish spending by corporate special interest groups, threatens to restructure the nation's communications environment in a fashion that may stifle competition and limit civic activities on the information superhighway.

PC World's in-depth inquiry into the finances and political processes shaping the communications landscape found that all the players—lawmakers, congressional committees, policy think tanks, the administration—have been touched by corporate

ing. The level of spending we discovered dwarfs the amounts from traditional big-spending interest groups, such as defense, and is likely to match

spending and high-pressure lobby-

or surpass lobbying expenditures in the upcoming reform of the health insurance industry—which boasts \$900 billion in revenues compared with \$90 billion for communications.

While none of this spending is illegal, experts say the hefty expenditures that *PC* World discovered—as much as \$2 million funneled to members of a single congressional committee considering a single telecommunications bill—are setting the agenda for the information superhighway legislation and helping to speed its passage through Congress.

Setting the Foundation

Whatever rubric is used to frame the debate—Internet, National Information Infrastructure (NII), information superhighway, convergence, communications regulatory reform—the landmark policy deliberations under way in Washington will set the foundation for the business and social structure of the information age.

The assault, led by telephone and cable companies, pits the interests of big business and its allies against the concerns of public interest groups and self-appointed small-business guardians. In the middle stand Congress and the White House.

"Just as the telephone system revolutionized the way every business operates, just as the computer is even now revolutionizing the way business is operating, the information highway will do the same," said Vice President Al Gore, in an interview in March at the White House. "New services that we don't even dream of right now will be huge players in the economy of the next decade. Any business that assumes the information superhighway will not have a profound impact on its future is making a mistake."

Gore's Vision

Encouraged by Gore's vision of a ubiquitous network of computer and communications networks, lawmakers are engaging in the most comprehensive revision of such policy since the Communications Act of 1934. Local telephone companies, cable television providers, long-distance tele-



News Monitor

BIG FISH EAT BIG FISH: Novell's acquisition of WordPerfect Corporation and of Borland's Quattro Pro spreadsheet business creates the second-largest PC software company and provides users with a single vendor for networking and desktop applications. Novell plans to continue offering the Word-Perfect-Borland suite. Also in the works: work-group application suites that combine electronic messaging, group scheduling, document management, conferencing, and work-flow automation, says John Edwards, Novell executive vice president. Company officials expect to complete the Novell-WordPerfect merger this summer.

"It's good for the industry," says Tomec C. Smith, president of InfoCenter Market Research in Aurora, Colorado. "It makes Borland more solid financially and puts Novell in a stronger position to compete with Microsoft." However, Smith says, the merger is unlikely to hurt Microsoft. He predicts that software pricing is likely to stabilize as a result of the merger.

WARNING—CONFLICT DETECTED: When you install the latest beta version of Windows 4.0 on a machine that has OS/2 installed, you'll get a curious message: 'Setup has detected OS/2 files on your system. Although you can install this version of Windows, these OS/2 files use considerable disk (continued on page 59)

Business in the balance: Service pioneer Edward Vielmetti fears he won't be able to compete against regional Bell Ameritech.

phone companies, and communications equipment manufacturers all want to enter each other's markets. And everyone wants the right to generate the programming and services expected to produce the real revenues of the information age, as well as to own the wires over which consumers receive those products.

Top of the News

More than 30 bills dealing with various aspects of the information market are floating about Washington. But commanding everyone's attention are two fast-track bills in the House of Representatives and one in the Senate that hold the keys to the kingdom—deregulation.

So Many Bills, So Little Time

The National Communications Competition and Information Infrastructure Act (the Markey-Fields bill) seeks to promote competition by opening up local telephone mar-

kets to cable providers; it would also allow the phone companies to offer cable services. The Emerging Telecommunications Technologies Act (the Brooks-Dingell bill) would allow the local phone companies to enter the long-distance and electronic publishing markets.

Meanwhile, in the Senate, the Communica-

tions Act of 1994 (the Hollings bill) is moving quickly toward committee hearings. The bill includes provisions from both House bills, along with suggestions for providing universal access. Defining this access has been left to the FCC, which has yet to act publicly on the matter.

The House legislation passed through the telecommunications subcommittees in early March and appeared headed for easy approval before the full committees as well as on the floor. The Senate bill was tentatively set for consideration in April.

"A consensus exists on a bipartisan basis

Your Leaders at Work: Pending Legislation Affecting the Data Superhighway

More than 30 bills in Washington affect various parts of the emerging information infrastructure. These are among the most important. (Not included are bills addressing education, libraries, health services, and technical matters.)

Infrastructure

Bill: National Communications Competition and Information Infrastructure Act

Sponsors: Markey, Fields

Goal: Promote competition by opening up local telephone markets.

EWAY DAY SOO CHANNEL

Status: pending in House

Bill: Emerging Telecommunications Technologies Act

Sponsors: Brooks, Dingell

Goal: Allow local phone companies to enter long-distance market, alarm services, and electronic publishing.

Status: pending in House

Bill: Local Exchange Infrastructure Modern-

ization Act

Sponsor: Boucher

Goal: Require infobahn participants to design interoperability into network

Status: absorbed into Markey-Fields bill

Bill: Communications Act of 1994

Sponsor: Hollings

Goal: Fewer concessions to regional Bells (contains provisions of both Markey-Fields and Brooks-Dingell).

Status: pending in Senate

Government Information

Bill: Improvement of Information Access

Act

Sponsor: Owens

Goal: Require government agencies to use diverse methods, including computer net-

works, to disseminate information and broaden public access to government.

Status: referred to House Government Operations Committee

Bill: Government Printing Office Electronic
Information Access Enhancement Act

Sponsor: Rose

Goal: Enhance electronic access to materi-

al published by GPO.

Status: reported to House

Bill: Paperwork Reduction Act

Sponsor: Nunn

Goal: Require government agencies to make information available in electronic

format.

Status: referred to Senate Governmental Affairs Committee

Privacy

Bill: Individual Privacy Protection Act Sponsor: C. Collins

Goal: Improve protection of individual privacy, including electronic data banks, and establish a permanent privacy protection commission.

Status: referred to House Government Operations Committee

and on a bicameral basis in Congress that these bills should be enacted," says Rep. Rick Boucher, D-Va., a prime mover in support of the deregulation bills and sponsor of another to fund development of business applications for the infobahn.

Winners and Losers

Backers of the legislation say the time is right for the government to "deregulate and get out," providing the media giants with the economic incentives to build Gore's hotly hyped information highway.

"Interactivity is here, and like all important innovations, it will produce winners and losers," says Gerald Levin, chair and CEO of Time Warner. "The losers will be

those who decide that they can wait and watch, that there's no urgency involved, that they can go on working and producing in splendid isolation from a technology that will transform the way that people live, work, entertain, and educate themselves.

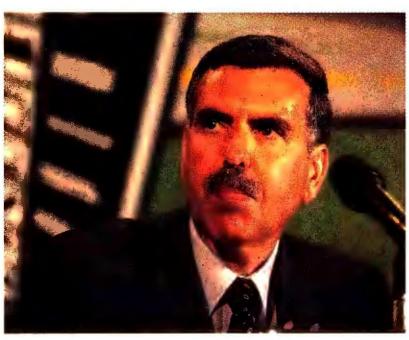
"The winners will be those who not only face up to change but embrace it, who see interactivity as the chance to create new relationships with consumers, who

seize the opportunities to succeed."

As Levin and others at the top of the food chain move in for the kill, small businesses—smaller at least than Time Warner—are fighting to establish a level playing field in which they can compete. The defenders include such pioneers as Edward Vielmetti, cofounder of an Internet service provider in the Detroit area, whose company suddenly faces the prospect of competing with Ameritech, Detroit's regional Bell operating company with \$12 billion in revenues.

"They've opened an office locally to study providing Internet service, and we certainly won't be able to compete with them on access," said Vielmetti, whose business hangs on the outcome of the current policy deliberations. "I'm watching Ameritech closely to figure out exactly what they can sell. There are details that could have things end up being really miserable."

In the 27 years since the Internet began as a Department of Defense experiment in fault-tolerant communications, the net has emerged as a driving force behind smallbusiness start-ups, with commercial interests surpassing educational and military presence in 1991. In addition to the few hundred people around the world such as Vielmetti who provide access, there are thousands of electronic publishers and software design firms that wouldn't exist without the Internet's communal, flat-fee economic model. The future of that model is



"Interactivity is here, and like all important innovations, it will produce winners and losers," says Time Warner CEO Gerald Levin.

one of the key issues being lobbied.

Small business's standard-bearers in Washington are a few poorly funded public interest groups. They are also battling to reserve a lane of the infobahn for those aspects of community and quality of lifehealth care, education, social services, civic activities—that reach beyond business.

The Public Interest

"There are too many important public interest concerns not addressed in the pending bills," cautions James P. Love, director of economic studies for Ralph Nader's Center for Study of Responsive Laws. "We are not ready to pass major telecommunications legislation yet."



News Monitor

(continued from page 57)

space. Exit Setup or Continue?' A similar message in a beta version of Windows 3.1 complained if you were running DR DOS instead of MS-DOS and was cited by FTC insiders as one of the primary triggers of that agency's antitrust probe of Microsoft. The Justice Department is now engaged in its own antitrust investigation of Microsoft.

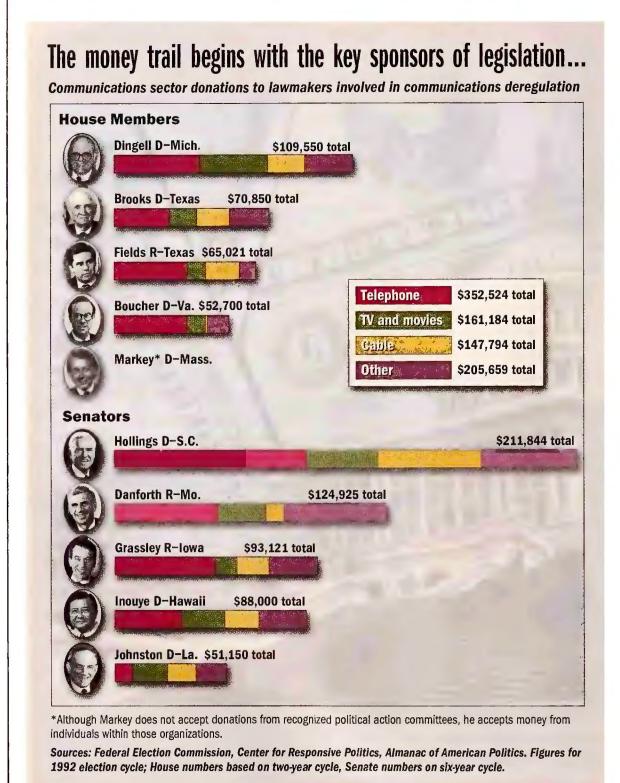
DOS 6 WITHOUT DOUBLESPACE: MIcrosoft was ordered to pay Stac Electronics \$120 million after a jury found that the DoubleSpace data compression in version 6.0 of MS DOS infringed on two patents owned by Stac, which makes the popular Stacker compression program. Version 6.21 of MS-DOS is now shipping, without compression. Microsoft is also shipping new versions of Windows NT and other software that used the compression code internally.

50-MHZ 486SX2 SYSTEMS DEBUT:

You'll see these new clock doubled chips in low-end 486 systems selling for \$1500 to \$1600. The 50-MHz SX2 averages 30 percent better performance than the 25-MHz SX chip, says Intel spokesperson Joanne Hasegawa. One of Intel's rivals, Advanced Micro Devices, started shipping a similar clock-doubled SX-25 chip-the Am-486SX2-50—to PC vendors in March.

Edited by Randy Ross Contributors: Joe Abernathy, Jeff Bertolucci, and Laurianne McLaughlin

Top of the News



The Danger of Abuse

Love cites a litany of key issues that have been brushed aside: plans to privatize the Internet backbone; the auctioning of the wireless spectrum to big business; a lack of provisions for public-access channels like those now available on cable television; no equal-time provisions for marginal political candidates; the fight over who controls the wires into your business and home; and, in particular, whether the owners of the wires should also be allowed to develop the programs that are carried along them.

"The danger of abuse is immense, unless policymakers take steps to prevent anticompetitive actions by vertically integrated companies," says Love. "The House of Representatives [this year] will pass the most important rewrite of the 1934 Communications Act in 60 years without holding a single hearing on the common carriage of video markets." This will determine whether all Americans have access to the common carrier of tomorrow as they do to the common carrier of today, Ma Bell.

Each day of deliberations sees new twists in the lobbying game. A snapshot of the lobbying action in early March revealed the following from a single committee hearing:

Lobbyists for Microsoft, General Technologies, and the Republican Party successfully warded off a proposal to require open

architecture in a critical piece of real estate on the information superhighway—the settop box that will control what you see when you turn on your computer-telephone-TV. Days earlier, the Justice Department had opened an antitrust investigation of set-top-box maker General Technologies over this issue, and Justice is also investigating Microsoft for alleged abuses associated with its ownership of DOS and Windows—which it now wants to extend to those same boxes.

The so-called Open Platform proposal to guarantee cheap, universal access to the infobahn—using ISDN architecture in conjunction with low-cost coaxial telephone wiring—was defeated by lobbyists for Corning Glass, which makes fiber-optic cable.

Fevered Activity

The full extent of special interest spending on this legislation won't be known for years. Yet it is easy to witness the fevered activity in Washington, where hundreds of phone company lobbyists promote the interests of their firms and millions of dollars are donated to the campaigns of the key legislators with authority over the NII.

Communications-sector political action committees (PACs) spent nearly \$10 million in the 1992 election cycle on direct campaign contributions alone. This figure doesn't reflect such expenditures as the annual golf tournament for lawmakers that AT&T holds at Pebble Beach; or PacTel's tours of the California wine country; or the tens of millions of dollars the Baby Bells direct into community grass-roots lobbying; or think tank sponsorship, inaugural balls, and power lunches.

Legislation starts with individual lawmakers. The ten primary lawmakers standing behind deregulation legislation accepted \$867,161 from communications-sector PACs during the 1992 election cycle (see the chart at left). From the desks of those lawmakers, bills move to committee, where, experts point out, all the real work is done when it comes to issues as complex as telecommunications. Communications PACs gave \$5,684,886 in the 1992 election cycle to members of the five congressional committees ruling on deregulation (see the chart at the top of the next page).

Money, Money, Money

Are legislators swayed by these contributions? A number of public interest groups think so. Take the case of the Senate Judiciary Committee, which recently conducted antitrust hearings on the TCI-Bell Atlantic merger. During the 1992 election cycle, committee members accepted \$943,000 from the communications industry. Moreover, experts say current spending related to active legislation is likely to far surpass 1992 levels. Judiciary committee members accepted \$14,148,700 overall during the 1992 cycle from the industries they are supposed to oversee, according to PC World research based upon a database at the nonpartisan Center for Responsive Politics that matches Federal Election Commission filings to known special interests. Even with a much shorter fund-raising cycle, members of the House Judiciary Committee accepted \$718,000 from the communications industry and \$6,680,000 overall from the industries it is charged with regulating.

Or consider this: Members of the Senate Commerce Committee, which has jurisdiction over the Ernest Hollings bill to rewrite the Communications Act, accepted \$2,046,886 from the communications indus-



Deregulation is moving too fast through Congress, says James Love at the Center for Study of Responsive Laws.

... and broadens at the committee level

Selected special interest donations to congressional committees with power over deregulation and communications



Sources: Federal Election Commission, Center for Responsive Politics, Almanac of American Politics. Figures for 1992 election cycle; House numbers based on two-year cycle, Senate numbers on six-year cycle.

try during the last election cycle. Members of the House Energy and Commerce Committee, which has jurisdiction over one of the two House bills affecting deregulation, accepted \$1,298,000 from the communications industry. And members of the House Science, Space and Technology committee accepted \$679,000 from communications PACs in the 1992 election cycle. All told, *PC World* found that these five committees accepted a breathtaking \$69,538,609

from industries that had business before them.

The political process clearly is being distorted by the money, argues Chuck

director of the nonpartisan Washington watchdog group Center for Public

Lewis, the executive

Integrity, which is conducting its own inquiry

into the money behind the NII debate. "When you look at the money that has gone to members of Congress and the Clinton campaign, and you look at the money given to the Democratic Convention in 1992 by AT&T and Nynex, and you look at the money given to the inaugural, and you look at the big guns hired from the administration, there is no question

that some serious lobbying is going on here."

The money and connections help move legislation, experts say. "In early 1993, it became apparent that we should look at this [policy process], and it's moved like lightning," says Lewis, former producer of 60 Minutes. "It's getting jammed through somehow. It brings us back to the question, Would this be moving through Congress so fast without all this money behind it? It's a good assumption that it wouldn't.

"One thing we are fascinated by that people don't know about is the access that

"There is no question that some serious lobbying is going on here." —Chuck Lewis

some of these phone people have had to Bill Clinton and Al Gore."

Gore has been the congressional patron saint of communications technologies such as the Internet for a decade. He is widely admired in technology circles for turning a small government investment in the NSF net, the nationwide backbone of the Internet, into a global phenomenon that at the present time spans more than 60 nations, with more than 15 million users and a 100 percent annual growth rate,

Top of the News

Telephone companies do the most lobbying . . . Communications sector total campaign donations—1992 election Other \$2,174,102 Tv and movies \$1,060,051 Cable \$1,214,009

for Responsive Politics

Sources: Federal Election Commission, Center

Total = \$9,574,179

according to the Internet consulting and publishing firm Matrix Information and Directory Services, located in Austin, Texas.

Vision or Business Plan?

Gore promised during the 1992 campaign to act as a catalyst for developing a widely accessible network capable of supporting both community and commercial activities. Last September in his proposal "The National Information Infrastructure: Agenda for Action," he stated, "There is a national consensus that construction of an advanced NII will help unleash an information revolution that will change forever the way people live, work, and interact with each other." Then last January, at a Los Angeles event hosted by the Academy of Television Arts and Sciences, dubbed the SuperHighway Summit, Gore revealed the administration's vision for the NII—a vision dominated by large industrial concerns.

The proposal, if implemented, would encourage private investment, promote and protect competition, provide open access for consumers and service providers, preserve and advance universal service, and ensure regulatory flexibility. Gore also proposed a new type of regulation for the new breed of multifaceted phone-cable-media-entertainment companies, which in effect represents complete deregulation.

Critics of the NII proposal were quick to cry "sellout."

"With the NII, you don't see a vision. You see a business plan for the seven regional Bells, Hollywood, and the cable industry," charges Jeffrey Chester, executive director of the nonpartisan Center for Media Education. "I really feel that there is an opportunity here to speak about something larger, to give a sense of what the communications system should look like in the

twenty-first century and how it should affect citizens, that every city council and local government will be online, that legislatures will be online, that public radio will make the transition into the twenty-first century."

Judging from the list of invited speakers at the SuperHighway Summit, some voices are being heard more clearly than others. In the limelight, a who's who of convergence—CEOs of Time Warner, Oracle, Bell Atlantic, TCI, Walt Disney, and dozens of other firms—shared the stage with Gore. Of all the famous faces, only one was readily identifiable as a spokesperson for the public interest: Electronic Frontier Foundation chair Mitchell Kapor. EFF has become syn-

onymous with electronic civil rights, and House lawmakers such as Rick Boucher cite EFF as *the* public interest group called in to help draft their legislation.

But for all the EFF's good work on civil liberties, critics charge that the foundation's agenda on telecommunications may not be its own—that because the EFF, the most influential technology lobbying organization in Washington, has accepted millions of dol-

The NII is "a business plan for the...
regional Bells, Hollywood, and the cable industry." —Jeffrey Chester

lars from the same communications industries for which it is seeking to shape the competitive environment, it may be biased.

Jerry Berman, EFF executive director, confirmed that the foundation has accepted money from AT&T, Bell Atlantic, MCI, the Newspaper Association of America, Apple, Microsoft, IBM, the cellular industry, and the regional Bell operating companies. But like many members of Congress, Berman—a respected lobbyist—claims that accepting

... and AT&T outspends every PAC in America

Top 15 communications and electronics PACs—1992 election

AT&T*	\$1,297,535
Bell South	\$835,068
National Cable TV Association	\$631,199
<u>GTE</u>	\$615,977
Ameritech	\$518,284
National Association of Broadcasters	\$493,951
United Telecommunications	\$424,060
Pacific Telesis Group	\$310,762
U.S. West	\$266,822
Southwestern Bell	\$258,630
Bell Atlantic	\$239,351
Westinghouse Electric	\$214,800
Harris Corporation	\$207,490
VYNEX	\$205,520
MCA	\$182,650
* Indian Constitution Control	Total \$6,702,099

*AT&T supports the nation's largest corporate-sponsored political action committee.

Sources: Federal Election Commission, Center for Responsive Politics

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Continued from page 62

money from so many groups provides insulation from any one interest.

"What we've tried to do is get a complete diversity of foundation and industry funding so that we're not representing any particular industry point of view," he says. "We call our shots, we make our positions, and we've attracted support from across the cations industry." This is a problem, he says, because these think tanks issue what appear to be objective policy papers but may be more nearly industry press releases.

"Obviously the Cato Institute has a particular bias toward free-market economics," says Lawrence Gasman, author of the conservative think tank's book *Telecompetition:* The Free Market Road to the Information

Highway, whose writing and publication was funded by the telephone industry. "The issue to me is how to provide new, innovative, and useful information services for both resi-

dential users and business users. I think the best way of providing that is by letting the free market work its way. If some consequences are not so desirable—for instance, very poor people not being able to pay their phone bill—my suggestion is, you deal with that as a subsidy rather than having a universal service concept.

"There's no such thing as a level playing

field. You don't have that in any industry, so why should you have one in communications? To me, [Telecommunications Inc. CEO] John C. Malone is a great man."

Indeed, Malone's vision is the best single argument for or against completely ceding the information superhighway to the free market: Malone says his cable empire, which he estimates reaches 25 percent of U.S. homes and which observers believe reaches 40 percent, brings consumers choice. Others charge that because regulatory rules allow cable providers to serve as gatekeepers, your only "choices" are among properties in which Malone has an economic interest—and that in fact it is difficult to get a new station carried on TCI without signing part of it over to Malone.



According to recent testimony in antitrust hearings before the Senate, Malone and TCI own 11 percent of Black Entertainment Television, 15 percent of the Family Channel, 50 percent of American Movie Classics, and 71 percent of the

Home Shopping Network. Ted Turner's media empire is beholden to Malone



"There's no…level playing field…in any industry, so why should you have one in communications?" —Lawrence Gasman

spectrum. What you have to do is make sure you don't exchange your principles, and we think we haven't."

The EFF, however, is not the only target for corporate funding. Says Chester: "The Heritage Foundation, the Manhattan Institute, the American Enterprise Institute, the Cato Institute, all have telecommunications projects trying to influence public policy, and they're all funded by the telecommuni-

Government Access on the Internet

If, as experts predict, society is about to split into the information haves and have-nots, better make sure you're among the haves. The following E-mail addresses and Internet destinations will give you the power to lobby the government like a pro. You can use these E-mail addresses via any online service that has an Internet gateway, such as CompuServe and America Online. FTP (file transfer protocol) sites, telenet sites, and gopher destinations require a full, interactive Internet account.

Government Access

ACE (Americans Communicating Electronically) is the White House's program for bringing the government to the people. "We're trying to make sure that all the information that's available to me is available to all Americans who are interested, as quickly as it is to me," says Jock Gill, who administers the ACE program for President Clinton. Send E-mail to Info@ace.esusda.gov for more details. Here are addresses for obtaining information on specific issues and for contacting specific offices and agencles:

The White House: E-mail president@whitehouse.gov or vice.president@whitehouse.gov

White House briefings, papers, legislation ftp whitehouse.gov
White House daily press releases: E-mail clinton-info@campaign
92.org (in the body of your message, place only the word help)

Census data, congressional Information, committee rosters gopher marvel.loc.gov, login marvel

Congressional legislation (updated daily) telnet locis.loc.gov or gopher

Federal agencies (information from 129 government agencies in the FedWorld bulletin

board gateway) telnet fedworld.gov

Federal documents ftp wiretap.spies.com

Federal Register gopher gopher.internet.com

Government gophers gopher peg.cwis.uci.edu

National Information Infrastructure nii@ace.esusda.gov

Electronic discussion lists let you join a roundtable of persons interested in a particular topic. Every piece of E-mail sent to the list is re-sent to each subscriber. For example, to subscribe to a list on election techniques, send E-mail in the form subscribe electly our.name@address—be sure to use your name and address—to list-serv@pccvm.bitnet. To join the Republican Party mailing list, send E-mail in the form subscribe gop-l your@address to listserv@pccvm.bitnet.

For an updated list of electronic government information services, divided by subject matter, contact Blake Gumprecht at gumpbw@vm.temple.edu for the document Internet Sources of Government Information.

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486DX2-66	\$1795

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- ZEOS 14" 1024 x 768 SVGA color monitor, .28mm dot pitch
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Top of the News

Continued from page 64

for a financial bailout. He successfully demanded that CNBC be developed as a financial network instead of a 24-hour news channel because of TCI's partial ownership of Turner's CNN.

The specter of cable companies extending to the information highway their control of both content and service—and of phone companies emulating the cable companies' regulatory model, as they are lobbying to do—is what has so many people concerned. It is also the reason so much money is flowing into Congress as the debate begins over the future of the information highway. From the industry's perspective, the debate in Congress is all about protecting and expanding markets. Malone believes cable plays a seminal role in the infobahn.

Stimulating Programming

"We don't invest in programming to control it," Malone said in hearings before the Senate Judiciary Committee. "We invest in programming to stimulate it and because we think it's a good financial investment."

But a Hobson's choice may be all that's available to small- and medium-size companies trying to do business on the highway if Congress moves ahead with deregulation.

bizarre thing is, [Congress] is talking about allowing the phone companies to follow suit and enter data markets."

Don Goff, director of federal government affairs for AT&T, and as such director of AT&T's PAC, the largest corporate PAC in the United States, says his organization must participate in the process.

"The objective is not to be ideological, it is not to be partisan, but to support the candidates whose participation in

the political process would seem to support the same ends we try to achieve in our business planning," Goff says. "The investment is in the process—in the process of having this representative democracy we have and having a broad participation."

The size of this "investment" is staggering. The telephone industry spends more than four times as much on lobbying as the next-largest communications industry lobbying group, and AT&T alone ac-

> counted for \$1,297,535 of the telephone industry's 1992 election cycle total of \$5,126,017.

> "We think of it as the access charge the longdistance carrier pays in order to access the customer at the local exchange," Goff says, noting that the regional Bells support 26 separate PACs. "It becomes

the cost of doing business in Washington."

A few lawmakers, including telecommunications heavyweight Rep. Ed Markey, D-Mass., say they are trying to resist this onslaught of special interests by refusing PAC donations altogether. Markey, however, accepts money from individual members of the PACs, an action one expert says puts Markey right back with the others.

Indeed, during the 1990 election cycle, Markey accepted \$61,600 of his \$336,209 in total receipts from communications industry interests. The Center for Responsive

Politics has not yet correlated the figures for individual donations that were made during the 1992 election cycle. "It is true that the agenda of the policy debate has been shaped by money," says Andrew Blau, project coordinator of the Benton Foundation's Communications Pol-

icy Project. "The entire political system is infected by the need to have money. The corporate sector has money, it has interests, and in general can use that money to express its interests. It has more access and more of a role in shaping public policy. I'm not saying that's good—I'm saying that's the way it is right now."

Time to Be Heard

Times are changing. Though this political process is on the fast track, there is still time to make your voice heard. Write your representative and write your senators, but do it with poetic irony: Log on to the Internet (see "Government Access on the Internet"), get the day's legislative update from the gopher at bell.com, and, using the power of the very tool that communications industry lobbyists seek to usurp, advance your agenda for a change.

Senior News Editor Joe Abernathy is an Internet pioneer in his own right. He also manages the Internet-based New Information Technologies mailing list for journalists and is executive director of the Houston Free-Net Committee.



Malone, CEO of TCI. "We invest in programming to stimulate it."

Defining Principles for the Information Age

The information infrastructure should ensure

- affordable, universal access
- the freedom to communicate
- · a vital civic sector
- a diverse and competitive marketplace
- an equitable workplace
- privacy
- public involvement in information infrastructure policy decisions

Source: Telecommunications Policy Roundtable

Asserts James Love of the Center for Study of Responsive Laws, either sign with the likes of Malone on his terms and provide the content he dictates—or stay off the highway.

gave the cable companies the right to own channels, they did everything they could to screw their rivals," says Love. "They want to monopolize the pay-per-view channels. They use their control over the infrastructure to control the content markets. And the

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Pentiums Speed Up to 100 MHz

TEST DRIVE

If you're unfamiliar with

Moore's Law, the "\$%*!\$" you swore when Intel announced the latest and fastest Pentiums is a vivid demonstration of the theorem.

Postulated by Intel cofounder Gordon Moore in the early seventies, the axiom holds that processor performance will double every 18 months. Moore's prescience foretold the arrival in early March of the 90-MHz and 100-MHz Pentiums—and predicts 150-MHz versions next year, followed by the next generation of Pentiums, the P6.

Fastest PCs Ever

Nonetheless, you weren't the only ones surprised by Intel's announcement; vendors too were caught off guard. Although 90-MHz and 100-MHz Pentium systems should be available as you read this, we could get our hands only on prototype units—essentially alpha versions—for testing.

Even so, the 90-MHz systems from Dell Computer and Micron Computer proved to be screamers, hurtling through our application benchmarks. As expected, the 90-MHz systems ran about 30 percent faster than 60-MHz Pentium PCs; the production models should be even faster.

Prices are far from firm but should range from as low as \$2999 (for a base-model Dell Dimension XPS P90) up to about \$4000. And that Dell unit is no stripped-down base case: You get a 528MB hard disk, 8MB of RAM, a 256K cache, an STB video card with 1MB of DRAM, and a 15-inch monitor. (The model we tested used a 64-bit #9GXE-PCI with 4MB of VRAM.) Micron's P90 PCI PowerStation should be available in 8MB to 192MB RAM configurations with a variety of video cards, including the 64-bit Matrox MGA Series II 2Plus PCI graphics controller with 4MB of VRAM used in our test model. It comes with a 512K cache, hard disk options from 540MB to 2GB (for SCSI), a double-speed CD ROM drive, and a 15-inch monitor. A typical configuration, priced at \$4199, includes a 64-bit 2MB PCI Micron's
P90 PCI
PowerStation:
Three times faster
on Excel benchmarks
than a typical
486DX2-66

desktop.

drive, a doublespeed CD ROM drive, 16MB of RAM, a 256K cache, and a 15-inch monitor.

Inside the Pentium

The performance boost is due largely to the new Pentium. The chip architecture remains the same as in earlier Pentiums, although the 90-MHz and 100-MHz models have 3.3 million transistors—200,000 more than the 60-MHz and 66-MHz versions—and they are 45 percent smaller than their predecessors. Like the new DX4 chips, these are 3-volt processors and run cooler than the first-generation Pentiums, a plus that is due in part to Intel's low-power-

consumption SL technology (which accounts for some of the additional transistors).

Vendors have also refined their system designs. The most significant advance: The incorporation of Enhanced IDE Mode 3 adapters. Compared with traditional IDE adapters, Mode 3 adapters support partitions greater than 520MB and offer transfer rates of up to 11MB per second.

That these systems are the new PC performance leaders is hardly surprising. What is truly amazing is that they cost hardly more than last month's leader.

The ----

video controller, a 540MB hard -Russell Glitman in part to Intel's low-power-TEST REPORT 90-MHz Pentium Sets New Performance Standard RAM (MB) **Application performance (in minutes:seconds)** System **Dell Dimension XPS P90** 1:15 256 1:09 1:26 1:36 Pentium-90 Micron P90 PCI PowerStation 256 1:21 :36 1:53 1:15 :57 1:14 1:10 Average of 7 desktops 8 or 16 1:33 256 or 512 1:29 1:14 1:34 2:03 2:33 Average of 12 desktops 486DX2-66 8 or 16 0 to 256 1:43 Shorter times are better. Paradox 1.0 for Windows Word 2.0 for Windows WordPerfect 6.0 for DOS Excel 4.0 Freelance Paradox 3.5 Source: PC World Test Center application benchmarks

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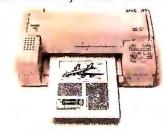
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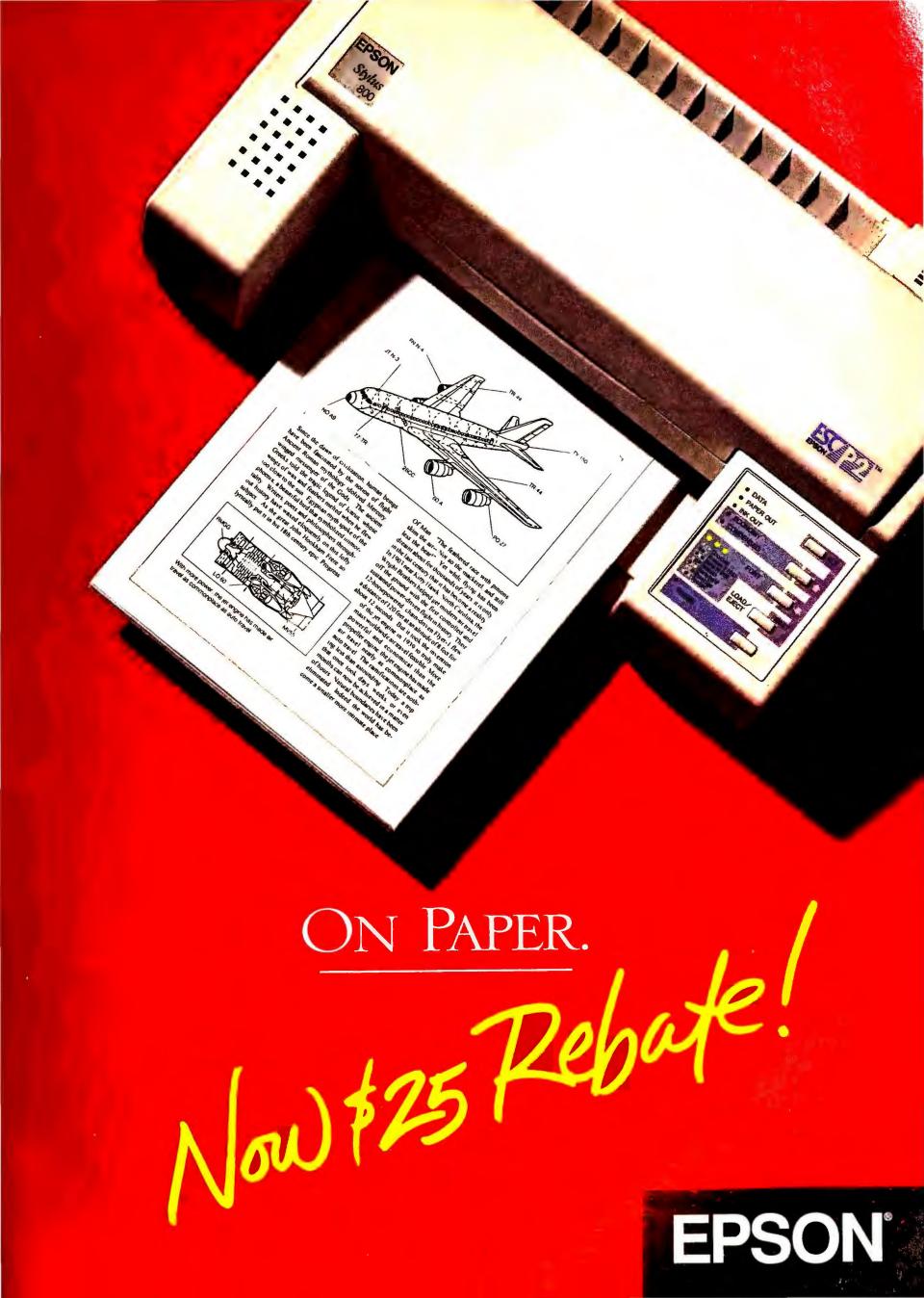


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Norton Utilities Tracks Windows INI

TEST DRIVE

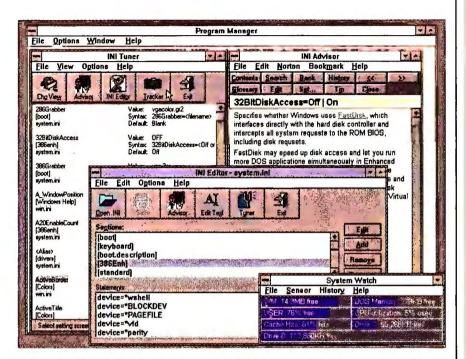
Managing Windows

and its obscure INI files is a critical if arcane chore that has plagued Windows users. No more. Norton Utilities 8.0 now provides powerful Windows system and configuration management and includes essential Windows utilities, while retaining its familiar DOS tools.

I've long wished for a set of well-integrated Windows tools like those in the late beta version I tested. The most notable among them, INI Tracker, tracks changes to Windows' WIN.INI and SYSTEM.INI files. Windows problems are often directly attributable to the installation programs of Windows applications, many of which make wholesale changes to INI files without asking and without making backups. INI Tracker helps solve these problems by logging all INI file changes as well as changes to vour AUTOEXEC.BAT and CONFIG.SYS. You can choose to keep any number of these "snapshots." Restoring your original Windows environment

Norton Utilities 8.0

Unique Windows utilities extend familiar DOS tools.
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A SET OF INI TOOLS for tracking and fine-tuning Windows system files comes with Norton Utilities 8.0. System Watch tracks resources.

is simply a matter of picking the snapshot you want and clicking on the Restore button. A handy File Compare tool uses two windows to highlight exactly what's changed.

Norton Utilities 8.0 also includes INI Tuner, which works along with INI Advisor to clarify those often-mysterious INI sections and entries. INI Editor lets you make changes.

You have to credit Symantec for not making broad changes to the basic Norton Utilities interface. The DOS installation and individual utility interfaces are exactly as they've been for years. That's reassuring when you're in panic mode and need, say, to grab the UnErase utility to retrieve a file.

After you've installed Norton Utilities 8.0, two new Norton groups (DOS and Windows) appear on your Windows desktop. The DOS group is the route to familiar utilities such as UnErase, the Disk Editor, and the ever-popular Rescue Disk (which creates a floppy boot disk that contains all essential

CMOS and File Allocation Table information).

The basic Norton DOS utilities eschew a fancy interface; they just do the job. And several of them (such as Hardware Diagnostics) make it clear that you must exit to DOS or disable your network drivers before you can use them.

Norton System Information includes Hardware Diagnostics; this utility provides a clever new IRQ Status test. When you install an add-in card such as a sound board or a CD ROM interface, finding a free interrupt can be a frustrating trial-and-error process. Other diagnostic utilities I've known had a disconcerting way of overlooking installed boards that were not in use. Norton's test checks out the hardware thoroughly.

The bottom line: Symantec successfully keeps a venerable set of tools both practical and familiar while incorporating unique cutting-edge technology. Norton Utilities 8.0 is essential for every PC user.

-Stan Miastkowski

Fast Graphics, Cheap

New graphics boards are using some tricks to let affordable but slower dynamic RAM (DRAM) deliver VRAM-like performance.

First there was memory interleaving, a technique to time the board's accesses to and from dual banks of memory, reducing the wait for DRAM to recover for the next transaction.

Then came XRAM, which uses a 256K DRAM cache to handle screen refreshes 70 or so times per second. The cache frees the rest of the board's DRAM to accept incoming graphics data from the system.

Now, a number of board makers are enhancing performance by widening to 64 bits the paths used to transport data from the graphics processor to the DRAM. We tested two 64-bit DRAM boardsthe Number Nine #9GXE64, and Orchid Technology's Kelvin 64-and found their performance almost 20 percent faster than that of standard 32-bit DRAM boards. Street prices for these boards should fall between \$250 and \$300 with 2MB of DRAM.







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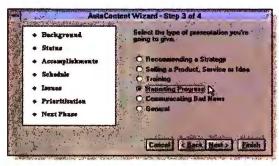
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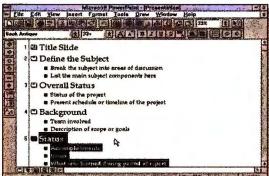
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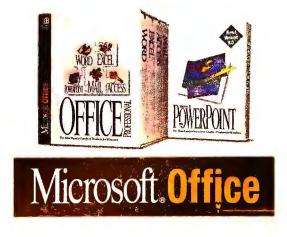


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Others

A PC WORLD MONTHLY SECTION ON GETTING THE MOST FROM YOUR NETWORK

Back to the Office via Remote Control



o any of these scenarios sound familiar? (1) You can't work at home without hauling disks back and forth and then laboriously updating the office version of each file. (2) You're part of a project team and you want to track development work on the new product each day, but this week you're giving presentations out of town. (3) You need the latest information from the company database before you call on clients, but you're spending far too much time calling headquarters and copying numbers into your portable PC.

In short, you need to be two places at once. You need access to your programs and files back at the office, as well as the ability

the kind of long-distance connection you need for such situations. These applications let you connect via modem to your office

PC or, through your office PC, to a LAN. The software comes in two parts: a remote component that you install on your mobile computer, and a host component that you install on the desktop machine (or that you have your net administrator install on another network PC).

to update your mobile computer's files. Your

trusty E-mail system can't handle the job,

because it can't pluck a file off your hard

Remote control packages provide exactly

disk or run one of your applications.

If your desktop machine is operating as host, leave the system on when you leave your office. When you dial in through a modem, your remote machine acts as if it were simply an extra keyboard, mouse, and monitor attached to your office-based PC. You can also log in to a network through your remote; you simply dial in to the host PC and have it act as a conduit to your office network. You'll have the same network capabilities as if you were back at your desk, except that operations such as copying files will be noticeably slower.

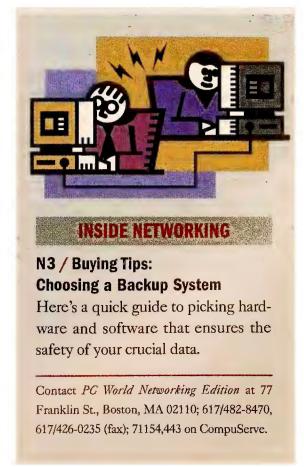
While early remote control applications were often clumsy and troublesome, today's crop is approachable and robust. The packages typically support connections to individual PCs (dial-up or direct PC-to-PC) and networks, include a password system for increased security, and let you disable the host's screen and keyboard from your remote PC. (Otherwise, anything that appears on your remote screen will also appear on your office PC's screen, and someone in your office could view it or even enter data on the host keyboard.)

These packages generally can run scripts to perform regular tasks such as downloading a weekly report. They also contain a general-purpose communications program for calling public mail or bulletin board systems, plus a Chat utility for conducting an online conversation with another user.

Be warned, however, that remote com-

Remote Control Packages...

- · Give you access to another PC, for running applications or for copying files
- · Connect via modem to either a single PC (through which you can access a network) or a dedicated network host, or directly via cable to another nearby PC.
- . Support both Windows and DOS applications
- List for about \$200



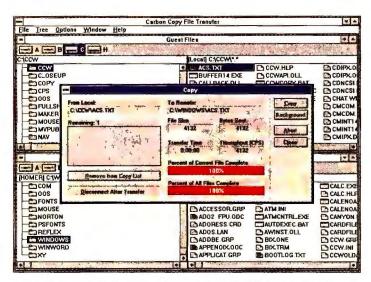
Networking

puting is slower than sitting at your desk and typing at your own keyboard. How much slower depends on your setup—particularly your modems. If you plan to do a lot of remote computing, invest in the fastest modems you can afford, since your connection will be only as fast as the slowest modem on the link. You also should make sure that your host machine is reasonably powerful and that, if you're running Windows, your remote PC has two serial ports free (for mouse and modem).

Here are snapshots of three veteran remote control packages.

Carbon Copy

Microcom's Carbon Copy comes in two versions (currently release 6.1 for DOS and 2.0 for Windows), and the distinction between



CARBON COPY LETS YOU DRAG AND DROP files and shows you the status of files being sent over the wire.

them is more subtle than it first appears. You can actually work with both DOS and Windows applications if you have the Windows version of Carbon Copy. With the DOS version you can work only in DOS on your local PC, but you can still control a remote PC that's running Windows.

Cross-compatibility is built in. For example, a PC running the Windows version of the remote software can call into a host running the DOS version. This way, if you already have the DOS version running at one of your company's locations, users from different locations can call in using the Windows versions—a nice touch.

You also can buy add-on software for both DOS and Windows versions that lets you remotely control one or more LAN workstations from another—a feature that's used primarily by network administrators for

tasks such as remotely updating users' software. (Network administrators were early adopters of remote-control packages, using them particularly as troubleshooting devices.)

Setup for the DOS and Windows versions is easy; the program asks little more than your name, whether you are using a serial port or a LAN connection, and whether you

want the host to require a password from remote callers. Note, though, that Carbon Copy is a large program, particularly the Windows version: You'll need at least 4MB of disk space plus an additional 2MB for a swap area during installation.

Carbon Copy for Windows operates at up to 115.2 kbps, which is nice for direct con-

nections. It also has options for both MNP-10 connections (an error-correction option that gives you clear transmissions over particularly noisy telephone lines) and cellular connections. By contrast, the DOS version has a maximum speed of 38.4 kbps and includes no special MNP-10 or cellular modem features.

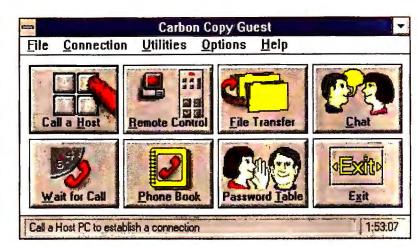
The user interface is button oriented, so once you've set up a Guest-Host communications session, you can perform many routine functions just by clicking an icon. The automatic data

compression and drag-and-drop file transfers are snazzy. You get a directory tree that shows everything on both computers; all you have to do is look up the file and drag it

to the destination icon. Carbon Copy compresses the file, transmits it, and then decompresses the file at the receiving end.

Close-Up

Norton-Lambert's Close-Up version 5.0 runs under either DOS or Windows, comes on a single 3½-inch disk, and sets up in a matter of minutes. The installation program automatically loads each computer with both host and remote capabilities. You are asked to pick your modem from a list. Once you've

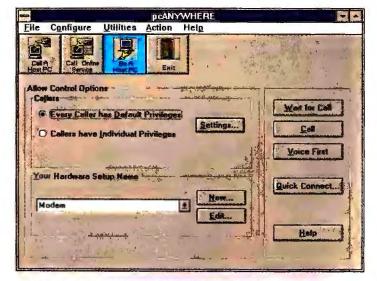


CARBON COPY allows one-touch initiation of such online capabilities as Chat, File Transfer, and Remote Control.

chosen one, Close-Up automatically configures your system and presents you with what it considers to be the best configuration for your computer. You can either accept what Close-Up suggests or modify the configuration as you like.

When you load and run Close-Up from Windows, you actually jump from Windows to DOS and back to Windows. Start out by clicking the Close-Up icon in Windows; the program drops you into DOS so that you can dial and connect to the host. If the host is up and running Windows, Close-Up acts as if it's another Windows application on the host. If the host is running under DOS, Close-Up treats your remote PC as a simple DOS extension of the host.

Close-Up's speed and small size are big pluses, and a number of handy features, such as smart handling of screen updates, make for a smooth entrée into remote computing. For example, if you're flipping back and forth between several pages in a word processing document, Close-Up "remembers" each page and snatches it from local memory when you hit either the <Page Up> or <Page Down> key. Close-Up transmits data only when you start making



NORTON PCANYWHERE'S MAIN WINDOW lets you set up a given session as a host or a remote partner.

changes to the document, and the portion of the screen that actually changes is usually relatively small. In informal tests, Close-Up seemed noticeably faster at updating the screen in Windows than Carbon Copy or Norton pcAnywhere (see the following reviews).

Close-Up's maximum rated speed is 115.2 kbps. In addition, the program provides three levels of error correction for keystrokes and transmitted screen information, from no error checking (which is a faster but

riskier method) to almost total error checking (slower but more secure).

All file transfers are protected by the company's own error correction protocol—even if you choose to skip error checking for keystrokes and screen updates.

Norton pcAnywhere

Like Carbon Copy, Symantec Corporation's Norton pcAnywhere comes in two versions: for DOS (version 4.5) and for Windows (version 1.0). Each version also has an add-

on software pack that lets a user at one LAN workstation remotely control up to five additional LAN workstations. The Windows version comes on two 3½-inch disks (which can be traded for 5¼-inch disks), and the DOS version comes on four 5½-inch disks (tradable for 3½-inch).

In the DOS version you can choose to be only a host or only a remote user, as circumstances warrant. The DOS version's remote portion also lets you run under Windows or access a host running Windows.

Buying Tips: Choosing a Backup System

ackup systems are a network's emergency parachute—the last resort in a desperate situation such as a server disk crash. So you can't be too careful when choosing a backup system. And the choice goes beyond picking a tape drive. You must choose software to control the process, and make sure that the backup software accommodates the way applications on your network open and use files.

The Hardware Side

You should consider three factors when choosing a tape drive: capacity, speed, and the way the drive connects to your network.

Three types of tape drives predominate: low-end QIC-80, 4mm digital audio tape (DAT), and high-end 8mm DAT. QIC-80 drives connect to parallel ports or floppy controllers. They sell for under \$350 on the street, but they have a low capacity (250MB per tape) and low performance (a 5MB-perminute data transfer rate).

The 4mm DAT drives, probably the most popular, offer capacities of up to 4GB per tape (8GB with compression) and a transfer rate of 20MB per minute. DAT drives connect to any SCSI adapter and range in price from \$1500 to \$3500.

8mm DAT drives provide up to 5GB of capacity (or 10GB with compression) and transfer rates of 30MB per minute. These drives also connect to SCSI adapters and cost between \$3000 and \$5500.

Making the Right Connections

Should you connect your tape drive to a workstation or directly to a server? You can argue either side of this issue. Connecting directly to a server offers unrivaled perfor-

mance and minimizes network traffic (since all backup operations are confined to the server). But tape drives are more problemprone than other components, so a direct connection may weaken server stability.

If a single tape drive can't back up all your network drives, you can buy additional tape drives, which lets you run multiple backup sessions at once, or you can equip your tape drive with an *autochanger*, a device that changes tapes during backup-and-restore operations. Autochangers are popular for remote, unattended network sites because they minimize human intervention. But they are sophisticated robotic devices, so don't be surprised at their five-figure price.

Software: From Basic to Sophisticated

In the early days, backup programs came with tape drives. Now you can mix and match software and tape drives. Solutions range from basic file-copying utilities to supercomplex programs that not only back up and restore files but maintain databases of archived files, schedule backup sessions, and rotate the tapes. You'll pay anywhere from \$400 to \$2000 per server for one of these sophisticated packages.

Network managers are divided about whether a no-frills or a feature-rich approach is best. Those who opt to manage the tracking of files and backup sessions manually fear that the databases maintained by the more elaborate backup programs are themselves a potential point of failure. Those managers who let the backup software control things feel that the efficiency with which they can locate archived files and manage tape rotation is worth the risk.

The biggest pitfall unaddressed by

most backup programs is the handling of files that are in use during backup. Most backup programs simply skip open files and then attempt to back them up again at the end of the session. Others can detect whether the files are open for reading or for writing and will back up only those files open for reading. Still others attempt to back up open files no matter what.

Unfortunately, most programs don't let you choose the method of handling open files. And most prevent users from updating a file while it is being backed up. Some vendors sell modules that perform such "hot backups" of database files created and managed by database engines from suppliers such as Oracle, Sybase, and Btrieve.

Some backup software/hardware combinations also can back up the hard disks of workstations across the net. If you want to do that, make sure you choose appropriate software and hardware.

Evaluate your backup requirements thoroughly before making a hardware decision. Consider the capacity and data transfer performance you need. Select backup software even more carefully, evaluating whether you want a system that lets you manage operations manually or one that handles its own file, backup session, and tape-rotation cataloguing. If you need to back up files while they are in use, question your backup software vendor thoroughly about the handling of open files. And if possible, get evaluation units to try before you buy.

-Bill Lawrence

Bill Lawrence helps manage a 3000-node network for a major western utility.

Networking

You can load and run pcAnywhere for DOS from the command promptalthough if you're operating remotely, you can also run it from the Windows Program Manager. Once you're up and running, you access program commands through a series of neatly and logically arranged menus.

The Windows version's main setup screen contains a menu bar with all the selections you need to set up your comput-

er and modem for any type of communications session. As with the other two programs, installation is quick and straightforward. Once it's installed, the package offers a familiar Windows look; however, unlike Carbon Copy, pcAnywhere features a twotiered menu structure that separates the actions you perform while communicating (such as File Transfer or Save Screen) from the operations that are required to set up or configure a communications session (such as Be a Host or Call a Host).

Both the DOS and Windows versions run

Remote Networking Specialists

Remote control packages let two PCs share screens. That's handy for copying files but not always for running Windows applications, since updating screens via modem is slow. An alternative remote-access approach called remote networking puts your remote PC directly on your office network. You dial into a special network connection device, and you're connected as if you were at your office.

Performance under Windows is faster than normal, since you're working on your own PC without waiting for screen updates, but it's slow on jobs that pull large quantities of data off the net. The network connection device is expensive, but you don't need a dedicated remote-access PC on the network or software for each user. Sample products include DCA's Remote LAN Node and Shiva's Net-Modem and LANRover lines.

at up to 115.2 kbps and use parity-checking error control for keystrokes and screen updates. Both versions also include a wide assortment of file transfer protocols, which contain their own error checking and correction algorithms for file transfers. Note that pcAnywhere is finicky about IBM PC compatibility. Of the three programs, it's the only one that refused to run on one of my PC clones.

-Glenn Hartwig

Glenn Hartwig is a freelance author and editor living in New Hampshire, where electronic communications is both a necessity and a reasonable alternative to lengthy commutes and baggage-carousel gymnastics.

Carbon Copy 2.0 for Windows, 6.1 for DOS

Microcom, 800/822-8224, 617/551-1000 Reader service no. 601

Close-Up 5.0

\$199

Norton-Lambert, 805/964-6767

Reader service no. 602

Norten pcAnywhere 4.5 for DOS, 1.0 for Windows

\$179 (DOS), \$199 (Windows) Symantec, 800/441-7234, 503/334-6054

Reader service no. 603

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New Products

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NEC Brings Multimedia to the Corporate Desktop

EC's new multimedia PCs are not kids' stuff. With the new Image 450m and Image 466m, NEC introduces its first multimedia systems designed for corporate users. The Image m systems offer high performance, top-of-the-line CD ROM drives, and multimedia software designed for businesspeople.

For the new Image m line, NEC took its current high-end series, the Image 486es, and added multimedia components. (According to the PC World Test Center, Image es systems offer above-average 486 performance; we expect the Image m line to perform comparably.) The Image m models sport a VESA local bus video accelerator with 1MB of VRAM (expandable to 2MB) and can display 16.8 million colors at 640 by 480 resolution. Standard features include 8MB of RAM expandable to 128MB and a 420MB hard drive. You get a three-year warranty.

The Image m's high-performance CD ROM drive, one of its notable multimedia features, promises faster video and ani-

NEC Image 450m and 466m

NEC's first business-oriented multimedia printers offer triple-speed CD ROM drives and Lotus's ScreenCam software.

NEC Technologies
800/632-4636,
EstImated street price:
\$2785 to \$3125 without monitor

Reader service no. 666

mation, quicker database searches, speedier installation of software distributed on CD ROM. Currently, most multimedia PCs offer double-speed CD ROM drives with 300kilobyte-per-second (K/sec) transfer rates. But the Image m models use NEC's Multi-Spin 3Xi, a triple-speed drive with a 450-K/sec transfer rate. The average access time of the MultiSpin 3Xi is 195 milliseconds (ms), considerably faster than the 250ms (or slower) access times of many double-speed drives.

The MultiSpin 3Xi's unique control panel lets you adjust drive

settings (such as volume) by means of buttons and knobs—many CD ROM drives make you use Windows software for this task. The MultiSpin 3Xi is also the first CD ROM drive from NEC that can play music when the PC is off. (The drive's front panel displays the number of the track that's playing.)

When the PC is on, you can listen to a CD while working on a spreadsheet (don't tell the boss). And if you use the bundled headphones, you won't disturb your neighbors. Each Image m also comes with Labtec CS-800 speakers and a microphone.

The Image m models include a 16-bit stereo sound card either Creative Labs' Sound Blaster 16 or Media Vision's Pro Audio Spectrum 16. (Unfortunately, you won't know which



MULTIMEDIA FOR BUSINESS: NEC's new Image m PCs feature triple-speed CD ROM drives, 16-bit sound cards, and multimedia business utilities.

card you're getting until the system arrives.) These comparable sound cards may not please music aficionados, because they lack wave-table MIDI support. The Image m sound cards rely on FM synthesizers that approximate the sounds of different musical instruments, while cards that have a wave-table synthesizer use digital recordings of real instruments stored in the sound card's ROM and can simulate the instruments more accurately. Though you'd want a wave-table synthesizer for music composition, the Sound Blaster 16 or Pro Audio Spectrum 16 should suffice for business applications.

NEC wisely bundled Lotus's ScreenCam with each Image m system. One of the more interesting multimedia business applications, ScreenCam enables you to capture Windows screen activity, cursor movements, and sound clips in a short "movie." For example, a ScreenCam movie could show the screen activity as you scroll through items on a spreadsheet or a report while your recorded voice simultaneously explains your actions. You can send these movies to co-workers and clients. ScreenCam can also help with team projects and serve as a presentation and training tool.

According to NEC, Image m street prices range from \$2785 for the 50-MHz 486DX2 system (the 450m) to \$3125 for the 66-MHz 486DX2 (the 466m). NEC sells monitors separately; for example, the 14-inch Multi-Sync SVGA costs about \$330 on the street.

-Laurianne McLaughlin

AST Hits the Warehouse Clubs With Pentium System

ou know a technology has entered the mainstream when you can find it on the shelf of your local warehouse store between the cases of motor oil and the gallon cans of tomato sauce. Case in point: AST is selling its Advantage EXP/60, an entry-level Pentium system, exclusively through four outlets: Computer City, Incredible Universe, Price/Costco, and Sam's Club.

Because list prices are a foreign concept to warehouse stores, and each chain setsand often changes-its own prices, it's difficult to say exactly how much the EXP/60 will cost. But you can figure that for about \$3200, you'll get a 60-MHz Pentium, 8MB of RAM, a 256K external cache, a 420MB hard disk, the usual collection of ports (two serial, one parallel, and one mouse), and a 14-inch super-VGA monitor. You'll also get one free PCI slot and three ISA slots (one equipped with a 14.4-kbps fax-modem).

The unit's preinstalled software is a bit on the thin side. You'll find MS-DOS 6.2, Windows 3.1, Delrina WinFax, and start-up kits for Prodigy and America Online. The EXP/60 would be more useful out of the box if AST had included one of the "works" integrated packages. But if you're going to lay

AST Advantage EXP/60

Pentium power for the relatively frugal, at a warehouse store near you.

AST Research

800/876-4278

Street price: from about
\$2900 without monitor

Reader service no. 667

down the bucks for a system with this much horsepower, chances are you'll want to choose your own applications.

Besides the Pentium's plentiful processing power, one highlight that distinguishes the EXP/60 from competing preconfigured systems is all the room AST has left under the hood for expansion and upgrades. There are four empty drive bays for adding peripherals, a software-upgradable Flash BIOS, and an easy-to-use 273pin ZIF (zero insertion force) socket, should you opt for the Pentium OverDrive chip or the more powerful processors Intel will eventually make available.

For those seeking more muscle, AST offers options. Again, prices will vary by store, but for a system with a 540MB hard drive, 16MB of RAM, and a 15-



AST'S ADVANTAGE EXP/60 is a new Pentium system sold through popular warehouse clubs such as Price/Costco and Sam's Club.

inch monitor, the bottom line should be about \$3300. Comparably priced Pentium PCs from mail-order biggies such as Gateway and Dell often include CD ROM drives, so the EXP/60 isn't the cheapest Pentium system. But if you're near a warehouse store and want your Pentium now, AST has a reputation for excellent quality.

-Stan Miastkowski

Sound and High-Speed SCSI on One Card

daptec's \$399 AMM-1572 offers just about everything a multimedia upgrader could need—a high-performance SCSI host adapter, CD-quality stereo sound, and more, all on a single space-efficient ISA card. Add a double-speed CD ROM drive and a pair of speakers, and you can endow any Windows PC with first-rate multimedia capabilities.

Many audio cards offer a SCSI port, but it's usually a limited 8-bit connector intended only for hooking up a single CD ROM drive. The Adaptec board provides SCSI-2 support so you can attach a CD ROM drive and other peripherals, such as hard disks and removable storage systems, as your

computing needs expand.

The AMM-1572 provides 16bit stereo sound with wavetable MIDI synthesis; you also get Microsoft's Windows Sound System, a suite of business audio applications bundled with a microphone.

SCSI and sound boards are notorious for their thorny installation. But the included Adaptec EZ-SCSI and EZ-Audio software made configuring the board easy; I just had to press <Enter> a few times.

The AMM-1572 also supports the XA multimedia format, which synchronizes multimedia playback by interleaving video, audio, and other information into one data stream. The catch is, the XA standard hasn't

AMM-1572 SCSI Audio Host Adapter

This SCSI-2 adapter offers CD-quality sound and other features targeted at multimedia users.

Adaptec Inc.

800/442-7274,

408/945-8600
List price: \$399

Reader service no. 668

garnered wide support among software developers. Whatever XA's future, the AMM-1572 offers a comprehensive package of features likely to serve multimedia enthusiasts well.

-Harry McCracken



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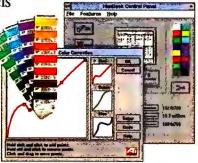
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WinSwitch changes color and resolution... without leaving Windows.

for Windows users too. with acres of virtual desktop and flickerfree graphics at up to 100Hz refresh. Exclusive software handles color calibration, and our unique WinSwitch lets you change color and resolution modes without restarting Windows. Plus, the GRAPHICS PRO TURBO makes full-motion video really hum with no additional multimedia hardware. So don't bee stung by lesser graphics. Get the GRAPHICS PRO TURBO. It's a

(Larger numbers are better)

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Winbench 4.0* 1024 x 768 /256 colors moels/sec	36.2	28.0	20.0
Winbench 4.0* 889 x 600/18/7 M colors mps/s/sec	25.7	12.1	4.6
VGA Performance ++ xpelanae	4,428	575	1,662
Motion Video Performance ## #####/sec	24	11	13

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* All performance tests done on a Pentium 66MHz, 16MB RAM, 256K cache, 200MB HD at 60Hz, using 2MB versions of PCI graphics cards. † Winbench 3.11 at 1024x768 resolution in 256 colors. 11 VGA performance tested using PCBench 8.0 (video harmonic) 111 Motion Video performance measured under Windows using 65K colors. Test clip recorded at 320x240 at 30 fps using Indeo codec.

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**Suggested U.S. retail prices, dealers may sell for less.

Mass-Market Multimedia Madness From Packard Bell

C retail giant Packard Bell has announced 486- and Pentium-based multimedia systems that will interest denizens of home offices and small businesses. Though other vendors offer competitive systems through the retail market, not many can match Packard Bell's generous software bundle.

The Packard Bell systems' processor types range from a 25-MHz 486SX to a 60-MHz Pentium, all with ZIF sockets for easy upgrading. The 486 base configurations include 4MB of RAM (expandable to 64MB), and the Pentiums are stocked with 8MB of RAM (expandable to 128MB). Hard drives run from 210MB to 420MB. For multimedia, each system has a 16-bit sound card, amplified stereo speakers, and an internal double-speed CD ROM drive.

Priced from \$1200 to \$1700, the 486 systems come in desktop and minitower configurations; the Pentium systems, priced from \$2200 to \$2400, are available only in a desktop case. The Pentium models also include a 14.4-kbps fax-modem and communications software. For all the Packard Bell sys-

Packard Bell Multimedia series

Mass-market multimedia PCs with double-speed CD ROM drives, sound cards, speakers, and impressive software bundles.

Packard Bell 800/733-5858
Estimated street price: 486 PCs \$1200 to \$1700, Pentium PCs \$2200 to \$2400 without monitor Reader service no. 669

tems, the monitor costs extra.

I examined a top-of-the-line Pentium PCI desktop system with 8MB of RAM, a 420MB hard drive, and an \$860 17-inch multiscan monitor. Performance was fast and smooth even with multimedia applications such as animation—just what you'd expect from this kind of horse-power.

But brute force doesn't tell the whole story. The desktop systems have adequate expandability, with three ISA slots and a pair of PCI slots. All of these systems come with a bountiful bundle of about a dozen software titles, including Microsoft Works and Software Toolworks' Multimedia Encyclopedia. The Pentium multimedia models also add Macromedia's Action SE 2.5 with ClipMedia multi-



LEAN, CLEAN MULTIMEDIA MACHINE: Packard Bell's new PCs feature double-speed CD ROM drives and 16-bit stereo sound cards.

media presentation software.

I can report only a couple of minor gripes about my computer. The keyboard seemed just a trifle cramped, and no microphone was included with the unit. Still, these Packard Bell systems offer plenty of power and a plethora of software.

-Gene Smarte

Amdek Joins the Nineties With New Monitors

mdek was once the name in PC monitors. Chances are, the monochrome monitors most of us once used carried the Amdek label. Lately, however, the company has been quiet, and the few new products it has introduced have been out of step with the rest of the monitor market. Amdek may now be set for a comeback, with four competitively priced color monitors and a \$109 monochrome model.

The low-end model, the 14-inch monochrome AM/432E, harks back to Amdek's glory days. But the other four—the AM/732NI, the AM/732E, the AM/815E, and the AM/817E—are thoroughly up-to-date color displays. These color models comply with the EPA's Energy

Star guidelines for low power consumption as well as with the MPR-II standard for low radiation emissions.

The Amdek monitors also support the high resolutions and fast refresh rates that today's buyers expect. For comfortable computing, your monitor should support a refresh rate of at least 70 Hz, regardless of the resolution you use. The baseline, 14-inch 732E model supports 60 Hz at 640 by 480; but its more advanced sibling, the 14-inch 732NI, supports 70 Hz at every resolution up to 1024 by 768. The 15-inch 815E gives you 1024 by 768 at a rocksteady 76 Hz, and the 17-inch 817E offers 76 Hz all the way to 1280 by 1024.

These Amdek monitors are

Amdek AM/432E, AM/732E, AM/732NI, AM/815E, and AM/817E

Competitive new monitors from the one-time market leader.

Amdek 800/722-6335

List price: \$109 to \$839

Reader service no. 670

priced at the low end of today's market. At \$839 direct, for example, the 817E may not be the least expensive 17-inch monitor out there, but it's pretty darn cheap. The 815E will run you \$379 direct, while the 732NI sells for \$299 direct.

-Dan Miller

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you'd print. Or organizing sent and received faxes in convenient folders. Or converting faxes into word processing documents with OCR.

There's added convenience with dozens of ready-to-use cover pages. Fax phonebooks that are drag-and-drop simple. And improved fax annotation tools that even let you add your signature.



Based on extensive usability testing, the new customizable interface includes folders for organizing sent and received faxes.

Don't try this with a fax machine.

Imagine faxing, not just an image of a document, but the actual file itself*, so it's ready to be used in an application. Imagine sending a single document that is automatically faxed to some people and e-mailed to others.

Now imagine you're on the road, and WinFax PRO automatically forwards faxes to you. Or lets you retrieve faxes sent to your regular fax number*. And there's more.

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Forecast Pro and Benchmarking: Tools for Improving Your Business

hink of these two programs as experts in a box, ready to help you make better business decisions. And you don't have to pay them by the hour. Your statistics adviser, Business Forecast Systems' Forecast Pro 2.0, makes it easy to create accurate forecasts for sales, service requests, and other uses. Your quality control adviser, LearnerFirst's Benchmarking 1.0, leads you through a threeto-six-month analysis and retooling of your company's products, services, equipment, and business processes.

Forecast Pro 2.0 for Windows

If you do occasional forecasting but lack a statistics background, you may not be generating the most accurate forecasts. Or you

tical method yourself, Expert Selection can do it for you. Here's where Forecast Pro shines. First, you import data in ASCII, Excel (XLS), or 1-2-3 (WK1) format (but not in 1-2-3 for Windows' WK3 or WK4 format). When you choose Expert Selection, Forecast Pro evaluates the data, recommends which statistical method to use, and does the forecast. (In the previous version of Forecast Pro, this was a multistep process.) The program uses popular statistical methods such as exponential smoothing, Box-Jenkins, and dynamic regression. It also displays many types of graphs.

The more advanced Forecast Pro XE is available for people

> whose main job is forecasting. The program's forecasting models build on exponential smoothing method and correct for special circumstances as strikes. such Forecast Pro XE contains multilevel exponential smoothing to ensure accurate forecasts for large data sets-for example,

predicting sales of a product when it's available in different packages, sizes, and markets.

Review Common Questions 1. Aren't we already doing benchmarking 4. Is it really possible to get data from other companies? 5. Is it ethical to collect benchmarking data? . Where can I get the benchmarking data I need? . How much time do I need to spend on this? . How do we coordinate our data collection and d 10. Will everybody be expected to benchmark something?

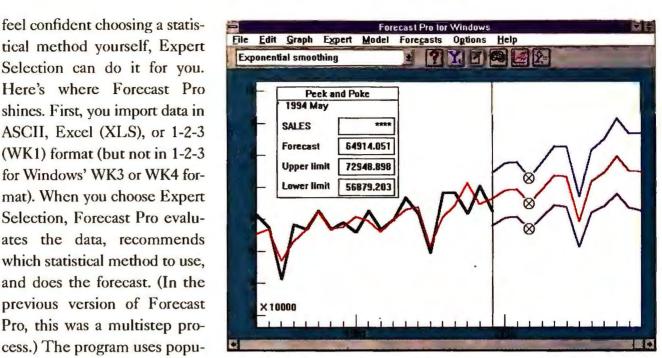
BENCHMARK OF SUCCESS: Benchmark 1.0 helps measure your business's performance.

may be wasting time struggling with a statistics spreadsheet or package that's more complicated than you need. Forecast Pro saves you time by reducing some of the complexity of statistical forecasting.

Version 2.0 boasts a simple menu structure and tool bar, plus a new Expert Selection feature. In forecasting, the biggest challenge is how to evaluate your data. If you don't

Benchmarking 1.0 for Windows

While Forecast Pro helps with day-to-day planning, Benchmarking 1.0 is designed for larger business decisions. Benchmarking is a quality improvement method that companies use to measure the performance of employees, products, equip-



FORECAST PRO 2.0 chooses a statistical method, such as exponential smoothing, then creates a forecast and graphs based on your date.

ment, and processes, and to set goals for improvement.

Benchmarking 1.0 serves as a teacher and an organizer, and it doesn't assume you have an MBA. The program advises you to form a team for benchmarking, which typically takes three to six months to complete. The program gives you a quick introduction to benchmarking, then displays informational screens, poses questions, and offers advice as you progress.

The software breaks the benchmarking process into 19 easy-to-follow lessons, which are organized like chapters in a book. You start by analyzing your business and identifying which aspects to benchmark, such as manufacturing processes, products, or equipment. The software then guides you through the benchmarking process: You collect internally published information, do original research and interviews, visit company facilities, and study your competitors to determine their strengths. Benchmarking 1.0 then helps you organize your information into a database and create reports of your findings. Finally, you identify corrective actions, develop a plan, get management approval, make the changes, and track their impact. Along the way, Benchmarking 1.0 answers your questions and offers advice.

-Laurianne McLaughlin

Forecast Pro 2.0, **Forecast Pro XE**

Quick business forecasts for novices and experts alike. **Business Forecast Systems** 617/484-5050 List price: \$595, XE version \$995

Reader service no. 656

Benchmarking 1.0 for Windows

A guide to help you benchmark your business. **LearnerFirst** 800/863-8050 List price: \$475, for American **Society for Quality Control**

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May 1994 June 1993 February 1993





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PowerViewer

learned the horrifying news. That big meeting with the president of the company next week? It's been moved up. Way, way up. And that report for the big meeting? It's due in half an hour. Fortunately, you've got PowerViewerTM for WindowsTM, the one tool that lets you access virtually any database and create presentation-ready reports with a few simple clicks of the mouse. You take a long sip of coffee, sit down in front of your computer and click open PowerViewer.

Access More Information.

Click. Quickly, you access the Connect Profile menu and select the database you want. Because PowerViewer supports over 25 of the most popular PC and relational databases, all the information you need is right at your fingertips. And with Powersoft's Database Connection Hotline, you know any questions you have will receive immediate answers. Click. You go into the Report Painter and select the specific data for your report using one of PowerViewer's powerful point-and-click query techniques. You choose the one that suits you best, whether it's our easy-to-use QuickSelect, our powerful graphical query builder, or a query you've saved from a previous task. Lick. Now you're ready to create your report. You select one of the many built-in QuickStyle

Create Stunning Reports.

reports with full-color 2D and 3D graphs and charts. PowerGuides and Data Smart design tools lead you through every step and let you preview and customize any aspect of your report in seconds. Include a pie chart. Change fonts. Add colors. Pull in your corporate logo. And click, click, click — suddenly, you've created a masterpiece.

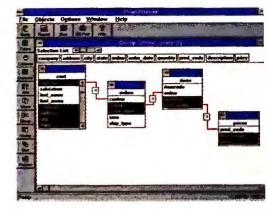
PowerViewer makes information access as simple as point and click. It empowers you to make full use of your company's information and lets you do it faster and with greater ease than you ever thought possible.

PowerViewer, Just \$99.*

It's 11:00 and you've just come out of the big meeting. Your report was a hit. A big hit. So big, in fact, the president has asked you to run it by the entire company, gather everyone's opinions and give him a report on your findings. Under ordinary circumstances, this would be the kind of news that could ruin your entire month.

Fortunately, one of your colleagues has PowerMaker™ for Windows, the tool that gives you all the functionality of PowerViewer plus the power to design fully-interactive forms, manipulate databases and create complete Windows-based applications in no time.

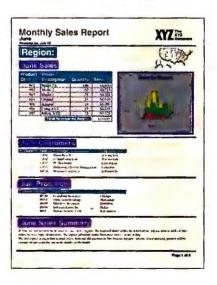
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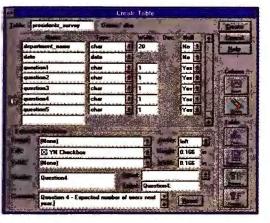


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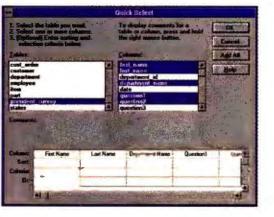




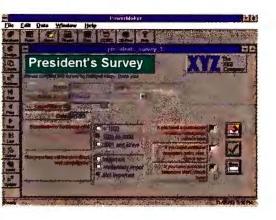
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PowerMaker, Just \$199.*

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database is updated automatically. All you have to do is go in and create your final report. And you already know how easy that's going to be. PowerMaker lets you take the power of PowerViewer a step further, helping you build and distribute your own form-based applications, as well as update databases. With PowerMaker, you can create living, breathing Windows applications that your entire department can use. And you can do it all by yourself in just a few short minutes.

Call 1-800-273-2841 Today.

Of course, this scenario is merely a reenactment of the typical office crisis. But the fact is, PowerViewer and PowerMaker make accessing the information you need, producing stunning reports, and even creating and distributing your own Windows applications as simple as point and click. And right now, these tools are not only incredibly easy to use. They're also incredibly easy to buy, because we're offering them to you at special prices of just \$99 for PowerViewer and \$199 for PowerMaker. And each is backed by Powersoft's 30-day o order satisfaction guarantee. PowerViewer and PowerMaker today, simply contact your corporate reseller, stop by CompUSA or call Powersoft directly at 1-800-273-2841.

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Astound Raises the Bar for Windows Presentation Software

Astound for Windows 1.5

Easy-to-use presentation program loaded with clips.

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Reader service no. 658

ntil now, only Mac users could be Astounded. But with the introduction of Gold Disk's Astound for Windows 1.5, the rest of us can employ this remarkably complete and powerful presentation software. Astound provides power, ease of use, and a CD ROM full of media clips to spice up your show. And Astound's aim is broad. It compares favorably with Harvard Graphics and Freelance, as well as with the multimedia-strong Action and Compel. Astound even treads a bit on the authoring-tools turf of IconAuthor, ToolBook, and HSC Interactive. Think of it as Aldus's Persuasion on a healthy dose of doctor-recommended steroids.

Like many presentation packages, Astound provides templates and lots of clip art to give would-be presenters a starting point. You don't have to spend hours dreaming up color schemes and formats. Instead, you can concentrate on the message you wish to present; the templates provide the cohesion. And you can readily move Astound presentation files between Windows and Mac systems.

You can choose from 50 ready-to-use slide-show templates. You can use a template as is, you can modify it, and you can create your own. Astound features a Persuasion-like arrangement of views, with slides, a slide sorter, and an outline. Because I've spent some time with Persuasion, this familiar interface made me feel comfortable right away.

Perhaps Astound's most intriguing feature is its animation capability. If you want to spiff up a potentially boring bar chart, you can have the bars glide into place on the chart by specifying the path you want each bar to follow. You can ani-

mate clip art, your own drawings, and even text. To animate an object, you simply draw a line for the object to follow; then you specify when you want the animated object to appear on, move across, and exit the slide. It's a simple process, but yields professional-looking results. I wish, however, that Astound would let me make curved paths for my animations; it allows only straight ones.

With the 1200-plus clips of

sound effects, music, fonts, animations, video, and other goodies included on Astound's CD ROM, you can create lots of presentations without repeating yourself. Plus, Astound is an OLE 2.0 client, allowing you to link your Astound presentations to your spreadsheet, word processor, and other OLE-enabled programs. Astound for Windows definitely deserves your attention.

-Gene Smarte

IdeaFisher: A Creative Juicer

ut of bright ideas? Idea-Fisher, a bright idea in itself, is now available in a Windows version. Especially helpful for marketers, designers, inventors, writers, and decision makers, IdeaFisher jump-starts dead creative batteries by linking words and concepts together and keeping track of them.

The program consists of two interlinked databases, IdeaBank and QBank. IdeaBank stores 775,000 words, phrases, and analogies that spark associations in 28 major categories and 420 subcategories. You select Idea Words or Phrases from the main menu, type in any word, and IdeaBank comes up with a list of related ideas. (I typed in Shakespeare and got a list of nine subideas, including "literature/writers" and "Ancient Egypt/Ancient Greece.") A notepad keeps tabs on everything you select; by the time you reach your train of thought's caboose, you have a nice list of associations.

IdeaFisher's other database is QBank, comprising 6000 questions you can draw from to

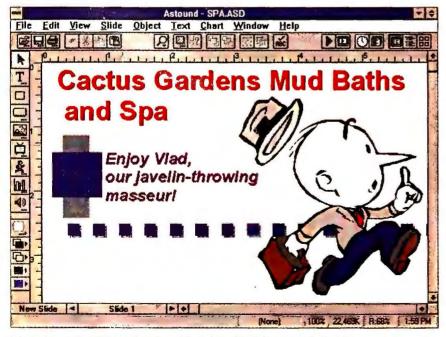
IdeaFisher for Windows

Innovative way to help generate ideas. IdeaFisher Systems, Inc. 800/289-4332, 714/474-8111, 714/757-2896 (fax) List price: \$199 Reader service no. 659

develop a disciplined approach to problem solving. Select New Product and Product Improvement, for example, and QBank asks questions such as "Who should be involved in the project?" A report-writing function lets you write up ideas, expand and collapse questions in outline fashion, and do other tasks.

Just as you wander grocery store aisles to get ideas for dinner, you can use IdeaFisher to generate raw material. You need great self-discipline to make this \$199 program pay off with a bona fide strategy, script, or advertisement. Still, it's a lot more interesting than waiting around for a visit from the Muse.

-Bronwyn Fryer



TEMPLATES, ANIMATION, AND A CD ROM FULL OF CLIPS are some of Astound for Windows' tools for building good presentations quickly.



Microsoft* Windows™ for Workgroups 3.11 is fast. Very fast.

In fact it might be more appropriate to call it Microsoft Windows GTI. Because, for local disk access, it's now up to 150% faster than Windows 3.1 operating system. This added speed, powered by 32-bit technology from our "Chicago" project, means applications can be loaded at twice the speed. It also

makes searching for files and loading Windows up to 100% faster.*

You'll be happy to hear that this new version of Windows can be used by everyone, whether you're stand-alone, networked, or dialing into your office from the road. Windows for Workgroups just installs what you need and you're off to the races.

Packed with new features like

Microsoft At Work™ fax technology and super-fast networking that works with Novell® NetWare, Windows NT™ and other standards, Windows for Workgroups 3.11 is an essential upgrade for any Windows 3.1 user. But there's only one way to experience this speed and power. Drive it.



UnInstaller 2.0 for Windows Zaps Unwanted Applications

ou may not know it, but Windows is destroying your PC. Like an insidious disease, it's consuming your hard disk, crippling your system setup, overrunning your configuration files, and slowing performance in the process. The reason: During installation, many Windows programs dump all sorts of vaguely named files and poorly documented configuration updates throughout your system, making it virtually impossible to delete them completely at a later date.

But MicroHelp has devised a cure. Its UnInstaller 2.0 is a Windows-savvy utility that ferrets out the splay of offending DLL, INI, and other obscure file types that get left behind in various subdirectories. The program also snoops through configuration files, such as WIN.INI and SYSTEM.INI, to remove references to deleted applications. UnInstaller even lets you eliminate duplicate files-a common Windows scenario-and eases the flood of fonts, drivers, and other Windows flotsam that can fill your hard disk. And while UnInstaller can't get every file every time, its simple interface and useful online help make it a powerful tool.

Still, tinkering with Windows is no small matter—ice the wrong DLL, and you've lost

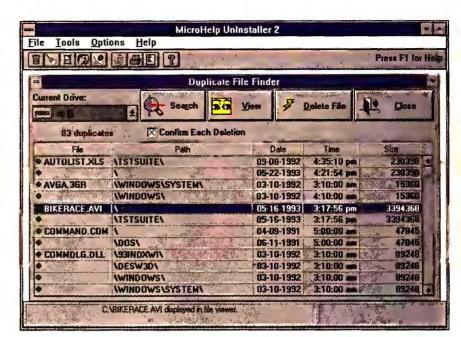
Uninstaller 2.0 for Windows

Easy-to-use utility fights the spread of DLL and INI files.
MicroHelp, Inc.
800/922-3383

List price: \$69.95
Reader service no. 660

your word processor. UnInstaller plays it safe by letting you review your options before taking action. It lets you do a dry run of an uninstall procedure and provides a detailed report of what will be removed and how much disk space will be freed. It also includes an undo feature for restoring deleted files. UnInstaller 2.0 requires 3MB of available hard disk space. For anyone working with Windows applications, UnInstaller 2.0 is a vital tool that is well worth its \$69.95 list price.

-Michael Desmond



HARD DISK HOUSEKEEPING: MicroHelp's Uninstaller can delete a Windows application's related files and duplicate files to save space.

Lotus Notes: Easier to Install, Soon Easier to Use

series of upcoming releases of Notes 3.0, Lotus's acclaimed groupware product, should make your network administrator's life a little easier. And version 4.0, due by mid-1995, will sport a new interface and other features designed to simplify the lives of end users as well.

Perhaps the most significant improvement for administrators is a NetWarè Loadable Module (NLM) version of Notes. Available in version 3.1, the Notes NLM can be installed on networks running NetWare 3.11 or 3.12. For large networks of, say, more than 50 users, Notes previously required a dedicated server running OS/2. If your network gurus weren't familiar with OS/2—and many aren't they had to learn and install this complex operating system before installing Notes. With the new NLM version, network staff can install Notes on a familiar operating system.

In version 3.1, due to ship by

the time you read this, Lotus will support TCP/IP, the protocol that allows Notes users to communicate with UNIX-based computers.

A slightly later release, version 3.15, will add new features for end users, including a readyto-run customer service application that you can customize without complex programming. A multimedia guided tour explains basic Notes concepts, such as the use of forms and views for manipulating data.

Notes users stand to gain the most with version 4.0, which will provide a variety of interface enhancements. Context-sensitive menus will offer different commands, depending on the task you're performing. With InfoBoxes, already available in Lotus's Improv spreadsheet software, you can click on-screen objects to view their attributes and features. Both enhancements save you from rooting through layers of menus to find relevant commands.

Notes 3.1, 3.15, and 4.0

Two version 3 upgrades provide NetWare and TCP/IP support; version 4.0 will offer a better interface and other enhancements.

Lotus Development Corp. 800/346-1305

List price: Version 3.1 or 3.15 \$495 per server or client, 4.0 price unavailable

Reader service no. 661

Notes 4.0 is also expected to offer special support for mobile users, making it easier to dial in from remote locations. For Notes developers and administrators, version 4.0 will include improved programming features, additional security, and agent technology to allow you to create intelligent commands that can, for example, search multiple Notes databases and notify you whenever certain types of data are added.

-Randy Ross

New Delrina WinComm PRO makes powerful communications easy. So why struggle with Procomm?







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o take part in the on-line revolution, you'll need a powerful communications package.
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But perhaps you'd prefer software that puts that power right in front of you in a clean, intuitive interface. One that not only makes it easier to go on-line but simpler to do things once you're there. With features like a customizable, icon-based phone-

book. Drag-and-drop file transfer. A customizable button bar where you can place your most common tasks. Even a scrollback buffer that lets you refer back to text from your current session, as well as text from previous sessions.

In that case the only choice is new Delrina WinComm PRO™. The one *PC Computing* called "...Intuitive enough for a novice user, yet still packed with enough sophisticated features to keep an on-line junkie happy."

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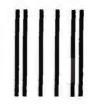
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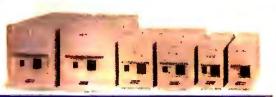
'All other brands of UPS die regularly in this ightning prone environment. My APC won't lie!" said Paul Sisilli, Systems Analyst, City of Port St. Lucie . "With other brands, users don't ind out until it is too late. The power nterruptions here are very hard to live with. The other brands are dying off. Typically they ast just beyond their warranty period. My Back-UPS is going on three years...no other brand is as reliable."

virtually all separate surge suppressors. Surge performance is even backed by a \$25,000 Lifetime Equipment Protection

If you're protecting a network server, a communications interface port (on models Back-UPS 400 and higher) provides the security of an automatic shutdown to all major OS including NetWare, Windows, Windows NT, LAN Server, LAN Manager, LANtastic, SCO Unix, OS/2, Banyan Vines, AppleShare/System7 and more, so your data is safe whether the system is attended or not. PowerChute software and interface kits sold separately.)



And since data processed on networked clients needs protection too, the \$139 Back-UPS 250 provides an



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Don Traux knows first hand about Back-UPS reliability: "It ought to be against the law to buy a computer without an APC Back-UPS 250. I recently had a direct lightning hit right outside the house...my computer never blinked. Each morning I get a surge down the line and both APC's hate it - they simultaneously 'holler 'n clamp' while my 'Brand T' quietly sleeps in. I've relegated that unit to non-critical household stuff like my VCR."



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Andrew Wargo, Manager at Baxter Land Company, tried two other brands before Back-UPS. "One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! I then bought my Back-UPS for less than half of what I had paid for the others. We've purchased three more Back-UPS and for the past 14 months they've been just hummin' away on the same power line that was eating the other brands alive!"

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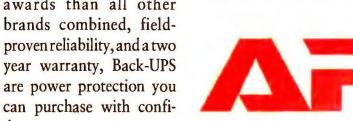
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PC DOCS Open 2.0

Reader service no. 662

Document management to help organize your office and reduce paperwork. PC DOCS Inc. 800/933-3627, 904/656-5559 (fax) List price: \$495 and up File menu in one of several applications that work with PC DOCS Open, including the latest versions of Microsoft Word, WordPerfect, and Lotus Notes). To locate a document on a network, type in a keyword, an author's name, or other criterion, and select *Search*.

PC DOCS Open 2.0 includes a module for remote users who can "check out" files by modem. To preserve version control, you can't edit a checkedout document until it's been returned (although you can read it). When you come back into the office, PC DOCS Open shows you which documents have changed. You can locate documents and attach them to E-mail messages, or tell the system where to store and when to delete items. You can instruct the system to automatically store a memo on optical disk or delete a file after 180 days.

When saving a file, you fill out a customizable Document Profile that lists the file's author, application, date, client, and other relevant information. While this profile system is the linchpin of PC DOCS Open's entire document management scheme, not everyone will relish

filling out a form for every document. Another drawback is the complicated pricing: \$495 per server, \$299 per workstation, and \$20 to \$50 per mobile module (depending on quantity). Still, your office's sanity may well be worth the price.

-Bronwyn Fryer



THE QUICK RETRIEVE FEATURE in PC Docs Open shows you the last 30 documents you edited. Just click a title to perform tasks like printing.

Versions Keeps Track of Your Files

f your work requires that you collaborate with others and keep multiple versions of data files as part of that collaboration, look at StarBase Corporation's Versions 1.1. The original Versions was strictly a programmer's tool, but the new release is designed to help regular users track their work. I looked at a prerelease copy of Versions, with a help system that had not yet been updated for nonprogrammers.

Versions keeps multiple drafts of a project's files in one container file—probably on a network. When you want to edit, say, a particular Ami Pro document or a Quattro Pro worksheet, you "check out" the file, and Versions copies the current version of the file (or an older one if you prefer) to your local hard disk. Versions then automatically loads the appropriate Windows program to let you view the file. No one else can check out the file until you return it. The program keeps a record of who changed the file, and when. You can also add notes about changes you made.

The program is fairly easy to configure. You set the number of drafts to keep, and Versions deletes the old drafts automatically (unless, of course, you make a version permanent, in which case the program won't erase it). Versions can also delete all but the current and permanent versions of a file.

You can take a snapshot (Star-Base's term is *milestone*) that saves all of a multifile project's files in their current state; you simply select the latest version of this WordPerfect file, that Excel file, and so on, and enter a name.

What's missing? Work-flow control, for one thing. You can't set up Versions to send a document automatically from one collaborator to another. And the only E-mail it supports is Microsoft Mail.

Programmers have needed version control tools for a long

time, and Versions 1.0 gave it to them at a reasonable price. But programmers aren't the only people who work creatively and collaboratively. With Versions 1.1, StarBase has made these tools available to the rest of us.

-Lincoln Spector

Versions 1.1

Save and track multiple
versions of your own work
and your collaborations.
StarBase Corp.
714/442-4400
List price: \$279, introductory
price through June 30 \$179
Reader service no. 663



Announcing the latest breakthrough in high-performance notebook computers—the TravelMate 4000E WinDX4 75.



The new TI TravelMate 4000E WinDX4/75MHz notebook. With its IntelDX4 processor, you have the power to be more productive.

At Texas Instruments, we've listened to your needs. That's why we've created a way for you to work faster and increase your productivity—

with the new TravelMate WinDX4/75 active matrix color notebook computers. You'll find a lightning-fast 75MHz IntelDX4 processor inside. Combined with our innov-

ative system architecture, your new TravelMate will scream with speed. And with 3 to 5 hours of battery life and a 455MB hard drive, you can be more productive even when you're on the go.

Finally, with so many high-performance features packed in, who needs a desktop PC? The TravelMate 4000E WinDX4/75 does it all. To learn where you can reserve yours today, simply call **1-800-TI-TEXAS** (1-800-848-3927), after all, they're going fast.

TRAVELMATE 4000E SERIES NOTEBOOKS

DISPLAY Active Matrix Color (9.5") IntelDX4-75MHz Active Matrix Color IntelDX4-75MHz Active Matrix Color 486DX2-50MHz Color 486DX2-40MHz Color 486SX-25MHz

Color 486DX2-40MH;
Color 486SX-25MHz
Monochrome 486DX2-50MH;
Monochrome 486SX-25MHz

MEMORY†

4MB RAM/455MB HDD

4MB RAM/340MB HDD

4MB RAM/200MB HDD

4MB RAM/200MB HDD

4MB RAM/200MB HDD

4MB RAM/120MB HDD

4MB RAM/120MB HDD

4MB RAM/200MB HDD

4MB RAM/200MB HDD

TRAVELMATE INTELLIGENT DOCKING SYSTEM

COMPATIBILITY TI TM4000E Series Notebooks EXPANSION Six 16-bit ISA slots, two PCMCIA Type III slots, four drive bays

INTERFACES slots, Parallel/2 Serial, VGA, ype III Mouse, keyboard, game e bays port and RJ-11 jack

† RAM expandable to 20MB with optional memory.

TravelMate, WinDX4, and "Extending Your Reach With Innovation" are trademarks of Texas Instrument Intel DX4 is a trademark and the Intel Inside logo is a registered trademark of Intel Corp. © 1994 TL

EXTENDING YOUR REACH WITH INNOVATION™



Cruise the Highways With Expert Travel Planner for Windows

omeday we'll all be scooting about in computer-equipped cars that tell us exactly how to get from point A to point B and how much time and gasoline the journey requires. Until that time, you can taste the future with the help of Expert Travel Planner CD ROM for Windows, a multimedia guide to intercity travel in North America.

Truth be told, the \$49.95 CD ROM offers many of the same information and planning capabilities as Expert Travel Planner for Windows, a \$14.95 floppybased application. Type in your starting point and destination, and both programs use color maps and a database to create a detailed itinerary that you can print or save to disk. The itinerary includes the precise route for driving from one city to another, as well as routes to any desired stops in-between, based on your preferences—quickest and shortest are two of the choices. You also get information on the time and expense for a given excursion.

In addition, both programs offer bare-bones descriptions of United States destinations and phone numbers for major attractions, parks, and chambers of

Expert Travel Planner CD ROM for Windows

gram offers audio and video clips—but \$14.95 floppy version has much of the same information.

Expert Software 800/759-2562, 305/567-9990 List price: \$49.95

Reader service no. 624

commerce. The CD ROM adds Canadian and Mexican destinations; time-zone and area-code maps; and a graphic icon interface designed to guide you into the information, but there are so many icons (17 in the tool bar) they sometimes get you lost instead. (The company also sells the Expert Travel Planner Gold Edition for both DOS and Windows on floppy disk; each is \$49.95 and has all of the CD ROM's features, except sound and video.)

The CD ROM also includes 24 full-motion Microsoft Video for Windows clips, 79 high-quality slide shows, a choice of various background music styles, and online audio help. The videos are of good technical quality, but the selection disappoints. There are a few places you'd expect to find profiled-New York, Las Vegas, Niagara Falls. But the film clips exclude many popular vacation spots (Orlando, San Francisco, New Orleans) in favor of less-frequented locations (Charleston, West Virginia; Jacksonville, Florida; Columbia, South Carolina). Also, various chambers of commerce and visitor's bureaus produced the videos, which explains why every city looks like Shangri-la.

As with many CD ROMs, this disk's multimedia features are competently produced but don't contribute much useful information. So unless you're dying to base your next trip on a computer slide show or on a small-frame video clip, the \$14.95 Expert Travel Planner probably offers all the electronic travel planning help you'll need—until there's a computer in your car, that is.

-James A. Martin



TRUCKIN' WITH YOUR CD ROM: Map out your next trip with Travel Planner's database, color maps, videos, and photos.

¿Cómo Se Dice CD ROM?

ver turn on a Spanish-language TV program and realize you've forgotten everything you learned in Spanish class? Or perhaps you can't understand any Spanish speaker who doesn't have the same accent or vocabulary as your teacher? Don't give up. Video Linguist—Spanish CD ROM can teach you español while saving you airfare to Spain.

The program features video clips from Spanish television on subjects ranging from sports and travel to art, food, and wine. Unlike the boob tube, however, Video Linguist-Spanish allows you to stop the program at any moment for a translation or transcription of the dialogue. If you don't want to stop the program, you can slow down the speech or ask for an English translation. Best of all, the CD ROM will keep track of vocabulary you ask about and print it in a study list.

The video clips are the nicest feature of this program. Though

Video Linguist-Spanish

Spanish television teach español.

Cubic Media, Inc. 800/232-8242

List price: \$139

Reader service no. 625

short (about 1 to 3 minutes each) and limited (44 total), they let you see gestures and facial expressions you couldn't find in any textbook. A few of the clips are blurry, which reduces their effectiveness as a language training tool. Still, the advanced student can profit immensely from the program's broad sampling of accents, gestures, and vocabulary. As the content of language training CD ROMs improves, programs such as Video Linguist-Spanish will surely become an essential part of language study, whether it's in the classroom or at home.

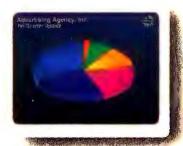
-Sarah Klein

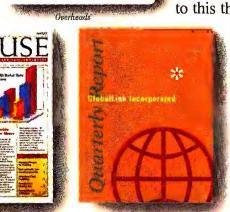


Science has found a cure for snoring. At least during your presentation.

It's the new Phaser™ 220 color printer by Tektronix®. It's affordable. It's easy to use. And it's the best way to keep people awake without the use of costly stimulants. How? Quite simply, amazing color. The Phaser

220's SuperCell 600™ technology allows you to print a whopping 600 x 300 dots-per-inch. And in lay terms, that's a lotta dots. And a lotta dots means your annual reports will yodel, your pie charts will do backflips and your bar





The Phaser 200 series starts at a suggested retail price of only \$2,995. Who says money can't buy happiness?

should come with an airbag. The Phaser 220 also offers true Adobe® PostScript™ Level 2 and supports PCs, Macs, workstations and just about every network interconnect. Add to this the fact that it's reliable, has multiple

paper trays and a huge print capacity and you've got yourself one tough workhorse. For a free Phaser 220 print sample or the name of your nearest Tektronix dealer, call 800-835-6100, department 34I.

For faxed information, call 503-

graphs will announce their presence with authority. Plus you get all this great color at two pages per minute on most common laser papers. At this speed, it

thority. Plus 682-7450, and ask for document #5003. But don't wait minute on too long. Because business is getting more and more competitive. And if you snooze, you lose.

Phaser is a trademark of Tektronix, Inc. PostScript is a trademark of Adobe Systems, Inc. All other marks are trademarks or registered trademarks of their respective companies

Procomm Adds Fax Support

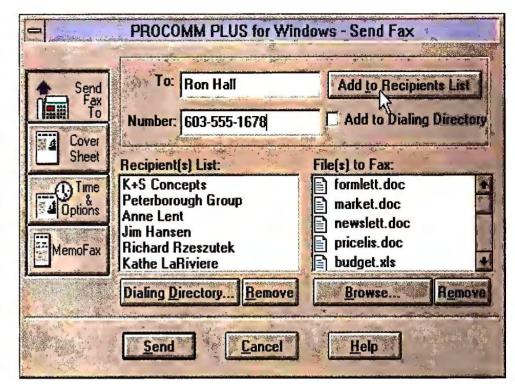
In the early days of the PC, Datastorm's Procomm has gone through a progression of versions while continuing to hold the title as the top-selling communications package. The latest incarnation, Procomm Plus for Windows 2.0, is a major upgrade that sets a new standard for Windows communications packages. Sure, it's full of new features; but Datastorm also retained the package's fabled ease of use.

At first glance, the 2.0 screen doesn't look much different than version 1.0's, but there are loads of new options in the drop-down menus and on the icon bar. The biggest and most evident additions are fax options. Datastorm has waited a long time to incorporate fax capabilities into Procomm, and it's been worth the wait. The product, of course, offers the usual option to fax directly from your applications by choosing a Procomm fax driver from your print setup. You can also send a quick Memofax, as well as receive and view incoming faxes.

But 2.0's fax abilities are best suited for serious fax users, including those who broadcast faxes to large numbers of recipients. It's easy and quick to add recipients and documents to a list and let 2.0 take care of the faxing chore. Most intriguing is a unique fax-on-demand feature that integrates with the package's host mode. Authorized users can call in to your computer and request faxes.

Up to now, fax on demand has been available only in specialized proprietary packages.

Another large improvement is that the program's icon bar is finally fully customizable (like the SmartIcons used in Lotus applications). Datastorm calls it the Action Bar. You can have up to five bars, each tuned to your preferences or particular online services. The dialing directory is versatile enough to be your main phone book, with sections for modem, fax, and voice num-



PROCOMM PLUS FOR WINDOWS 2.0 includes a multitude of useful new features that make it highly customizable, yet easy to use.

bers. You can also import or export phone books from and to other applications.

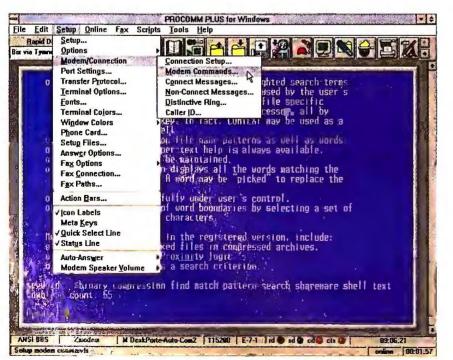
Recognizing that many advanced users and corporate environments have 1.0, Datastorm included a number of high-level upgrades in the new version. The ASPECT scripting language, previously quite powerful, has been extended with array support and unlimited onscreen controls for those who develop advanced Procommbased apps. Then there's network support for NCSI/NASI and NETBIOS extensions, which lets you run Procomm from a modem server on Novell and Microsoft networks. And for those who need to grab data from a corporate mainframe, there's the IND\$FILE transfer protocol, which communicates with IBM big iron.

On the ease-of-use front, the product offers many clever enhancements. The package's installation supports over 500 specific modems and even detects many automatically. You can easily set up the "Rapid Dial" directory for your most frequently called numbers. Several

ASPECT scripts are included, such as a full-featured graphical interface to CompuServe and an MCI Mail interface that lets you read messages off line.

Other features leverage the graphic abilities of Windows. They include an instant menu of most frequently used commands that pops up when you click the right mouse button. For users of internal modems, there's a set of modem lights that lets you know what's going on inside the box. All in all, Procomm Plus for Windows 2.0 is an eminently useful communications package.

-Stan Miastkowski

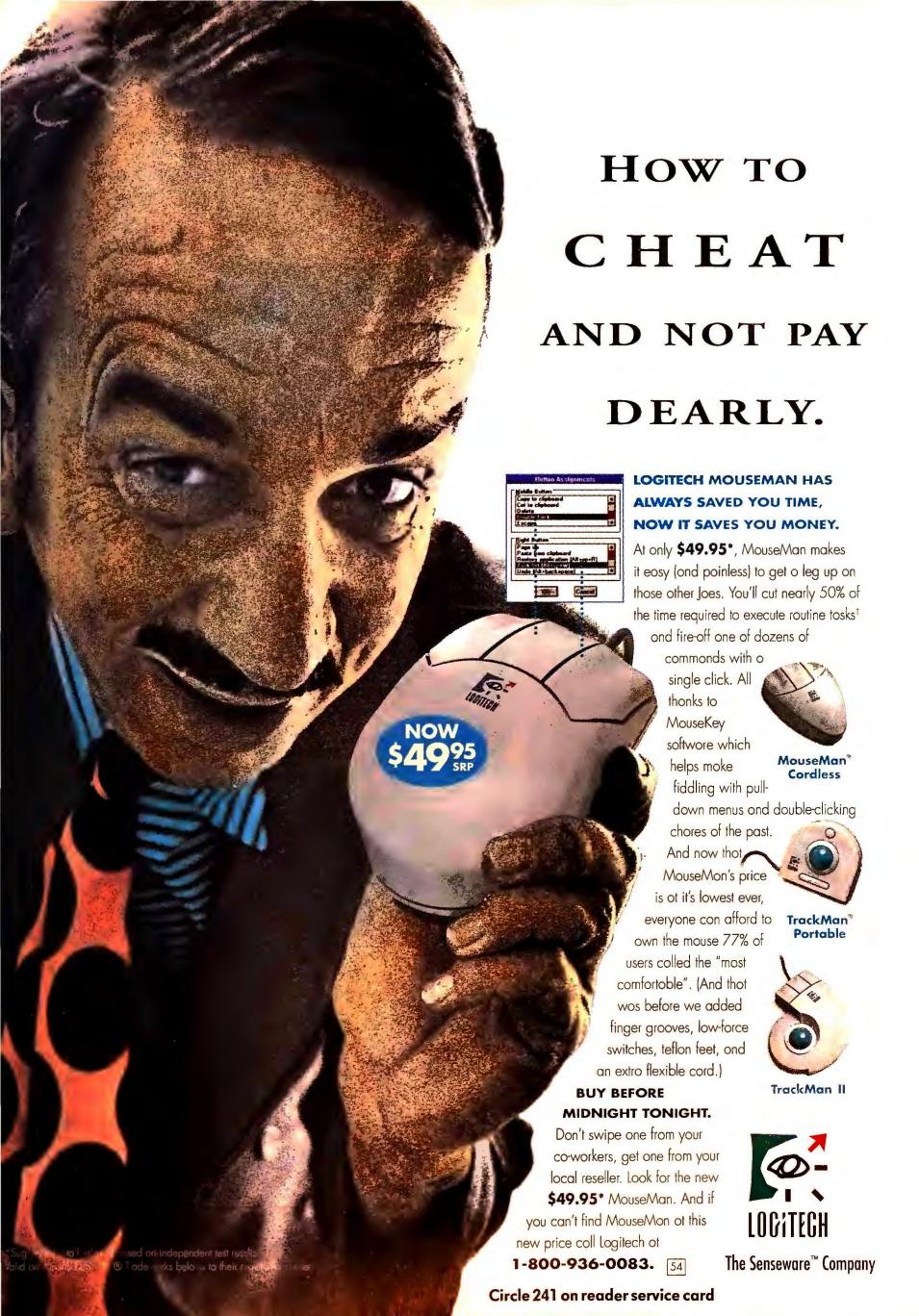


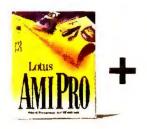
VERSION 2.0'S BUILT-IN CAPABILITIES go beyond competing packages with useful broadcast and host modes, plus fax-on-demand features.

Procomm Plus for Windows 2.0

Version 2.0 boasts a raft of new features, including fax capabilities.

Datastorm Technologies
314/443-3282, 314/8750595 (fax)
List price: \$179, upgrade from version 1.0 for Windows or 2.0 for DOS \$69
Reader service no. 626









THE SIMPLE FACT OF THE MATTER IS THAT

NUMBERS AND WORDS DO NOT INHABIT SEPARATE

WORLDS. YOU KNOW THAT. WE KNOW THAT. BUT

NONE OF THE OTHER WORD PROCESSORS HAVE FIGURED IT OUT.

WORD PROCESSOR BUILT TO WORK WITH

1-2-3° RELEASE 4 FOR WINDOWS. ONLY

AMI PRO HAS FULL FILE COMPATIBILITY

WITH 1-2-3 RELEASE 4. ONLY AMI PRO

SHARES A CONSISTENT LOOK AND FEEL

WITH 1-2-3 — THE MENUS ARE LAID

OUT THE SAME, THE SMARTICONS® WORK

THE SAME, FORMATTING IS INTUITIVE;

IN SHORT, EVERYTHING WORKS THE WAY

YOU EXPECT IT TO. WHICH LETS YOU GET

YOUR WORK DONE FASTER.

LOTUS® AMI PRO® IS THE ONLY WINDOWS™

TUITIVE;
THE WAY
S YOU GET

AND ONLY
AMI PRO



Collect and Copy
makes it easy
to move multiple
data sets
from 1-2-3 to Ami Pro.

1.2.3

PROPOSA

TO THE BOARD OF DIRECTORS * SPORTSWEAR DIVISION * JULY 2 1991

Global Expansion of Recressional Markets

We would like to propose the following topic for facus and at the Annual Netwing of the Adversory Sport Board of Directors that coming Springer to highe of the fact has Mercury sides of secretained sports capagement have thyroceted in the Curibbean and other international resort ingredient of the promise for establishing a specific distribution channel to adequately service those areas

Regional Accuses lone Strategy

As the chart at left thus area, our sides of water sports

YOU INTO 1-2-3 WHERE YOU CAN COLLECT ANY NUMBER OF

HAS COLLECT AND COPY - JUST CLICK ON THE SMARTICON AND AMI PRO LAUNCHES

DATA SETS, CHARTS OR GRAPHICS, FROM ONE SPREAD-

SHEET OR FROM SEVERAL, AND COPY THEM BACK INTO

YOUR AMI PRO DOCUMENT IN ONE SIMPLE STEP. THERE'S NO CLOSING ONE APPLICATION AND OPENING ANOTHER.

THERE'S NO SWITCHING BACK AND FORTH. COLLECT AND COPY GUIDES YOU THROUGH THE PROCESS QUICKLY AND CLEARLY.

AND COLLECT AND COPY AUTOMATICALLY SETS UP A LINK BETWEEN THE TWO DOCUMENTS SO ANY CHANGES YOU MAKE TO THE SPREADSHEET WILL APPEAR IN YOUR AMI PRO DOCUMENT - AUTOMATICALLY. MEANWHILE, THE CURRENT RELEASES

word processor does words and a spreadsheet does numbers, right? But what if you want to put words in your numbers and numbers in your words, like combine the projected met revenue with War and Peace? Well hay, don't worry. Our software works together. Your people work to gether. It makes working together work.

OF MICROSOFT® WORD AND WORDPERFECT® WILL NOT EVEN READ YOUR 1-2-3 .WK4 FILES. YOU'LL BE CUTTING AND PASTING, CUTTING AND PASTING. AGAIN AND AGAIN. WITH AMI PRO, YOU NOT ONLY WORK WITH NUMBERS MORE EASILY: YOU WORK WITH YOUR COLLEAGUES MORE EASILY TOO — AMI PRO FEATURES ENHANCED INTEGRA-TION WITH LOTUS NOTES® GROUPWARE.

OPENING UP A Hard Disk Space POWERFUL NEW AMI PRO MS/WORD ENVIRONMENT WORDPERFECT

FOR WORKGROUP

Ami Pro takes up a fraction

15 MB

25 MB

32.5 MB

of the room on your hard disk. COLLABORATION.

RIGHT NOW, YOU CAN MOVE FROM YOUR CURRENT WORD PROCESSOR TO AMI PRO FOR JUST \$129. OR UPGRADE TO LOTUS SMARTSUITE® — INCLUDING AMI PRO, 1-2-3 RELEASE 4, FREELANCE GRAPHICS®, APPROACH® DATABASE AND LOTUS ORGANIZER™ - FOR JUST \$299 ** CALL 1-800-TRADE-UP, EXT. 9566, FOR AN

Working Together

AMI PRO WORKING MODEL, OR VISIT YOUR LOTUS AUTHORIZED RESELLER.

WinFax Pro Puts On a Better Face

Delrina WinFax Pro 4.0

One of the most full-featured fax programs is now easier to use.

Delrina Corp. 800/268-6082, 408/363-2345 List price: \$129

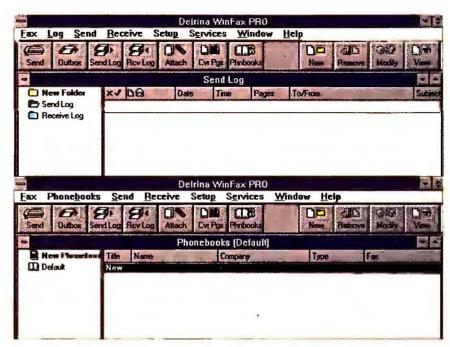
Reader service no. 627

elrina's WinFax Pro 3.0 was a little like a rambling genius—brilliant but sometimes hard to understand. With version 4.0, the vendor set out to make its program more comprehensible and accessible to the masses. Judging by the preproduction version of the program we worked with, Delrina has succeeded.

WinFax Pro 4.0 has a revamped interface, with different views for the fax outbox, send log, receive log, attachments, cover pages, and phone books. While this gives 4.0 enough personalities to rival Sybil, all views are similar. Menu items stay the same as you switch among windows, except for a single item that changes to reflect the current window. Also, in every view you see the windows laid out similarly. You see a main window that lists sent faxes, received faxes, and so on, and in a narrow window to the left, an associated folder directory tree (or phone book directory tree in the case of the phone book window). cc:Mail for Windows users will instantly recognize this layout. In fact, ce:Mail or Microsoft Mail users can use WinFax to send and receive E-mail and thus have a unified interface for fax and E-mail communications.

It's a snap to give each window a more distinctive look and feel. You can size the windows vertically and horizontally by dragging their edges, and add, delete, and swap column headings and information fields just by dragging and dropping. In fact, Delrina took to drag-anddrop like a kid to a new toyyou can use it to fax files, move fax attachments to a new folder, move phone numbers to a new phone book, and perform a myriad of other functions. The tool bar is also easy to customize. You add and delete buttons by-you guessed it-dragging and dropping.

What particularly impressed



PEAS IN A POD: Note the similarities between Winfax Pro 4.0's Send Log and PhoneBook views. Their menus are virtually identical.

us was how fast the new Win-Fax Viewer manipulates images. For example, a one-page text file that took WinFax Pro 3.0's viewer more than 10 seconds to rotate sideways took only 3 seconds in 4.0.

-Bryan Hastings

SafeJack PCMCIA Modems Solve Annoying Problem

he problem of connecting a standard telephone line to a wafer-thin PCMCIA modem has spawned some so-so solutions, ranging from fragile slide-out connectors to bulky adapter cables. But Angia's new line of aptly named SafeJack PCMCIA fax-modems offers one of the best solutions.

FAXMODEM

SafeJack has a sturdy hood with an edge connector that plugs into the PCMCIA card. A key safety feature releases the connector from the card with a slight tug. So if you trip over the phone cord, your \$3000 notebook computer won't go clattering to the floor. The connector also includes two RJ-11 jacks, which let you hook up a regular phone at the same time.

SafeJack is available in three models. All include built-in Class 1 (9600-bps) fax capabilities and basic data communication speeds up to 14,400 bps, with a 16550 UART for reliable high-speed communication. A cellular model adds Microcom's MNP 10 error correction for mobile communications and AT&T's Direct Connect cellular package for specific cellular phones. Another

SafeJack PCMCIA Fax-Modem

the modem to your needs and deliver a unique, no-hassle phone line connector.

Angla Communications

800/877-9159

List price: V.32terbo \$349, voice command \$359, cellular \$369

Three different models match

Reader service no. 628

model includes V.32terbo for communication speeds up to 19,200 bps. The third model is voice enabled and includes a data compression chip and the software needed to turn your laptop into a voice-mail system.

The SafeJack line offers the features you need and a clever phone connector that could save the life of your laptop.

-Stan Miastkowski

Get Organized Get Curtisized



Presenting The Time & Space Saving Organizers from Curtis

Too much work? Not enough time? Curtis organizers help you work more efficiently and be more productive. Use a Top Shelf to organize paperwork. Free up more space with a Monitor Arm, System Stand and Printer Stand. Slide your keyboard out of the way with a Keyboard Spacesaver. Keep disks within reach with a Disk Box and supplies handy in a Mouse Pad Orga-

nizer. The Curtis Clip will hold copy where

you can see it and the Curtis Command Center provides fingertip control for your entire system.

Save time, work and space — get Curtisized today!



Quick Takes

Relay/PC

Designed for home PC and small-business users, Relay/PC is a scaled-down version of Relay/PC Gold, a network-ready communications program for large corporate sites. Relay/ PC gives you the communications essentials, such as the ability to dial into a host computer, online information services, and bulletin boards. Novices will find the program's step-by-step log-on procedure particularly helpful. Relay/PC's pop-up keyboard lets you send characters to online service menus by pointing and clicking the characters. The program's innovative, rotating-button cube holds up to 100 buttons, giving you easy access to common tasks. Unlike the \$399 Relay/PC Gold, Relay/PC lacks 3270 emulation for communicating with IBM mainframes. But with its \$99 list price, who cares? Relay Technology, 800/795-8674, 703/ 506-0500, 703/506-0510 (fax).

Reader service no. 631

Wired for Sound Pro 3.0, Talking Icons 2.0

MULTIMEDIAL Looking to put a little fun into computer tasks? Take a look at (and a listen to) Aristo-Soft's Wired for Sound Pro 3.0 and Talking Icons 2.0. Wired for Sound Pro's new Media Manager lets you play a variety of multimedia effectsincluding sound, video, images, and text—when specific Windows events happen. Version 3.0 adds a multimedia screen saver, a wallpaper changer, and a jukebox for creating custom playlists of sound files. The Wired for Sound CD ROM has more than 3000 sound and image files. Talking Icons 2.0 lets you replace Windows and application icons with "talking"

icons: You can add sound to keystrokes, mouse clicks, and other activities. Version 2.0 lets you customize the Windows desktop—changing font and background colors and animating menu buttons and title bars. Wired for Sound Pro 3.0 lists for \$79.95; the Wired for Sound Pro CD ROM costs \$49.95. Talking Icons 2.0 costs \$29.95. Aristo-Soft, 800/338-2629.

Reader service no. 632

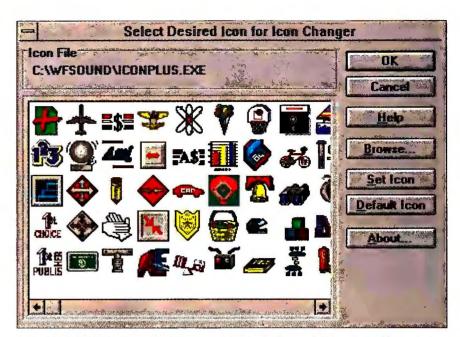
Smartbook II Notebooks

Commax's 486-based Smartbook II notebooks have staying power, thanks to their dealerupgradable processors, hard drives, and LCD screens. Featuring your choice of 25-MHz 486SX, 33-MHz 486DX, or 66-MHz 486DX2 processor, each Smartbook has 4MB RAM upgradable to 32MB and a choice of hard drives ranging in size from 120MB to 540MB. You can choose a monochrome, dual-scan color, or active-matrix color display (each measures 9½ inches diagonal). Other features include VESA local bus graphics, 1MB of video RAM, builtin (8-bit) audio, two PCMCIA Type II slots, and a built-in trackball. According to Commax, the 5.5-pound monochrome model runs 3 to 4 hours, while the 5.9-pound dual-scan color model and the 6.1-pound active-matrix model run 2½ to 3½ hours. All models use nickelmetal-hydride batteries. Smartbook II list prices range from \$1755 to \$5890. Commax, 800/ 526-6629, 408/435-5000.

Reader service no. 633

DrawPlus 1.0

You can't beat the \$29.95 price on Serif's draw program, Draw-Plus. You get many features you'd expect from its pricier



ICON INSANITY: Bored with your Windows icons? Wired for Sound Pro 3.0 features dozens of colorful alternatives.

competitors, including Bézier drawing tools, multicolored linear and radial fills, and the capability to group objects and manipulate text for special effects. What's missing is OLE 2.0 support, multiple levels of undo, support for a wide range of file formats, and clip art. Also, you can import and export drawings only in the WMF format or via the Windows Clipboard. Still, this is a terrific deal for those needing a basic draw program. Serif, 800/697-3743, 603/889-8650, 800/869-8909 (fax).

Reader service no. 634

Ultima A6000C ViewStation

Let the scanner price wars begin! The \$1100 street price on the Ultima A6000C View-Station makes this unit one of the most aggressively priced 600-dpi scanners we've seen. In fact, you'll pay the same amount for 400-dpi scanners from rivals Canon and Hewlett-Packard. This three-pass, 24-bit device scans both gray-scale and color images on its 8½-by-14-inch scanning surface. While the unit's hardware resolution is 600 by 1200 dpi, it goes up to 1200 by 1200 dpi through software interpolation, a process

that increases resolution by duplicating existing data. This scanner ships with Adobe Photoshop LE. Ultima also bundles PhotoStacker, its own Windows compression tool, which lets you compress images up to a 100/1 ratio with some data loss or up to 25/1 with no data loss. International, 510/659-1580.

Reader service no. 635

3DPC Screen Saver

Forté's 3DPC is an Escheresque screen saver that plays smooth, perpetual animations on your PC. By animating three-dimensional images rendered with photo-realistic reflections, shadows, and textures, 3DPC offers a new twist on screen saving. Forté renders scenes with Autodesk graphics software, giving each "flick" no visible beginning or ending. Mind-bending animations include a slick, slithering worm, a free-floating sky-morph, and a perpetual motion machine. As 3DPC protects your screen, other applications work in the background. You can change the play sequence and duration of each scene and set password protection. System requirements are modest: a 16-MHz

What to do when Work, work,

INCREASE SPEED

WINProbe uncovers the secrets to faster Windows operation. Simply click your mouse on "Tune Up" and **WINProbe** analyzes your system, then gives you up to 35 suggestions on how to speed up your system...

- Analyzes Smart Drive settings to improve hard drive performance
- Identifies and explains how to set up a permanent swap file
- Identifies which mode is best, Standard or Enhanced
- · Pinpoints the optimum driver for your VGA card
- · Optimizes and frees fragmented memory
- Analyzes and suggests the best Windows setup for your system

TROUBLESHOOT YOUR OWN PC

Few things are more aggravating than computer downtime and lockups. You waste time waiting for help and usually pay a dear price to get it when you finally do. Your time is valuable, so let **WINProbe** troubleshoot the problem for you. You'll be able to quickly identify the source of the problem; hardware, software, or configuration. Telephone support time is slashed. Repair bills drop like a rock (50% and more of your repair bills are for diagnosing the problem, **WINProbe** does it for you at NO COST!). Tests include...

- CPU and system board in 16 and 32 bit operation
- Math coprocessor
- Memory; conventional, extended, expanded, and XMS
- COM ports and MODEM control lines
- Floppy drive speed and surface analysis
- Hard drive surface analysis
- Keyboard and scan codes
- Video adapter and screen
- Mouse initialization and interrupts
- Printer operation, output, and cable





"This \$99 toolkit deserves high praise for ease of use, completeness, and accuracy."

Windows Sources

"A bargain worth writing home about."

PC Computing

"WINProbe's most impressive offering is its memory-reclamation capability. This feature alone is worth the price of admission."

PC Computing

RESOLVE SETUP PROBLEMS

Say 'goodbye' to software and hardware configuration and setup problems. **WINProbe** provides helpful information on...

- Installing a new hard drive
- CMOS display and edit
- IRQ, DMA, and UMB usage
- What to do when installing an add-in card
- Cleaning up *.INI and *.GRP files
- · Memory allocation and management
- Locating and removing duplicated system files

OPTIMIZE MEMORY

WINProbe includes a memory optimization feature which lets you reclaim memory that Windows applications use but don't properly make available when you're in another program. Now you can avoid system crashes and other problems caused by reduced available memory.

COMPATIBILITY

WINProbe requires an IBM AT, 386, 486, PS/2 or compatible with at least 1MB of RAM, DOS 3.1 or higher, Windows 3.0 or higher, and either a Hercules mono, EGA, VGA, or SVGA video. A mouse is recommended but not required.

BUY WINPROBE OR BUY THE BUNDLE

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Quick Takes



SLITHERING SCREEN SAVER: 3DPC combines three-dimensional graphics and smooth perpetual animation.

386SX PC with 2MB of RAM, 6.5MB of hard disk space, and standard VGA graphics running Windows 3.1 at 256 colors. 3DPC costs \$19.99 and ships on 3½-inch disks; 5¼-inch disks are \$5 extra. Forté, 619/431-6495.

Reader service no. 636

OnTime Interactive Voice Response System

You're on the road and want to check your schedule back at the office. If your calendar is Campbell Services' On Time for Networks, you can call from any

touch-tone phone and listen as the Interactive Voice Response System reads your appointments and E-mail messages to you. The system requires a dedicated phone extension and a PC with VoxLink's VoxMailan add-in card plus software that translates text into speech.

In the prerelease version we tried, the synthesized voice sounded like it came from a mouth filled with digital marbles, but it was intelligible. The system handles an unlimited number of users, though Campbell Services estimates that 100 traveling execs at a time is a more practical limit for a single phone line. The software supports Novell (MHS), Microsoft Mail (MAPI), and cc:Mail (VIM) messaging systems. OnTime for Networks costs about \$40 per user, plus about \$10,000 for VoxMail. Campbell Services, 800/345-6747.

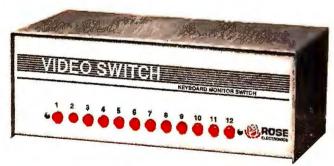
Reader service no. 637

CharacterEyes 2.1

CharacterEyes 2.1 OCR software combines a friendly, button-based user interface with powerful neural network recognition technology. Although you can't access CharacterEyes from within other applications (as you can with competitor Word-Scan Plus), you can save processed documents in Word, WordPerfect, 1-2-3, Excel, and other popular file formats. A pop-up verifier shows the original TIFF image to help you decipher words CharacterEyes has trouble recognizing. The product lets you designate multiple zones for recognition and retains the format of your

Your Choice of Keyboard Monitor Switches

Access multiple computers with a single keyboard and monitor to cut equipment costs, save valuable space, and end clutter



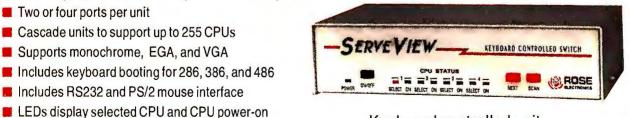
Manually controlled unit

Switch by keystroke, from front panel, or RS232 port

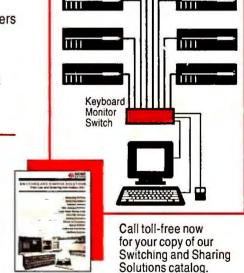
Scan function switches among CPUs automatically

Two or four ports per unit

- Simple pushbutton operation for quick selection
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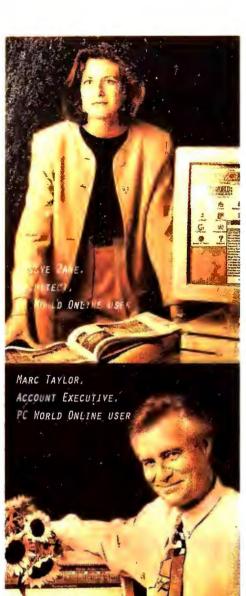
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A MOMENT TO ADMIRE
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Quick Takes

original document. Character-Eyes supports TWAIN but not OLE 2.0. It requires 2.3MB of disk space—quite modest compared with other OCR products. CharacterEyes lists for \$695 and costs about \$300 on the street. Ligature Software, 800/888-0060, 617/238-6734.

Reader service no. 638

Hayes LANstep 2.0

LANstep 2.0 from Hayes Microcomputer Products is a unique network operating system that combines some of the best features of enterprise, client-server, and peer-to-peer architectures. Designed to work with DOS, Windows, and NET-BIOS application software, LANstep targets networks with 5 to 50 workstations. Enhancements include support for 255 simultaneous users, multiple queues for shared printers, and improved installation procedures that use a single program for all operating environments. LANstep 2.0 also features new utilities to help network administrators with configuration and maintenance chores. It lists at \$595 for a 5-user system. Hayes Microcomputer Products, 404/ 441-1617.

Reader service no. 639

Acrobat Reader 1.0 for DOS

Do you primarily use DOS but occasionally need to view Windows or Mac documents? Adobe's Acrobat Reader 1.0 for DOS lets you view documents formatted in Adobe's Portable Document Format (PDF). The Acrobat products allow crossplatform exchange of documents that retains fonts, formatting, and graphics. Adobe's DOS version of its Acrobat Reader software lets you view and print PDF files but not cre-

ate or edit them. Acrobat Reader 1.0 for DOS sells for \$50. Adobe Systems, 800/272-3623.

Reader service no. 640

ComputerEyes/LPT

Digital Vision is helping bridge the gap between PCs and TVs with its ComputerEyes/LPT portable frame grabber. This pocket-size adapter digitizes video from a TV, VCR, or other analog source and transfers it to the PC via the parallel port. Since the product requires no add-in card, notebook users can capture video, and desktop users can share the unit, without difficult, time-consuming card installations. ComputerEyes/ LPT lists for \$399.95. Digital Vision, 800/346-0090.

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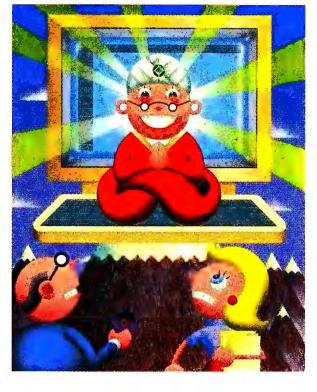
Where Does Improv Fit?

brates its first birthday, many users who Lotus expected to attend are skipping the party. These are the folks who considered adopting Lotus's multidimensional modeling tool, but turned instead to new add-ons in Excel and in Quattro Pro—although they are far less powerful (see "Benchmarking the Data Modeling Contenders").

Lotus is taking two steps to give Improv a happy second year. First, it's bringing the maverick development team back into the mainstream spreadsheet group. Second, it's slashing Improv's price to slightly under \$100 on the street because Lotus recognizes that most customers buy and use Improv as a second spreadsheet rather than a replacement for their old standbys. And it's a good move, although customers should note that historically Lotus has lacked patience with \$100 packages that don't sell themselves.



Eric Bender, Executive Editor



Secrets of a Spreadsheet Guru

L4 From the dawn of spreadsheet history, users have been making the same mistakes. A real-life office spreadsheet guru offers tips on how to avoid the most common pitfalls.

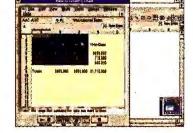
Benchmarking the Data Modeling Contenders

L8 Multidimensional data modeling tools differ dramatically in power and polish. Here's how Excel and Quattro Pro really stack up against Improv.

Present Multidimensional Data in 1-2-3

News

L2 The multimedia version of release 4.x for Windows will talk you through tricky operations. And spreadsheet users can create sophisticated applications with Visual Baler.



Improving Your Skills

L20 Creating and Sorting a Database

Model of the Month

L22 Managing Your Mortgage **※**

1-2-3 Tips

L25 Build Safeguards to Assure Accuracy

Macros

127 Macro Variables Add Flexibility **₹**

Q&A

Suite Success

L36 Installing Notes on a Remote PC

L38 Designing Page Layouts in Ami Pro

COMING IN JUNE

- ► Find the Right Release 4 Macro
- Ami Pro Tips and Techniques

The models and other files from these articles are available via PC World Online on America Online and CompuServe.



Lotus Adds Multimedia Help to 1-2-3 Release 4.x for Windows

evelopers at Lotus took great pains to build usability into 1-2-3 release 4.x for Windows. Now they've added some more. This winter, Lotus shipped release 4.x for Windows Multimedia Edition. A single CD ROM provides the 1-2-3 core software, an interactive Guided Tour movie, short movies that demonstrate specific 1-2-3

tasks, the ScreenCam utility, extra help with online documentation, and an add-in that reads worksheet data through your sound board, to help you proofread entries.

At the Movies

In the Guided Tour movie, a top-hatted magician shows you around the major functions of 1-2-3. If you don't have a sound board, the magician's words appear in yellow word balloons. If you have a sound board, you'll be able to concentrate on the magician's sleight of hand as you listen to the narration.

When you're stuck in the middle of a 1-2-3 task and you've forgotten what you

learned from the Guided Tour, select Help • Movie Guide from within 1-2-3 and choose a short movie about the task. Most movies are under 5 minutes, and they cover a wide range of topics—from copying and moving a range of data to creating versions and scenarios with Version Manager. A Toggle to Workshect button lets you pause a movie and return to 1-2-3 to apply what you learned. In the worksheet, the button changes to Return to Movie.

If you want to read the book before you see the movie, select *Help • Online Books* to start up a run-time version of Lotus's Smar-Text utility. This feature gives you the complete text of all the release 4.x manuals. The Outline window helps you get right to the specific chapter you need. When you come across a highlighted word or phrase, you can just click it to get a pop-up defini-

YOU CAN RUN SHORT MOVIES about specific tasks anytime within a work session in release 4.x's Multimedia Edition. The movie player buttons appear at the bottom of the screen; the intuitive VCR-like interface makes the feature easy to use.

tion or to jump directly to the section that covers the term in depth.

Budding filmmakers will appreciate the ScreenCam utility, described in our March 1994 issue ("ScreenCam Creates Help 'Movies'," *Lotus News*), which lets you create your own movies to train new employees, explain complex worksheets to coworkers, and document models. You can save a movie as an SCM file, which requires ScreenCam for playback, or as an EXE file,

which includes the clip and run-time player to allow co-workers without ScreenCam to play your movie back.

The Numbers Speak for Themselves

The Proofreader add-in converts labels and values in your worksheet to synthesized speech and plays them through the sound board. (You'll need a sound board and the

First Byte text-to-speech engine that comes with some boards.) Unlike the Guided Tour and short movies, which use natural-sounding, prerecorded, digitized speech, the Proofreader synthesizes speech on the spot. The synthesized speech sounds like a robot from a bad science fiction movie, but the result is clear enough for confirming data entry.

If you don't have 1-2-3, you can buy it in its multimedia form for \$495, the same price as the floppy disk version. Registered release 4.x users can get it at the upgrade price of \$129.

To use the Multimedia Edition you need a CD ROM drive with a data transfer rate of at

least 150K per second; at least 4MB of RAM; a 2MB swap file; and 16-color VGA. To get the most from its features, you should also have an 8-bit Windows-compatible sound board, preferably one that comes with the First Byte text-to-speech library (FB_SPCH.DLL). —Richard Cranford

Richard Cranford is a senior associate editor for PC World Lotus Edition and editor of the 1-2-3 for Windows Report.

Build Windows Programs With 1-2-3 Skills

preadsheet users who want to create sophisticated Windows programs without having to learn languages like C or BASIC can look forward to Visual Baler 1.0 for Windows. Baler Software, known for its DOS spreadsheet compilers, plans to introduce the first spreadsheet-based development tool for Windows later this spring.

Like its DOS cousins (Baler, BalerXE, and Ice), Visual Baler lets you create tamper-proof, stand-alone applications built with @functions, macros, and other spreadsheet tools. The applications can be distributed to anyone. Users don't need a spreadsheet, or even Visual Baler, to run them.

But Visual Baler is not just a Windows version of the DOS compilers.

Baler and BalerXE require you to set up a model in 1-2-3, load the Baler add-in to restrict user input in your model and make other modifications, and finally "bale" the file—compile it into a stand-alone application. Ice applications require 1-2-3 and exploit its cell handling and number crunching routines. But instead of starting 1-2-3 and loading an Ice application, you start the app directly from the DOS prompt.

Visual Baler, on the other hand, doesn't require 1-2-3 or any other spreadsheet. You develop your apps right in Visual Baler with the built-in spreadsheet editor. You can also create your own online help files.

The worksheet environment is similar to that of release 4.x for Windows, with some Excel touches thrown in. It has a row of icons along the top, a status bar along the bottom, selectable row numbers and column letters, and nameable worksheet tabs (except they're at the bottom, as in Quattro Pro and Excel). Advanced 1-2-3 features, such as Version Manager and Solver, are absent, as are the new database features.

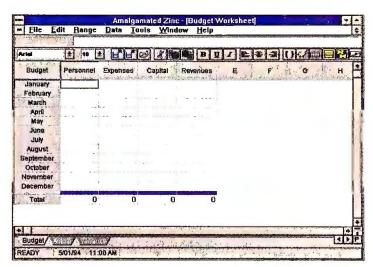
Visual Baler's @functions don't include release 4.x's esoteric engineering, statistical, and mathematical functions, but its macro language is comparable to release 4.x's. For example, instead of using the menu-dependent /DQIempdata~~Ccritrange~DD command to delete records from a database, Visual Baler lets you use {DATA-QUERY-DELETE "empdata", "critrange"}. Some of

release 4.x's dialog-producing macro commands—{CHOOSE-ONE}, {CHOOSE-MANY}, {CHOOSE-ITEM}, for example—are also present. A utility for producing custom dialog boxes was described in the documentation but wasn't available in the pre-beta review copy.

Visual Baler provides additional macro commands specifically for baling your worksheets: For example, there are commands to restrict cell pointer movement to certain areas of a worksheet and commands

to remove options from the menu bar.

Unlike the spreadsheet products it emulates, Visual Baler lets the developer customize the worksheet frame, replacing the column letters and row numbers with any text, as in the figure above. The feature



YOU CAN SHED THE SPREADSHEET LOOK AND FEEL with Visual Baler by replacing column letters and row numbers in the worksheet frame with custom text.

highlights the fact that the application is completely self-contained; it's not an application running inside a worksheet.

Visual Baler, which will retail for \$495, requires a 386SX or better with 4MB or more of memory. —**Richard Cranford**

Lotus Adds More SmartMasters to Freelance

f the 65 SmartMasters in Freelance Graphics for Windows aren't enough, you may find what you need in the SmartMaster Business Pack. The Business Pack includes 36 new templates covering a wider range of industries and international interests, all optimized for color and black-and-white output.

Instead of using the Blocks or Buttons SmartMasters to present the weekly meeting agenda, choose from two Weekly Meeting templates, or use the Marketing Plan and Project Update SmartMasters instead of generic designs.

Architects, stockbrokers, manufacturers, engineers, physicians, and farmers will find templates to suit their needs among the 13 new industry-specific SmartMasters.

Those who do business overseas have a larger choice of international images—of

London, Australia, France, Italy, Spain, Germany, and Holland.

There are 34 new clip-art images, including depictions of such bromides as "burning the candle at both ends" and "hitting a home run."

The Business Pack is available from Lorus for \$10 (800/343-5414), on the Lorus forum on CompuServe, and from Ziff-Net. The Pack requires 1.8MB of hard disk space. The files can also be accessed from a floppy.

-Ann Kremers



FOREIGN MAPS, FLAGS, AND LANDMARKS, like this view of London, are included in 15 new SmartMasters.

SECRETS OF A Some of the numbers in the worksheet had been entered as a label, including the apostrophe label prefix, dollar sign, STOREGATION OF A Some of the numbers in the worksheet had been entered as a label, including the apostrophe label prefix, dollar sign,

Here's a ninefold path for transcending common 1-2-3 traps.

kay, I admit it: Within my office, I'm The Spreadsheet Guru. I've been using 1-2-3 since the Golden Age of release 1A, and I continue to run most versions, from release 2.01 to release 4.x for Windows. When my co-workers hit stumbling blocks in 1-2-3, they pad down the hall to my office rather than open the documentation or call customer support.

That's fine with me, mind you. I like working with others, and it's a great way to meet new people. But most of all, I'm always up for the challenge of solving a spreadsheet puzzle.

It's striking how often the same problems crop up—no matter which release people are using and regardless of their level of expertise. Here are nine of the most common 1-2-3 problems. Get the solutions to them under your belt, and you'll be well on your way to guru status.

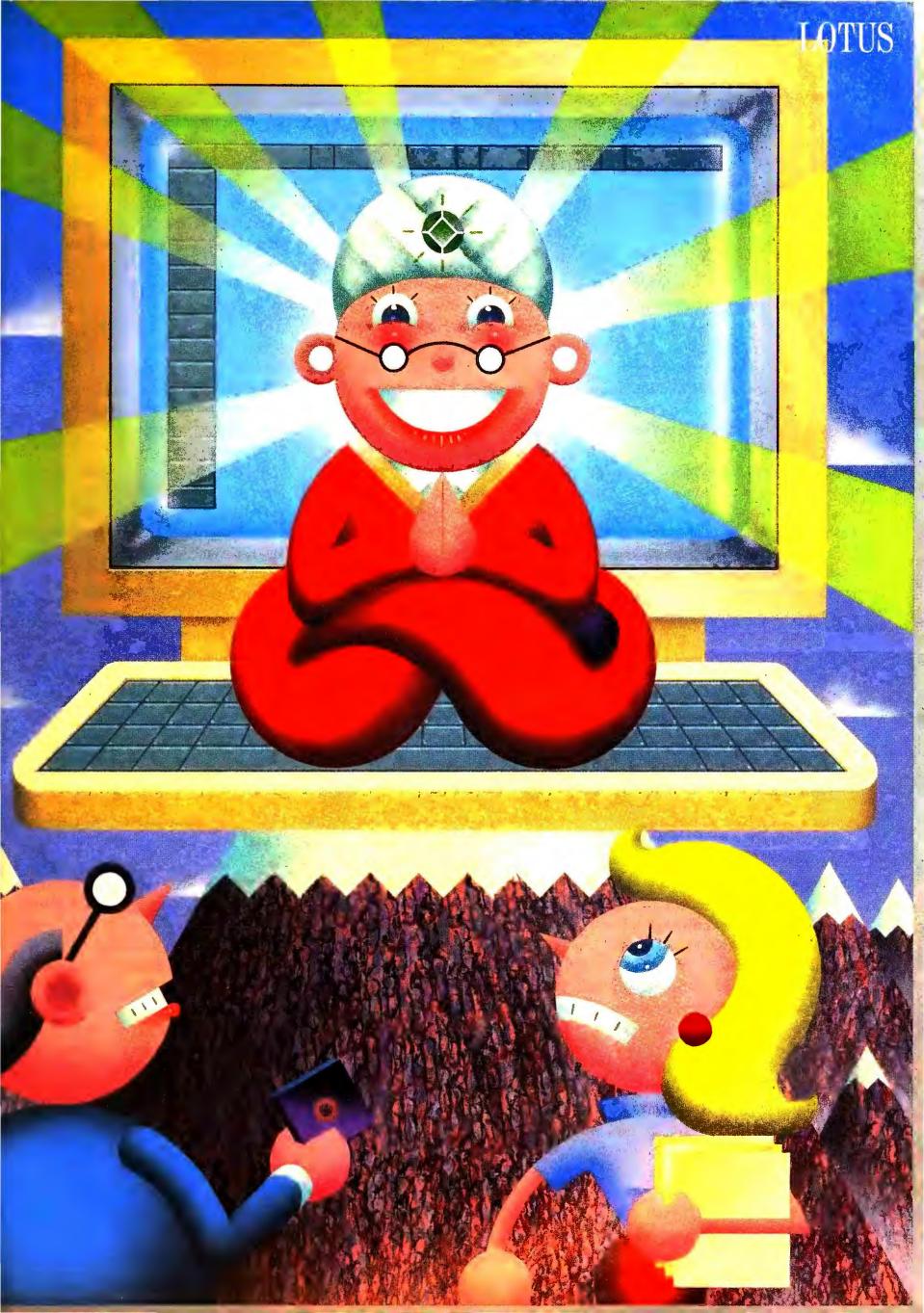
BY JOHN THOMPSON

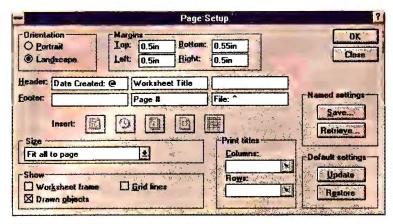
comma, and decimal point. For example, the value 9860 had been entered as '\$9,860.00. By adding these characters to the number, the user found the result he wanted, and it looked like a dollar amount, but he had also inadvertently entered labels instead of numbers. A label in a worksheet evaluates to zero. The solution to this problem is to enter the number without formatting characters, and then assign a numeric format to the number using the Range Format command.

1 My numbers don't add up. A 1-2-3 for DOS release 2.x user came to me with this problem. A quick look at the worksheet revealed nothing amiss. But a closer examination revealed the

2 I can't center a label over several columns. When I investigated each cell in the range in Edit mode, I found that one cell contained a single space (indicated by the telltale apostrophe). 1-2-3 would center the title only in the cells that were blank. Once the space was removed, 1-2-3 centered the title.

Here's the root of the problem: The user was clearing entries from the cells in his worksheet by pressing





CREATING HEADERS AND FOOTERS is easy in release 4.x for Windows. Just click an icon to insert the date or file name.

the <Space> bar. A cell cleared with the <Space> bar appears blank in the work-sheet, but 1-2-3 actually stores the space, along with an apostrophe label prefix, as text in the cell.

Clearing entries this way seems harmless, but it can lead to a number of problems more serious than the one described above. For instance, it can cause memory problems, especially if you're working with large worksheets, because 1-2-3 loads all non-blank cells into memory when the worksheet is retrieved. And since text entries evaluate to zero, seemingly innocuous spaces can wreak havoc in calculations that include those cells.

Tracking down the spaces in a worksheet can be a little tricky. One technique is to use the Edit•Find & Replace command (Range•Search in 1-2-3/DOS) to find them. To try it, position the pointer in cell A1 and choose Edit • Find (or /Range • Search). To specify the range to search, click the Selected Range button in release 4.x, then press the <Period> key followed by <End> and <how> to select the entire active worksheet</h> area. Enter an apostrophe and a space as the text to search for, and choose Labels as the data to search. Click OK or choose Find to start the search. When 1-2-3 finds a space, it highlights the cell. Click Close or choose Quit to exit the Search command, and then press < Delete > or choose /Range • Erase to clear the contents of the cell. Repeat these steps until you've removed all the spaces in the worksheet.

3 1-2-3 just isn't working. Exasperated users come to my office complaining that they try to choose a menu command but nothing happens. Most of the time, the program is in Edit mode. When 1-2-3 is in Edit mode, all you can do is edit the contents of a cell. Once you

leave Edit mode and return to Ready mode, either by pressing <Enter> to accept the changes or <Esc> to cancel the changes, you can access the menu.

4 Why can't I do date arithmetic in 1-2-3? Many 1-2-3 novices enter dates in a cell just as they'd type them in a word processing document; for instance, May 15, 1994.

But if you want to use that date in a calculation—for example, if you want to calculate the number of days between two dates—the dates must be entered as values.

In 1-2-3 release 4.x for Windows and release 3.x for DOS, you can enter dates in the more familiar formats, like 5/15/94 and 15-May-94, and 1-2-3 will recognize the dates as values. Release 4.x automatically assigns a date format for you. In release 3.x, you must use the Range Format Date command to assign a date format.

In release 2.x, you use the @DATE function to enter a date in a cell. Then, you assign a date format to the cell by using the Range•Format•Date command. For example, the formula @DATE(94,5,15) returns the value 34469, which, when formatted as a date, is displayed as 15-May-94.

If you've already entered a series of dates as labels, and you used the *mm/dd/yy* or *dd-mmm-yy* format, all is not lost. You can use the @DATEVALUE function to convert the date labels to their date values. For example, if you entered the label 15-May-94 in cell B1, the formula @DATEVAL-UE(B1) returns the date number 34469.

5 My database isn't working. Sound familiar? Generally the culprit is blank rows in the database, which usually appear between the field names and the first record.

3 1	Corner Lel	LName	FName	DOH	Salary	Florid
	Emp_ld IR643	Ryan	Julie	03/12/90	50,250	Dept
The Street	NR497	Reynolds	Wendy	12/21/89		Marketin
a madeline of	N546	McGrath	Paul	06/02/88	32,000	
A merchal	WS355	Stephens	Michael	12/07/86	45,000	
* 1/4	A548	Ames	Janet	07/03/88	42,250	
Q I	IC357	Clarke	Hannah	12/09/84		Finance
	CG241	Grant	Cynthia	06/23/81	42,000	
11 E	3W950	White	Barbara	02/02/86		Marketing
12 5	SH357	Hunt	Steven	10/20/87	35,000	HR
13 J	D941	Donovan	Joan	02/14/90	49,000	Finance

HORIZONTAL LINES HELP TO SEPARATE AREAS of the worksheet visually without damaging the database structure.

In many cases, users add blank rows to improve the database's appearance. An alternative way to make the database look better is to use borders. Adding borders separates areas of the database visually while keeping the structure intact. For example, to separate the field names from the rest of the database, you would highlight the range of cells containing those names and choose *Style Lines & Color*, select *Outline*, and click *OK*. (Choose :Format Lines Outline in 1-2-3/DOS.) 1-2-3 applies a border to all four sides of the selected worksheet range.

6 Why is the 'MEM' warning flashing? This is a common problem for release 2.x users, and it occurs when too many cells are formatted.

Sometimes the blank cells that fall within a range of values are formatted along with the rest of the values in the range. In other cases, cells that have been erased still contain Wysiwyg formatting. Choose /Range • Format • Reset to remove numeric cell formatting from a cell and return it to the global worksheet format. To remove Wysiwyg formatting from a cell, select the cell and choose :Format • Reset.

If you're using 1-2-3/W release 4.x, select the range of cells to reformat and choose *Edit • Clear*. In the Edit Clear dialog box, select *Styles Only* and click *OK*. Alternatively, you can click the *Delete Styles from Range* SmartIcon, which you'll find in the Formatting SmartIcon palette.

How do I create headers and footers?

Most users know that they can include headers and footers in their reports, but they don't always know how to create them. Many users simply type everything directly into the header or footer areas, then align the information by eyeballing it.

1-2-3/DOS provides special codes for creating and formatting headers and footers. You can use the page number code, #,

to number each page in the report and the date code, @, to enter the current date. To align the data in the header and footer area, you can use the pipe symbol, I, to separate each part of the text.

For example, if you enter 'Date Printed:

@|Title |Page #' as a header or footer, the current date appears left-aligned, the worksheet title appears centered, and the page number appears right-aligned.

Creating headers and footers is easier in release 4.x for Windows. The Page Setup dialog box presents three separate text boxes for the header and three for the footer and five special icons that let you create headers and footers quickly and easily.

For example, you can include the current date, the current time, the page number, the file name, or the contents of a specific cell in a header or footer just by clicking one of these icons. Note that when you indicate the contents of a specific cell, the data in the header or footer changes when the data in the worksheet changes.

8 Why is my macro bombing? Debugging macros is always a struggle, especially if the user entered the macro in all capital or all lowercase letters. When this happens, separating the user-assigned range names from the program commands can be difficult. To avoid this problem, enter macros, @function commands, and menu commands in uppercase letters and enter user-assigned range names in lowercase, as the following example shows.

				I			
1	Mr.		FRte	st~			William I
21-				1141			
431	la ·		(GOT	O)the	~ere~		1 "
- Idea		The state of	9		x = 5/2	334	1

A MIXTURE OF UPPERCASE AND LOWERCASE LETTERS makes macro code both easier to read and more informative.

9 Why are borders printing twice on the first page of the printout? This is a classic problem. It occurs when you include the data assigned as the print border in the print range as well. For example, if the print border is contained in range A1..A49 and you specify the print range as A1..M49, 1-2-3 will first print the border range, A1..A49, and then the print range, A1..M49.

To correct this problem, do not include the border range within the print range. For example, the adjusted print range in this case is B1..M49.

John Thompson is an employee of the Massachusetts Welfare Department and the editor of the Boston Computer Society's Lotus Group Newsletter.

Guru Tips

Manage Range Names Efficiently

Make your range names as descriptive as possible. In many cases, compound names such as Total_Amount and North_Sales make the contents of the range immediately obvious. But beware of a mistake that

many users frequently make here: Don't confuse the hyphen symbol (-) with the underscore symbol (_) as the separator to divide the parts of a compound range name. When 1-2-3 sees the hyphen, it considers it to be a subtraction sign and proceeds to

subtract the last half of the range name from the first half. For example, if you create the range name Total-Amount, 1-2-3 would try to subtract Amount from Total.

There are a number of ways to manage range names effectively. One is to group the range names together by type. For example, you might name all print ranges Pg_1, Pg_2, and so on. Another technique is to use a character such as an underscore to start a range name and have it represent the range names involved with a month or menu screens, for example, _March and _Mark. Some characters to avoid when creating range names are the comma, the semicolon, and the period, as well as +, *, -, /, &, <, >, #, and {.

You can also force range names into a specific place within an alphabetical listing. For instance, to list all house payments together, use H as the first letter, followed by an underscore, then add the specific payment, such as mortgage, interest, or principal. The range names would then appear together in a list: H_Interest, H_Mortgage, H_Principal.

1-2-3 allows you to create a list of all of the range names in a worksheet. To do so, choose /Range • Name • Table and include a blank range in your worksheet.

Don't Use Columns as Spacers

It's very common—and inefficient—when creating worksheets to employ columns as spacers. This usually occurs when an entry

extends the width of a column. For example, if the label Total Amount is entered in a cell that has the default column width of nine characters, the text flows into the cells to the right. The user then moves two cells to the right and continues entering

Remember: Do use descriptive range names, don't use empty columns as spacers, and always let 1-2-3 fill a range of cells for you.

data. Although this practice doesn't cause any harm, it does add both extra keystrokes and time to the worksheet design.

The solution is to adjust the width of the column so that the entire entry fits. You can use the Style • Column Width command in 1-2-3/W release 4.x or the Worksheet • Column • Set-Width command in 1-2-3/DOS to accomplish this. If you're using release 4.x, you can also use the Fit Widest Entry command, which automatically adjusts the column width based on the widest entry in the column.

Quickly Fill a Range of Cells 1

Do you create a monthly list by typing each and every date in a separate cell in a column? If so, save time with the Data • Fill command, which allows you to fill a range quickly with a series of entries.

For example, if you're using 1-2-3/W release 4.x, enter the date 5/1/94 in cell A5, highlight range A5..A35, and choose Range • Fill By Example. 1-2-3 fills the range with the days of May and automatically assigns a date format to them.

If you're using 1-2-3/DOS, choose /Data • Fill and indicate range A5..A35 as the fill range. Enter @DATE(94,5,1) as the Start value, press <Enter> to accept the default step value of 1, enter @DATE(94,5,31) as the Stop value, and press <Enter>. 1-2-3 enters the days of May in each cell in the fill range. When you assign a date format, you can see that they are the days of May.



Benchmarking the Data Modeling Contenders

Excel and Quattro Pro really challenge Improv's

multidimensional analysis skills? By John Walkenbach

hen Lotus Improv appeared last year, it brought unparalleled ability to slice and dice worksheet data dynamically, giving you any kind of view that you want. Improv quickly emerged as the premier Windows tool for multidimensional data modeling, prompting Borland and Microsoft to attach data modeling modules to their mainstream spreadsheets.

Both Quattro Pro 5.0 for Windows and Excel 5.0 incorporate some of the data modeling tricks that made Improv famous, but the three packages differ dramatically in approach and power. Here we'll examine what each package really can do—and how that affects the work that you do.

What Is Multidimensional Modeling?

The easiest way to understand multidimensional modeling is to take a look at an example. Consider a department's budget stored in a traditional spreadsheet. Typically, months appear along the top row and budgeted expense items—salaries, commissions, and so on—appear in the first column. The intersecting cells contain the budgeted amounts.

Division J U.S. Division						Months Year
1200			Jar	Jan Fe		
			1993	1994	1993	1994
	Damus	Budget	2,002	2,250	2,002	2,250
Operations	Bonus	Actual	1,226	2,341	3,460	3,269
Operations	Transportation	Budget	979	1,100	979	1,100
	Transportation	Actual	1,511	860	-370	-499
	Salaries Benefits	Budget	31,150	35,000	31,150	35,000
		Actual	31,948	34,544	31,097	34,038
		Budget	6,541	7,350	6,541	7,350
A desiminate at a m		Actual	7,626	7,636	7,655	7,342
Administration	D	Budget	3,168	3,560	3,168	3,560
	Bonus	Actual	2,159	2,970	2,480	2,990
	T4-4:	Budget	445	500	445	500
	Transportation	Actual	1,029	-4	2,358	960

FIGURE 1: IMPROV CONNECTS CATEGORIES like months and department to tiles.

But most companies develop separate budgets for each department. The multisheet nature of modern spreadsheets makes it easy to store several departmental budgets in a single file. When you add a sheet, you're adding one more dimension—the department—to the model. Every budgeted amount can be described by month, expense account, and department.

Most companies compare their actual expenses—what was really spent—to their budgeted expenses. But if you're working with a traditional spreadsheet, you'll have to find another way to show this fourth dimension—actual expenses. For example, you can use one file to store the actual data, another to store the budget data, and a third file with link formulas to compute variances. This approach works, although if you change the structure of your budget, you also have to make identical changes in the other files.

It's easy to see how you could need even more than four dimensions. For instance, if you want to compare the previous year's budget with the current year's, you'll need yet another dimension.

When you start dealing with these types of applications, traditional spreadsheets show their limitations—and multidimensional modeling tools like Improv seem a godsend, providing an easy way to arrange and rearrange the kinds of data described above. **FIGURE 1** shows an Improv model set up with six dimensions (which Improv calls categories): division, department, expense item, months, year, and data (budget and actual).

Multidimensional modeling is not for everyone. If you haven't run up against the limitations just discussed, you probably don't need it. But if you like the idea of instantly recasting your data to see it in a different way, or quickly moving data around to generate a special report, multi-dimensional modeling software may be your solution.

An added benefit is the ability to create and work with subtotals and groups. In a conventional spreadsheet, generating formulas to calculate subtotals such as all personnel expenses or quarterly subtotals is essentially a manual task. As we'll see, multidimensional modeling makes this sort of task virtually painless.

Improv: Born to Model

You needn't do anything special to create a multidimensional model in Improv—the construction techniques are there when you start the application, reflected in every feature. You must, however, relearn some spreadsheet fundamentals.

An Improv model starts with two categories, each with a single item. The two items intersect to display a single cell. Adding categories to an Improv model is easy. When you choose the Create Category command, Improv inserts a category with a single item and also adds a category tile with the category's name. To add new items to a category, you can use the Create Items command or simply drag the item across a row or down a column.

In Improv, every category must consist of exactly the same items. In a budget model, for example, every department must have the same set of budget items. If an item such as commissions is not appropriate for a particular department, you must still include it. In other words, adding or removing a particular item in a category affects the entire model.

Data entry and editing. You enter and edit data in Improv just as you would in a standard spreadsheet.

Expressing Worksheet Tables as Databases

Most tables stored in spreadsheets can be expressed as database tables. Consider a 3-D worksheet budget model with 12 months, 100 expense items, and five departments. The database table version of this model would consist of four fields and 6000 records (12 by 100 by 5). The figure immediately below shows an example of a few records in such a database table.

MONTH	EXPENSE_ITEM	DEPARTMENT	BUDGETED
Jan	Wages	Marketing	25000
Jan	Commissions	Marketing	17000
Feb	Travel	Operations	1500

If you think in terms of the database table, extending the model is easy—just add new fields as appropriate. The figure below shows a few sample records from a table with two additional dimensions.

YEAR	MONTH	DIVISION	DEPARTMENT	EXPENSE_ITEM	BUDGETED
1993	Jan	U.S.	Marketing	Wages	25000
1994	Jan	Overseas	Marketing	Travel	15000
1994	Feb	Overseas	Sales	Commissions	22000

Formulas. Improv uses general formulas, which are entered in a separate area called a formula pane rather than in cells. A general formula can apply to multiple cells. Improv's formulas are English-like and easily understandable; they tell you by name where the data you're working with is coming from.

Views. Improv allows you to change the structure of your data simply by dragging the category tiles to another location. You can show a category as rows, columns, or pages. To rearrange the categories side by side, one on top of the other, or page by page, you just drag the tiles.

If you choose to drag a category tile to the upper left page corner, you are able to view only one item from the category at a time—this is comparable to seeing a single "slice." However it's easy to change the item that is currently displayed with the help of a *spin box*—a text box with a pair of arrows, one of them pointing up and the other pointing down. When you click on the spin box, you can choose to see a single page—or category—of the data on screen at a time; the rest of the data that's connected to that category remains hidden.

Grouping category items. Grouping is another important aspect of multidimensional models. In a budget model, for example, you might want to group all expense items that deal with employee expenses, and name the group Personnel. Grouping items is easy in Improv; you can even request that Improv create group summary formulas automatically. When you create a group summary, you can choose to hide the summarized items.

Formatting and charting. You can, of course, apply formatting to your Improv model. Simply select a category to highlight all cells in that category and use the floating InfoBox Style panel. But unlike traditional spreadsheets, Improv requires that you use a special Presentation window to create a chart. Once a chart is created, it's linked to the view it's based on and does not change if you change the view of the data.

External data access. Improv 2.1 includes a copy of Q+E Extend, which lets you bring data from external sources into an existing model. You can refresh the data at any time you choose by executing queries, stored in the formula pane.

Macro support. Improv uses a scripting macro language, similar to Visual Basic, that

allows you to accomplish anything you can do with menu commands.

How Traditional Spreadsheets Do It

Unlike Improv, Excel 5.0 and Quattro Pro for Windows 5.0 don't enable you to create the multidimensional model directly. Instead you start out with some input data and then transform the data into a multidimensional model stored

in another worksheet location. One key requirement of Excel and Quattro Pro: Before you can transform the data, it must be in the form of a flat database table (see "Expressing Worksheet Tables as Databases").

Excel Turns the Tables

Excel is far more flexible than Quattro Pro and can handle more data.

Excel enables you to convert a single-sheet database, a multiple-sheet database, or data stored in an external file into a pivot table, like the one that's shown in **FIGURE 2**. You can select the data for each department from the drop-down list box in range P1..Q1, and you can drag each buttonlike object around the table area.

Data entry and editing. In order to create a pivot table, you have to call up the Pivot Table Wizard by selecting Data • Pivot Table. The Wizard walks you through all the steps in the process of creating the table. First you select the type of data, and the source, which can be an Excel list or database, an external source,

multiple Excel ranges, or another pivot table. Then you confirm the range that Excel proposes or query the external source for the data. Next, you identify the variables that become rows, columns, pages, and the data in the pivot table. Finally, you indicate whether you want Excel to calculate grand totals, to save the data with the table, and to auto-format the table.

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P	Q	R	S	T	U	A	¥	I	1
Department	Item3 ±						-		_
Sum of Value	Month								
Account .	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	S
Benefits	7350	7350	7350	7350	7350	7350	8085	8085	
Bonus	3560	3560	3560	3560	3560	3560	3560	3560	
Commissions	0	0	0	0	0	0	0	0	
Copiers	1100	1100	1100	1100	1100	1100	1100	1100	
Hotel	1050	1050	1050	3200	1050	1050	1050	1050	
0 Lease	2500	2500	2500	2500	2500	2500	2500	2500	
1 Meals	500	500	500	1200	500	500	500	500	
2 Miscellaneous	4500	4500	4500	4500	4500	4500	4500	4500	
3 Othera	950	950	950	950	950	950	950	950	
4 OtherB	1200	1200	2000	1200	1200	1200	1200	1200	
5 Postage	250	250	550	250	250	250	250	250	
6 Salaries	35000	35000	35000	35000	35000	35000	38500	38500	3
7 Taxes	540	540	540	540	540	540	540	540	
8 Telephone	875	875	875	875	875	875	875	875	
9 Transportation	500	500	500	500	500	500	500	500	
4 M Din Chart2 A /8	10 1450			AEO,	+1	450	100	450	_

FIGURE 2: EXCEL'S PIVOT TABLE USES BUTTONS SIMILAR TO IMPROV'S CATEGORY TILES. You can drag these buttons just as easily as the Improv tiles. However, you can't touch this data.

Once you set up the table, you can rearrange it as you wish. But if you need to make changes, you must do so in the input data, since you can't edit cells in a pivot table. So if you want to change the factors you use to calculate your budget estimate, you must perform the calculation in your worksheet and then refresh your pivot table.

Formulas. You can specify what summary formula you want to use when creating the pivot table and enter other Excel formulas after it's created. Unlike Improv formulas, Excel formulas aren't general, so debugging a big data-pivot application isn't easy.

Views. Once a pivot table is generated, you use a method similar to that used in Improv

64.50 JE 14.	P		Q	RAIL H	R	7	5
1	Departm	ent	Item3	+			
2							
3	Sum of	Value	Account	Mon	th		
4			Benefit				
5			Jan	Feb		Mar	
6	Total		7350)	7350		7350
7							

FIGURE 3: WHEN YOU DRAG TWO BUTTONS TO ONE PIVOT TABLE, THEY APPEAR SIDE BY SIDE. But the data is stacked, which can confuse an unsophisticated viewer.

to change the arrangement of data. Simply drag a category button to another position—row, column, or page. You can call up the Pivot Table Wizard at any time to add or delete categories or change the view. However, creating or just rearranging large tables can take considerable processing time.

Button arrangement doesn't give you a visual clue to data arrangement, either. For

example, when you put two dimensions along the top of a pivot table, the buttons appear side by side, like Account and Month in **FIGURE 3**, even though the data below is arranged vertically.

Grouping category items. Excel makes it easy to group items in a pivot table: Just select the items to group, and click the

Group button on the Query and Pivot tool bar. Double-clicking a grouped category creates a new sheet that shows all the detail included in the category. Excel offers a wide variety of summary types in pivot tables, including sums, counts, and percentages.

Formatting and charting. One Pivot Table Wizard option lets you apply Excel's auto-

matic table formatting to the resulting pivot table. If you choose this option, your table will maintain its formatting even if you change the table layout drastically.

The charting data in a pivot table is also dynamic. For example, you can create a chart that always displays the current data in a pivot table. If you change the pivot table by selecting a different page item, for instance, the chart will update automatically.

External data access. When you start the Pivot Table Wizard, you can choose to work with a worksheet database or an external database table. If you choose the latter, you take a side trip to the Query application to select the database and define your selection criteria. The subsequent pivot table creation procedures are identical. Select Data•Refresh Data to make sure you're up to date.

Macro support. Excel provides complete macro support for all aspects of creating and manipulating pivot tables—even when the data source is an external database. This makes it possible to automate recurring pivot table tasks.

Overall, Excel's data modeling can be useful for generating a variety of summary tables for existing data. But your data must start in the form of a database or a series of two-dimensional tables that can be consolidated into a single pivot table. You can't use general formulas.

Quattro Pro Runs on a Desktop

Quattro Pro for Windows 5.0 includes the Data Modeling Desktop, a separate application that you can execute directly from the Quattro Pro Data menu. Before you can use the Data Modeling Desktop, your data must be in the form of a worksheet database. Then you can issue the Data•Data Modeling Desktop command and confirm your selection.

The Data Modeling Desktop application displays the selected data in a window. Drag the field names to construct a summary table. You have a substantial amount of control over how you want the fields to appear in the table. When the table looks the way you want, select it, and choose the Edit• Copy to Quattro Pro command to return the table to your worksheet. You can arrange this transfer as a two-way Dynamic Data Exchange link between the worksheet database and the Data Modeling Desktop by selecting options shown in FIGURE 4. This

	IMPROV 2.1	EXCEL 5.0	QUATTRO PRO 5.0
	FOR WINDOWS	FOR WINDOWS	FOR WINDOWS
	GEN	ERAL	Edu 12.82 in 12.22
Data entry <mark>and</mark>	Enter data into	Use PivotTable	Put data in
editing	same area as	Wizard; make	database form;
	model; use menu	changes in	select Data • Data
	commands or drag	input data, not	Modeling Desktop;
	items to expand	in pivot table.	link back to
	structure.		worksheet using a
			DDE link.
Formulas	English-like	Choose summary	Choose summary
	general formulas,	formula when	formula when
	entered in	building model;	building model;
	formula pane	enter other	enter other
		formulas in model	formulas in model
		afterward.	afterward.
- 45	VIE	WING	= + (, -
Drag-and-drop	yes	yes	in Data Modeling
category names			Desktop only
Stack categories	yes	yes	yes
in rows or columns			
Stack categories	yes	yes	no
as page slices			
	yes	yes	yes
Multiple views of		-	
Multiple views of the same data			
	**************************************	PING	
the same data	GROI	UPING *	limited
	**************************************	yes	limited

yes

yes

yes

EXTERNAL DATA ACCESS

MACRO SUPPORT

no

no

no

How Modeling Tools Stack Up

Charts in same

worksheet

Use external

directly

database tables

Macro language

view or window as

no

yes

with add-in

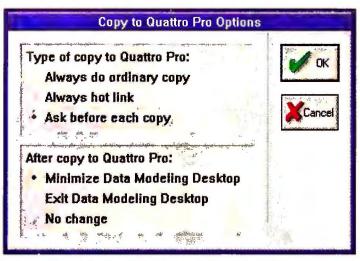


FIGURE 4: CHOOSE A COPY OR HOT-LINK option in Quattro Pro for Windows to get your data back to the worksheet.

two-way DDE link means that when you change data in the input table, the Data Modeling Desktop and results table will reflect the changes.

FIGURE 5 shows the Data Modeling Desktop. The input database (which contains data from the worksheet) appears in the window at the bottom of the screen. To add a category to the table, simply drag a field name to a row or column position in the summary table, and the Data Modeling Desktop recalculates the table. The table will display the additional items found in the database.

Data entry and editing. A worksheet must be recast as a database before you can use it as input to the Data Modeling Desktop.

When you're working in the Data Modeling Desktop, the input data for your model appears in a separate window. You cannot modify this data directly. If you want to edit the input data, do so in the input database. Then use the Data Modeling Desktop to generate an updated table. Since it uses DDE links to perform this update, you can set it up so updates occur automatically.

Formulas. You can specify the summary formula (sum, average, count, percentages, change values to text) that you want to use when grouping label bars, but you have to write more complicated formulas in the worksheet.

Views. Unlike Improv and Excel, Quattro Pro for Windows does not let you display categories as pages in your view. However, you can get a similar effect using the Limit window, which lets you define criteria for records to include in the table. For example, in a budget model you can show data for just a particular division. The order of the items within a category is always alphabetical, and

it cannot be changed. Therefore, if a category consists of month names, they will not appear in the standard chronological order. You'll need to perform manual cutting and pasting in the results table to put the months in proper order. But table updates overwrite your changes.

Grouping category items. Quattro Pro's Data Modeling Desktop lets you group specific items, but the process leaves much to be desired, since you must individually select each item to

group (no dragging allowed). Once you've created a group, you can choose to hide the group detail and show only summary values. However, if you ungroup the items and then later decide that you want them grouped again, you must create the group from scratch—the software doesn't remember previous groupings.

Formatting and charting. The only formatting that's allowed in the Data Modeling Desktop is simple font changes. But once

the results table is returned to Quattro Pro for Windows, you can use all the standard formatting commands to make the table look exactly the way you want.

You can also create graphs from the output of the Data Modeling Desktop. The graph series are linked to specific cells, so if the table structure subsequently changes,

the graphs may no longer be valid.

External data access. A potentially serious flaw in the program is the inability to work with external database files directly. If the data you want to model is in an external database table, you'll need to bring it into Quattro Pro by importing it or using the Data Modeling Desktop to get the results of a query. Also, your input database size is limited to 8192 records (the number of rows in a worksheet). In practice, however, we found that the Data Modeling Desktop cannot handle such large input tables. Attempting to

do so resulted in out-of-memory errors on a system with 16MB of memory.

Macro support. Since data modeling occurs in a separate application, you can't use Quattro Pro's macro facility to automate any of these procedures. If you need to convert data to a multidimensional table every month, there's no way that you can write a macro to automate the task.

Overall, Quattro Pro's Data Modeling Desktop lets you summarize worksheet database information by creating a separate summary table, but its modeling features are less extensive than those in Improv and Excel. Also, you cannot work directly with external databases. Quattro Pro's grouping and viewing features are quite limited, and the program is more cumbersome to work with since the Data Modeling Desktop is a separate application.

What's Your Modeling Job?

The question of which tool to choose comes down to your needs. If you perform a lot of trend analysis in your job, Improv is the best tool because it was designed for

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	Jan	Feb	Mar	Apr	May	Jun	Jul	A	ug	Sep	Oct	. No	Υ	De
A	4515.00	4515.00	4515.00	4515.00	4515.0	0 4515.0	0 4515.	.00 451	5.00	4515.0	0 4515	.00 451	5.00	4515
В	9450.00	9450.00	9450.00	9450.00	9450.0	9450.0	0 9450.	00 945	50.00	9450.0	0 9450	.00 945	0.00	9450
C	7350.00	7350.00	7350.00	7350.00	7350.0	7350.0	0 8085	00 808	35.00	8085.0	0 8085	.00 808	5.00	808
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E.	lege	Departme	nt	Jan	Feb	Mar	Apr	May	J	un	Jul	Aug	Sep	
11,	Sala	aries		21500	21500	21500	21500	21500	2	1500	21500	21500	215	000
	Ber	efits		4515	4515	4515	4515	4515	5	4515	4515	4515	45	15
	48 of	48	4											+

FIGURE 5: QUATTRO PRO'S DATA MODELING DESKTOP (at the top of the screen) lets you arrange and rearrange your data (at the bottom of the screen), but that's all you can do here. To edit, print, or graph rearranged data, you must go back to the worksheet.

the work you do, and you won't mind spending the time to get the data into the right structure the first time. But if analysis or research is secondary, and if you don't have a spreadsheet but still want data modeling ability, then Excel or Quattro Pro for Windows are better choices.

John Walkenbach is a freelance writer and spreadsheet consultant. He's the author of several spreadsheet books, including the PC World Excel 5 for Windows Handbook (IDG Books, San Mateo, California, 1994).

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appearance that makes them easier to grasp.

By Richard Cranford

IMPROV'S DYNAMIC VIEWS, which let you shuffle and reshuffle your worksheet data to uncover hidden relationships and trends, are not easy to emulate in 1-2-3. But we've created a 1-2-3 macro that lets you perform at least rudimentary data modeling. You can use this macro, probably with no modifications, in any 1-2-3 worksheet that contains a database.

Specifically, the data modeling macro presented here organizes a database into a compact table in which any cell represents the intersection of up to four fields. The macro uses the /Data•Table•Labeled command from the 1-2-3 Classic menu to create a table with either one or two fields along the left side and either one or two fields along the top. Custom dialog boxes guide you through the selection of fields.



Our macro is patterned after the Crosstab feature in 1-2-3 release 4.x for Windows, but it goes a little further by letting you create four-way tables from your data. Release 4.x's Crosstab feature lets you create only two-way tables.

Take a look at the database we created in **FIGURE 1**. It lists the sales of three categories of musical recordings (Classical, Jazz, and Show) in two formats (CD and LP), of two types (New and Used), for two stores (Uptown and Downtown).

To determine a breakdown of the sales figures for musical recordings according to store, musical category, type, and format, you could sort and re-sort this database a number of times, but you'd have to calculate subtotals each time you sorted.

An alternative is to use the macro to rearrange the data into an Improv-like table, like the one shown in **FIGURE 2**. In this example, every cell in range C4..F9 is the intersection of four fields. Cell C4, for example, contains the sum of the New Classical CDs that were sold at the Downtown store.

Before you create the macro, enter the labels and values that are shown in range A1..E21 of Figure 1. Then click the *New Sheet* button to place the macro on its own page, and enter the labels that are shown in **FIGURES 3** and **4**. Be sure to enter an apostrophe before the labels in cells A1, B14, B18, B21, B36, B37, B48, B52, B55, B61, C61, D61, E61, and F61.

Then preselect range A1..A75, select *Range • Name*, click the *Use Labels* button, and click *OK*. Save your worksheet.

Now move back to worksheet A and give the macro a try. Select the entire database, range A1..E21, then press **<Ctrl>-T**. The macro presents a dialog box that prompts you for the first field that you want to appear along the left side of the table (see **FIGURE 5**). The

	A	В	C	D	E
1	Store	Category	Туре	Format	Amount
2	Downtown	Show	New	LP	\$8.95
3	Downtown	Jazz	Used	CD	\$15.95
4	Downtown	Classical	New	CD	\$8.95
5	Uptown	Classical	New	LP	\$15.95
6	Uptown	Show	Used	CD	\$15.95
7	Downtown	Classical	Used	CD	\$11.95
8	Downtown	Show	Used	LP	\$8.95
9	Downtown	Classical	Used	LP	\$11.95
10	Uptown	Jazz	New	CD	\$19.95
11	Downtown	Classical	New	LP	\$19.95
12	Downtown	Classical	Used	CD	\$11.95
13	Downtown	Classical	New	LP	\$8.95
14	Uptown	Classical	New	LP	\$15.95
15	Uptown	Jazz	New	LP	\$19.95
16	Downtown	Show	Used	LP	\$15.95
17	Uptown	Jazz	New	CD	\$11.95
18	Uptown	Classical	Used	LP	\$8.95
19	Downtown	Show	New	LP	\$19.95
20	Uptown	Show	Used	CD	\$8.95
21	Downtown	Classical	Used	LP	\$15.95

FIGURE 1: THIS 1-2-3 DATABASE WOULD BE EASIER TO ANALYZE if you could collapse it into a four-way table. Enter the labels and amounts shown here to test the macro that does just that.

ExampleDatabase	B (Maco)	C 1	D	E 1	F
1 Sum for A	mount Field				
2		Nev		Use	d
3		CD	LP	CD	LP
4 Downtow	n Classical	8.95	28.9	23.9	27.9
5	Jazz	0	0	15.95	0
6	Show	0	28.9	0	24.9
7 Uptown	Classical	0	31.9	0	8.95
8	Jazz	31.9	19.95	0	0
9	Show	0	0	24.9	0

FIGURE 2: THIS FOUR-WAY IMPROV-LIKE TABLE makes any relationships and trends that exist in your data much easier to find.

dialog box contains a list of all the field names from range A1..E1 in Figure 1. Click anything except the Amount field, then click *OK*. (You can also select a field by double-clicking it.) Clicking Cancel here ends the macro.

The macro presents another dialog box prompting you for the second left-side field of the table. Notice that the field you selected the first time has been removed from the list. Again, select any field except Amount. If you wanted just one field to appear on this side of the table, you would click Cancel at this point.

Next, you'll see a dialog box prompting you for the first field that you want to appear along the top of the table. Select one of the remaining fields other than Amount. (As with the dialog box for selecting the first left-side field, you can click Cancel here to end the macro.) The box appears a fourth time, listing Amount and one other field. Double-click the other field. You could also click Cancel here to forgo a second field for the top of the table.

Now you'll see a dialog box asking you to select the field on which to summarize the database. The dialog box shows just one choice—the Amount field—so click *OK*. (Clicking Cancel here also ends the macro.)

The macro presents one more dialog box, in which you select a calculation type: sum, average, count, minimum, or maximum (see **FIGURE 6**). Click one of the radio buttons to select a calculation type, and then click *OK*. If you click Cancel here, the macro will automatically select sum as the calculation type. In a few seconds, the macro will add a new worksheet to your file and create a table like the one in Figure 2.

The idea of adding a new worksheet to the file comes from release 4.x's Crosstab feature, which does the same. If you want to put the table in a different sheet, select the range it occupies, then choose $Edit \cdot Copy$ from the menu to copy the data to the Windows Clipboard. Position the cell pointer where you want the table to appear, and select $Edit \cdot Paste$. You can delete the newly created worksheet from your file.

You can't reshuffle fields in the finished table as you can in Improv, Excel, and Quattro Pro. If you want to see the data summarized a different way—for example, perhaps you'd like to see Type and Category on the left, Store and Format on the top—just reselect the database and create another table, selecting the fields in whatever order you like.

Once you're sure that the macro is working correctly, delete the worksheet that contains the sample database, then save the file again. To add the macro to one of your own worksheets, open the file and add a new worksheet. Then move to cell A1 of the new

```
١t
               {WINDOWSOFF}{LET tablerange,@INFO("selection")}/DQRI{tablerange}~Q
2
               {SELECT-RIGHT @COLS(@@(tablerange))-1}{EDIT-COPY}{INSERT-SHEETS}
               {HOME}{EDIT-PASTE}/RT{END}{HOME}~~{R}/RE{END}{HOME}~{D 6}
               {rowheadings}
5
               {colheadings}
6
               {maketable}
7
               {LET A1, +sumtype& for "&E1&" Field"}
8
               {EDIT-CLEAR B1..F2, "both"}
               {STYLE-FONT-ATTRIBUTES "bold", "yes"}
               {END}{D}{U toprows}/M{END}{HOME}{PGDN}~{HOME}{D}~{HOME}
11
   rowheadings {LET listhead, "Fields for Left Side of Table"} {headings leftcols}
12
13
               {SELECT-RANGE-RELATIVE leftcols-1, var1*var2-1}{STYLE-BORDER "outline", "yes"}
14
               Q{U}{R leftcols}
15
16
17
   colheadings {LET listhead, "Fields for Top of Table"}{headings toprows}
               /RT{END}{HOME}~{U toprows}~{END}{SELECT-HOME}{EDIT-CLEAR , "both"}
18
               {U toprows}{SELECT-RANGE-RELATIVE var1*var2-1, toprows-1}
19
               {STYLE-BORDER "outline", "yes"}{STYLE-ALIGN-HORIZONTAL "center",, "yes"}
               21
22
24
   headings
              {DEFINE bordernum}{LET var2,1}{LET listprompt, "Select first field"}
25
              {getfields}{IF @CELL("type",choicenum)="b"}{DELETE-SHEETS}{QUIT}
26
               {makelist var1}{U}{R}
27
              {LET listprompt, "Select second field, click Cancel if none."}{getfields}
              {LET +bordernum,1+(@CELL("type",choicenum)<>"b")}
28
29
              {L}{D}{IF @@(bordernum)=2}{R}{U}{makelist var2}{L}{IF var1>1}{redist}
30
31
              {CHOOSE-ITEM A1, choicenum, listprompt, listhead}
   getfields
              {IF @CELL("type",choicenum)="b"}{RETURN}
32
              {LET @CELLPOINTER("address"),@@("A"&@STRING(choicenum+1,0))}
33
34
35
   makelist
              {DEFINE varnum}
36
              /M{BS}{HOME}{D choicenum+1}.{D @COLS(@@(tablerange))}~{HOME}{D choicenum}~
37
              /C~{END}{U}~/DQCZ1..Z2~O{BS}~UQ{DEL}{D}
38
              {IF @CELLPOINTER("type")="b"}/M{BS}{D}.{END}{HOME}~~
              {IF @CELLPOINTER("type")="b"}'<>empty~
39
40
              {END}{SELECT-HOME}{SELECT-DOWN}{END}{SELECT-UP}
41
              {STYLE-FONT-ATTRIBUTES "bold", "yes"}
              {STYLE-BORDER "left", "yes"}{STYLE-BORDER "top", "yes"}
42
43
              {LET +varnum, @ROWS(@@("!"&@INFO("selection")))}
44
              {R}/C{D var1*var2-var2-1}~{D var2}~
45
   redist
              {L}{D var1-1}{FOR count, var1-1,1,-1, move_it}
46
47
48
   move_it
              /M~{D count*(var2-1)}~{U}
49
              {U}{LET listprompt, ""}{LET listhead, "Select Field for Summary"}{getfields}
   maketable
51
              {IF @CELL("type",choicenum)="b"}{DELETE-SHEETS}{QUIT}
52
              /C-F1-{HOME}{R}/M{END}{HOME}-{HOME}-{EDIT-GOTO F1}
```

FIGURE 3: THE DATA MODELING MACRO arranges a standard 1-2-3 database into a four-way table. The macro continues in Figure 4.

	A	В	С	D	E ·	F
53		{CHOOSE-ONE option	ns,sumtype,"Select calcu	lation type"}		
54		{IF @ISNUMBER(sum	type)}{LET sumtype,"Sum"	}@DSUM		
55		({tablerange},E1,	A1D2)~{D}{L}@IF(@ISER	R(F1),"",F1)~		
56		{HOME}/DTLFE1E2	-{R leftcols}{END}{D}.{F	R var1*var2-1}~G		
57						
58	options	∑	&Average	&Count	&Minimum	&Maximum
59						
60		{LET sumtype, "Sum"}	{LET sumtype, "Average"}	{LET sumtype, "Count"}	{LET sumtype, "Minimum"}	{LET sumtype, "Maximum
61		@DSUM	@DAVG	@DCOUNT	@DMIN	@DMAX
62						
63		VARIABLES				
64	choicenum					
65	listhead					
66	listprompt				•	
67	count					
68	varnum					
69	var1					
70	var2					
71	bordernum					
72	leftcols					
73	toprows					
74	sumtype					
75	tablerange					

FIGURE 4: THE MAKETABLE SUBROUTINE, which begins in row 50, prompts you for the calculation type and fills in the values in the table.

worksheet, select File • Open, specify the path and name of the file that contains the macro, click the Combine button, and click OK. Finally, assign range names: Preselect range A1..A75, choose Range • Name, click the Use Labels button, and click OK.

There are a few things that you should keep in mind when you're using this macro with your own database. First, the fields that you select for the left side and top of the summary table should be the kind of fields that contain a small number of unique entries used many times. For example, if your database lists your company's employees, you wouldn't want to summarize on the Employee Number field. Instead, you would pick a field such as Department Number or Job Category. Also, the field that

you pick for the summary should be one that contains values.

Second, if you select Average as the calculation type, and there are combinations of fields for which there are no entries (in our database, for example, there were no sales of New Jazz CDs at the Downtown store), the macro places label prefixes into the table instead of ERR. To change the label prefixes to something else, edit the entry in cell B55. Replace the two quotation marks with whatever you'd like the macro to place in the table. For example, you might replace the quote marks with the label @NA or with a zero.

Third, if one of the fields that you select contains any empty cells, the records that contain those cells will not be included in the macro's calculation. For example, if you removed the label from cell

D10 of our database, the value for New Jazz CDs at the Uptown store (cell C8 of Figure 2) would be reduced by \$19.95.

Finally, if you select a database field for your table that contains no entries at all, the field name won't appear as a column heading in the table. Instead, the macro will use the label '<>empty' for the heading (see cell B39 of Figure 3 for this instruction).

Richard Cranford is a senior associate editor for PC World Lotus Edition and editor of the 1-2-3 for Windows Report. The models and other files from this article are available via PC World Online on America Online and CompuServe.



FIGURE 5: FROM THIS DIALOG BOX, SELECT ONE OF TWO FIELDS that you want to appear on the left side of the table.

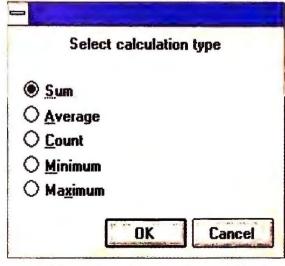


FIGURE 6: FROM THIS DIALOG BOX, SELECT THE CALCULATION that you want 1-2-3 to perform on the collapsed table.

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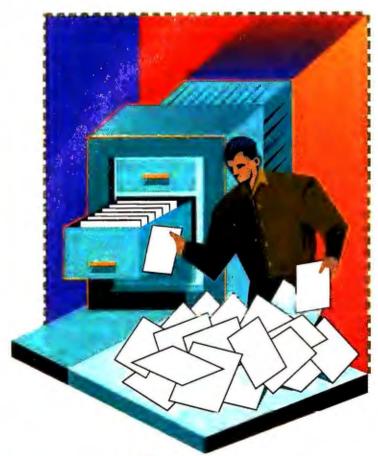
a.m. to 11 p.m. Mountain time, Fri. 6 a.m. to 18 p.m.







Creating and Sorting a Database



reating databases in 1-2-3 allows you to avoid the added expense and learning that are involved with database packages such as dBASE, Approach, and Paradox—as long as the database doesn't grow too large or the project become too complex. It's relatively easy to use your existing worksheet data or, if you work with release 3.x or 1-2-3 for Windows, to use data imported from outside databases.

Improvements in 1-2-3 release 4.x for Windows have rendered some of 1-2-3's traditional database tools obsolete (see "1-2-3 Database Management Made Easy" in April). However, the basics of data management remain the same whether you use 1-2-3 for Windows or 1-2-3 for DOS. Here's a refresher course on setting up a database and sorting that database on one or more fields.

1-2-3 Databasics

In its most elementary form, a database is simply a list of items. A shopping list of eight items, for example, is a database of eight records.

A 1-2-3 *database table* consists of rows and columns of information—the same

format you use when you write a shopping list on a piece of paper. Each new item in the list, or *record*, occupies one row of the database.

Database columns, or *fields*, are necessary when more than one kind of information pertains to each record. For example, if you're creating a purchase order for your company, you might want to record which department ordered which item, the total cost of each item, and the date each item was requisitioned. Each additional type of information becomes a separate field in the database.

FIGURE 1 shows the sample database just described. Rows 4 through 11 contain the eight records in the purchase-order database, and each column—A through D—contains a separate database field. The labels in range A3..D3, called *field names*, describe the information found in each field.

Sorting It All Out

To follow along, enter the data shown in Figure 1. Set the widths of columns A, B, and D to 13 characters. Enter the dates in column D using the @DATE function; in releases 3.x or 4.x, enter the date in the *mm|dd|yy* format. Assign the Fixed 2 format to the values in range C4..C11, and the 31-Dec-93 format (release 4.x) or the Date 1 format (1-2-3 for DOS) to the dates in range D4..D11. Save the file.

In Figure 1, the records in the sample database have been entered in chronological order, as shown by the data in

the Date Ordered field. In effect, the data is already sorted, chronologically. Using 1-2-3's database capabilities, you can sort the records on another field—for example, Department. If necessary, you can then sort on yet another field—for example, Amount—then later revert to the original sort order, sorting on the Date Ordered field.

Specifying Your Sort

When you perform a sorting operation in 1-2-3, you must specify three things: the records to be sorted, the field (or fields) on which you're sorting, and the sort order. For example, suppose you want to sort the database shown in Figure 1 by amount so the record with the largest amount appears first and the one with the smallest amount last.

It's fairly easy to identify the records to be sorted: They occupy range A4..D11, an area called the *data range*. (When you sort a database, do not include the field names in the data range, or they will be sorted along with the data.) The field on which you want to sort (called the *primary key field*) is the Amount field in column C, and the sort order is *descending*. (When you sort labels, an ascending sort order corresponds to alphabetical order, and a descending order corresponds to reverse alphabetical order.)

To sort the sample database in release 4.x for Windows, select range A4..D11, and then choose *Range • Sort*. Range A4..D11 is already specified as the sort range. In the Sort By box, specify cell

C3 as the Sort key. (Actually, any cell in column C will do.) Select the Descending button, and then click OK to sort the records.

In 1-2-3 for DOS, select /Data • Sort • Data-Range and specify range A4..D11 as the range to sort.
When 1-2-3 returns

1	A Corporate Shopping List					
3	Item	Department	Amount Da	te Ordered		
4	Desk -	Shipping	275.99	10-Apr-94		
5	Chair	Shipping	124.95	15-Apr-94		
6	Clock	Personnel	26.53	20-Apr-94		
7	Champagne	Accounting	54.25	25-Apr-94		
8	Envelopes	Shipping	77.44	30-Apr-94		
9	Breath mints	Accounting	10.85	05-May-94		
10	Printer	Personnel	741.55	10-May-94		
11	Disks	Personnel	9.86	15-May-94		

FIGURE 1: USE THIS DATABASE TO LEARN HOW TO SORT.

The data in each row constitutes a record; the data in each column constitutes a field.

you to the Data Sort menu, select *Primary-Key* and indicate cell C3 as the column by which the records will be sorted. (Again, any cell in column C will do.) 1-2-3 then prompts you for the sort order. Since you want to display the records by amount in descending order, press **Enter>** to select the default choice, D. When 1-2-3 returns you to the Data Sort menu for the third time, select *Go* to sort the records. In the sort-

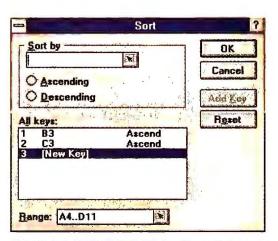


FIGURE 2: THE RELEASE 4.x Sort dialog box lets you specify 255 keys to sort on. In this example, we specified just 2.

ed data, row 4 now contains the record with the highest amount, \$741.55—the cost of the printer.

If you want to list the records from smallest amount to largest, simply reverse the sort order. Since 1-2-3 remembers the sort range and primary key from the previous sort, you can omit the steps for identifying those parameters.

In release 4.x for Windows, choose Range • Sort, select cell C3 in the All Keys section of the Sort dialog box, select the Ascending button, and click OK to complete the sort.

In 1-2-3/DOS, select /Data • Sort • Primary-Key, press **<Enter>** to accept the previous sort key (cell C3), type A to indicate ascending sort order, press **<Enter>** to return to the Data Sort menu, and select Go. In either case, 1-2-3 sorts the records in ascending rather than descending order by amount; row 4 now contains Disks, the record with the smallest amount.

Trying Different Keys

You can sort records in as many ways as you like without affecting the underlying data. For example, to revert to the original sort order shown in Figure 1, you would use the Date Ordered field as the primary sort key.

Try this now. In release 4.x for Windows, choose Range • Sort, select the first entry in the All Keys box, then indicate cell D3 in the Sort By box. 1-2-3 replaces the original primary sort key in the All Keys box with cell D3. Now click OK. In 1-2-3 for DOS, select /Data • Sort • Primary-Key, specify cell D3 (or any cell in column D). If 'A' does not come up automatically, type A to indicate ascending sort order. Press <Enter>, and select Go.

So far, we've used only one sort key. Suppose you want to sort the sample database in Figure 1 by department and have the records within each department appear in ascending order of amount. You need to use two sort keys, primary and secondary. The primary key is a cell in column B, representing the Department field; the secondary key is a cell in column C, representing the Amount field.

To get a feel for multiple sort keys, try sorting the database on these two keys. In 1-2-3 for Windows, choose Range • Sort. Select the first entry in the All

Keys box, then indicate cell B3 in the Sort By box. To indicate the secondary sort key, highlight New Key in the All Keys box, then specify cell C3 in the Sort By box. The Ascending button is already selected. Click the Add Key button, and your dialog box should look like the one in FIGURE 2. Now click OK.

In 1-2-3/DOS, select /Data • Sort • Primary-Key, indicate cell B3, type A (for ascending order), and press **Enter>** to return to the

Data Sort menu. Select *Secondary-Key*, indicate cell *C3*, type **A**, press **Enter**, and select *Go*.

Your sorted database should look like the one in **FIGURE 3**. Records are sorted by department in ascending (alphabetical) order, with Accounting first, Personnel second, and Shipping third. Within each department, orders are sorted by amount, with the smallest amount first and the largest last.

Sort of Important

Release 2.x lets you use only 2 sort keys at a time, while release 3.x and 1-2-3 for Windows allow 255. These additional sort keys work in the same way as the secondary sort key described earlier: When there's a "tie" between records based on the higher sort field or fields, the additional sort keys break the tie; otherwise, they don't come into play.

Watch for two common sorting mistakes. Don't sort the field names along with the database records, and make sure the sort range includes all the rows and columns in the database. If you omit columns, the integrity of the data is destroyed. If you omit rows, the resulting sort order will be inaccurate.

It's also a good idea to save your file before sorting. Another safeguard is to insert a column before the first column of the database. Then fill that range with record numbers, starting with the value 1. Make sure you include this new column when you specify the data range. If you goof up the sort, you can always sort on this record-number column to return the records to their original order. And if you discover you made a mistake while sorting, immediately

	A	8	C	D
1	A Corporate Shopping List			
3	Item	Department	Amount Da	ate Ordered
4	Breath mints	Accounting	10.85	05-May-94
5	Champagne	Accounting	54.25	25-Apr-94
6	Disks	Personnel	9.86	15-May-94
7	Clock	Personnel	26.53	20-Apr-94
8	Printer	Personnel	741.55	10-May-94
9	Envelopes	Shipping	77.44	30-Apr-94
10	Chair	Shipping	124.95	15-Apr-94
11	Desk	Shipping	275.99	10-Apr-94

FIGURE 3: THE SORTED DATABASE. Records are grouped by department. Within each department, records appear in ascending order by amount.

back out of the error with the Undo command (if you've turned the Undo feature on) to reverse the sort command. Then try the sort again with the correct sorting parameters.

By Kelly R. Conatser

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Managing Your Mortgage



hat will happen to my loan balance if I make extra payments? How much of my monthly payment is going toward the principal, and how much is strictly interest? How much is left on my mortgage after ten

years of monthly payments?

Questions such as these arise often when you're paying off a loan. And sometimes just knowing what happens to your loan after a payment is made eases the frustration you feel when you send money to the bank and see little decrease in the principal.

The model presented here, which works in 1-2-3 for Windows and 1-2-3 for DOS releases 2.x and 3.x, uses a simple amortization schedule for a fixed-rate loan to help analyze your loans. The model also allows you to gauge the effect of prepaying the principal in one or more mortgage periods.

Creating the Loan Analyzer

To create the loan analysis model, enter the labels shown in the figure on the facing page, except for the entry in cell

E14. Enter the values shown in cell A17 and ranges C4..C7 and C13..C14. Enter the dates shown in range C8..C9. Use the Style•Worksheet Defaults command (Worksheet • Global in 1-2-3/ DOS) to change the default numeric format to Currency 2. Use the Style. Number Format command (Range• Format in 1-2-3/DOS) to assign the Currency 0 format to cell C4 and the General format to ranges C6..C7, C13..C14, and A17..A377 and to cells F5 and F10. Now assign the Percent 2 format to cells C5 and F4, and assign the Date 1 format to range C8..C9.

Next, enter the formulas listed in the following table. Note that some of them initially return ERR.

CELL	FORMULA
F4	+C5/C7
F5	+C7*C6
F6	(@INT(@PMT(C4,F4,F5)*100)+1)/100
F7	@INT(((C9-C8)/360)*C4*C5*100+@IF
	(C9-C8,1,0))/100
F10	+C14-C13+1
F11	@SUM(@@(H4))-@SUM(@@(H3))
F12	@SUM(@@(H2))-@SUM(@@(H1))+@IF

@VLOOKUP(C14,@@(H5),5) F13 E14 +"period "&@STRING(@MIN(C14,F5),0)

F17 +C4

A18 +A17+1

B18 @MIN(\$F\$6,F17+(F17*\$F\$4))

(C13=1,F7,0)

C18 +\$F\$4*F17

D18 +B18-C18

F18 +F17-D18-E18

Copy range A18..F18 to range A19..F377.

H1 +"C17..C"&@STRING(16+C13,0)

+"C17..C"&@STRING(17+C14,0) H₂

H3 +"D17..E"&@STRING(16+C13,0)

H4 +"D17..E"&@STRING(17+C14,0)

H5 +"A17..F"&@STRING(17+C14,0)

Using the Model

To use the model, enter information about your loan in range C4..C14 of the worksheet. The model uses these inputs to calculate the statistics in range F4..F13 and to generate the amortization schedule in range A17..F377. (Only

five rows of the amortization schedule are visible in the figure.)

Our example analyzes a \$100,000, 30year mortgage at a fixed rate of 7 percent. To calculate the payments on this loan, enter the loan amount in cell C4, the interest rate in cell C5, and the length of the loan in cell C6.

To complete the payment picture, enter the number of payments per year

The model generates an amortization schedule based on the principal, interest, and term.

in cell C7. The vast majority of consumer loans require 12 monthly payments, as shown in the figure. However, you can account for a biweekly mortgage or a semiannual loan by entering the appropriate number in cell C7. (Biweekly mortgages, for example, require 26 payments per year. A loan with a semiannual payment requires two payments per year.)

The model uses these basic parameters to calculate the results shown in range F4..F6. Cell F4 shows the interest per period, and cell F5 shows the number of periods in the loan. Cell F6 uses a souped-up version of the @PMT function to calculate the payment due each period of the loan, rounded up to the nearest cent. (Most mortgage bankers round the monthly payment up to the nearest penny.) If you'd rather not round up the payment, just edit the formula in cell F6 to read @PMT(C4,F4,F5). This version of the @PMT function employs the fractionalcents method typical of most spreadsheet amortization models.

The model uses the payment calculated in cell F6, the periodic interest rate calculated in cell F4, and the loan amount you entered in cell C4 to generate the amortization schedule in rows 17 and below. Formulas in columns C and D calculate the interest and principal paid each payment period, and formulas in column F calculate the loan balance after the payment has been made. These formulas extend from row 18 to row 377, allowing you to analyze a loan with up to 360 periods. To analyze a loan that includes more than 360 payment periods, you must copy the formulas in range A377..F377 down to create the additional periods.

Initia! Interest

The entries in cells C8 and C9 enable you to calculate any interest that accrues on a loan before the monthly payments take effect. On a typical mortgage, each payment period corresponds to a calendar month. So if you close the mortgage on June 16, as in the example, the first payment covers the month of July—from July 1 to July 31—and is due on August 1.

What about the period between June 16 and June 30? Even though this period doesn't fall into your first mortgage payment, you're still using the lender's money and it probably won't be free. Instead, the lender charges interest on the entire amount—in this example, \$100,000—during the time before the first mortgage payment is due. You pay this initial interest at the closing, so it's often omitted from loan amortization models. However, the initial interest can be a substantial amount, so it's an important consideration.

To calculate the initial interest, enter the closing date of the loan in cell C8 and the first date that the mortgage payments cover in cell C9. In our example, the mortgage closes on June 16, 1994, and the first payment covers the period beginning on July 1, 1994: the month of July. The formula in cell F7 indicates that \$291.67 in interest will accrue between June 16 and June 30.

If payments begin immediately, there won't be any initial interest. For example, if you close a loan on June 16, 1994, and the first payment is due on July 16, 1994, the first payment covers the period from June 16 through July 15. In this case, you would enter the date value for June 16, 1994, in cells C8 and C9, and the formula in cell F7 would calculate an initial interest of zero.

	A	В	C 1	D	E	F 31
1	Loan Analysis	これのないとうないとうということになるというないないとはないとはないというないというというというというというと	there is the first the terror that we have been been been been been been been be	· · · · · · · · · · · · · · · · · · ·	and the second s	
3		landa			Laur Ordanda	
A same and a solder	ł.	Inputs	#400 000		Loan Outputs	0 000
5	Princip		\$100,000		Periodic interest	0.58%
			7.00%		Term	360
6	Years in loan		30		Payment	\$665.31
7	7 Payments/year		12		Initial interest	\$291.67
8	Settle	ment date	16-Jun-94			
9	Mortgage begins		01-Jul-94	9	Cumulative Analysis	
10					Number of payments	360
11	¥.				Cumulative principal	\$100,000.00
12	Cumulative Inputs				Cumulative interest	\$139,794.11
13	Beginning period		1	1	Balance due after	\$0.00
14			360		period 360	
15	•					
	Period	Payment	Interest	Principal	Prepayment	Balance
17	0					\$100,000.00
18	1	\$665.31	\$583.33	\$81.98		\$99,918.02
19	2	\$665.31	\$582.86	\$82.45		\$99,835.57
20	3	\$665.31	\$582.37	\$82.94		\$99,752.63
21	4	\$665.31	\$581.89	\$83.42		\$99,669.21

AN AMORTIZATION SCHEDULE helps you analyze aspects of your loan such as monthly interest payments at any point during the term of the loan. Optional inputs in column E allow you to gauge the effect of one or more prepayments on the mortgage principal.

Making Prepayments

To calculate the effect of prepaying the principal, enter the prepayment amount in the appropriate row of column E. Use this column to enter prepayments for as many periods as you like.

When you enter a prepayment, you alter not only the balance due in the ensuing months, but the entire amortization schedule. A prepayment immediately reduces the balance due. As a result, the interest payment for the following month (and ensuing months) declines because you are paying interest on a smaller outstanding balance.

In effect, prepaying the loan is like investing money at the periodic interest rate shown in cell F4. For example, if you enter 500 as a prepayment for the first period in the sample loan (cell E18), the balance at the end of the third period drops from \$99,752.63 to \$99,246.78—a difference of \$505.85. The extra \$5.85 is the amount that you would have received had you invested the \$500 for two periods at the periodic interest rate in cell F4.

A prepayment makes little difference over the short term. However, over the course of a long-term loan such as a mortgage, the compounding advantages of prepayments—especially those made early in the life of the loan—can significantly reduce the loan balance. The hypothetical \$500 prepayment in the

sample loan's first period, for instance, eliminates the last five scheduled payments and reduces total interest over the life of the loan by more than \$3000.

Rounding Up the Numbers

The model's cumulative inputs and cumulative analysis section show the total principal and interest you pay in any portion of the loan period, including any prepayments in column E.

The formula in cell F13 tells you the balance due on the loan after the period shown in cell C14. The balance due is updated whenever you change the ending period for a cumulative interest or cumulative principal calculation.

By Kelly R. Conatser

Kelly R. Conatser is a frequent contributor to PC World Lotus Edition and a consultant specializing in spreadsheet application design. The model from this article is available via PC World Online on America Online and CompuServe.



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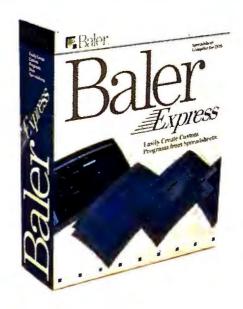
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Create Safeguards to Assure Accuracy



ou can't rely on 1-2-3 to catch all potential errors in your worksheet. 1-2-3 beeps if you forget to include a comma in a formula, but it doesn't say anything if you forget to include crucial nested parentheses. And while 1-2-3 won't let you refer to a damaged range name in a formula, it will overlook references to the wrong range. Yet such errors can undermine your work.

The best way to avoid these insidious traps is to incorporate error-checking tools into your worksheets. Here are some techniques that will help safeguard your models.

Remember the order of precedence.

Consider the worksheet in FIGURE 1. To find the tax due on income from both the East and the West regions, you must first add the two amounts, then multiply the sum by the tax rate, 28 percent. But if you

1 Region	Income
2 East	\$36,220
3 West	\$34,976
4	
5	
6 Tax Rate	28%
7	
8 Tax Amoun	\$46,013.28

FIGURE 1: LEAVE OUT THE PARENTHESES and your formula gives you the wrong tax.

enter the formula +B2+B3*B6, it returns \$46,013.28. That's a lot of tax for an income of \$71,196, way over the 28 percent rate. What went wrong?

You forgot to include parentheses to specify the order in which you want the two operations performed. When 1-2-3 reads a formula that contains more than one operation, it follows the rules of operator precedence shown in **FIGURE 2** unless you direct it otherwise with parentheses.

In our example, 1-2-3 first multiplied B3 by B6, then added that product to B2. By enclosing +B2+B3 in parentheses, you force 1-2-3 to perform that

operation first. The revised formula (B2+B3)*B6 evaluates to \$19,934.88, the correct tax.

Put your macros out of harm's way.

Avoiding errors is a lot easier if you organize your worksheet into sections. Create distinct areas for user input, formulas, and results. Separate macros from the main part of the worksheet, making sure to place them in an area that won't be affected if you insert or delete rows. In release 2.x you can place macros in the Macro Library Manager, where they can be accessed by any worksheet. In the 3-D releases (3.x and 1-2-3 for Windows), you can place macros in a separate sheet within the same file.

3 Reevaluate formula elements and range name locations. If one of your formulas just doesn't return what you expected, here are some tools that will help you examine it.

First, you can see the actual formula in the control panel if you place the cell pointer on the cell in question. Or, if you precede the formula with an apostrophe, the formula itself, rather than its result, will appear in the cell.

You can assign the Text format to cells that contain formulas. The Text format displays the formula within each cell instead of its result. In release 4.x for Windows, select Style Number Format Text. Then select the range that contains the formulas in question and click OK. In 1-2-3/DOS use the /Range Format Text command.

You can print the contents of the cells as a listing you can review. Select /Print•Printer•Range, specify the range to print, then select Options•Other• Cell-Formulas•Quit•Align•Go•Quit.

FIGURE 3 shows the cell listing you will get if you print the worksheet in Figure 1 using the Cell-Formulas command. The listing also shows the font, column width, and cell format of each cell. This Classic command does not have a Wysiwyg or release 4.x for Windows equiva-

lent, but it works in all releases of 1-2-3. To switch back to printing worksheets with the results, not the underlying formula, select /Print • Printer • Options • Other • As-Displayed • Quit • Quit.

Another useful tool is the Classic /Range•Name•Table command, which creates a list of all the range names and their cell addresses, allowing you to check the accuracy of named ranges.

In release 4.x for Windows, you can

PRECEDENCE	OPERATION
1	Exponentiation
2	Identification of value as positive or negative
3	Multiplication and division
4	Addition and subtraction
5	Equal-to and not-equal-to tests
5	Less-than and greater-than tests
5	Less-than-or-equal-to test
5	Greater-than-or-equal-to test
6	Logical NOT test
7	Logical AND and logical OR tests
7	Text concatenation

FIGURE 2: FORMULAS FOLLOW THIS ORDER of calculation unless you use parentheses to redirect them.

also use the Navigator to display a list of range names in the current file. In Ready mode, click on the Navigator button (next to the @function selector under the menu bar) and choose a range name from the list. The cell pointer goes to that range. If the name pertains to a multicell range, all its cells are highlighted.

A:A1: {Arial MT12 B} [W11] 'Region A:B1: {Arial MT12 B} 'Income A:A2: [W11] 'East A:B2: (C0) 36220 A:A3: [W11] 'West A:B3: (C0) 34976 A:A6: [W11] 'Tex Rate A:B6: (P0) 0.28 A:A6: {Arial MT12 B} [W11] 'Tex Amount A:B8: (C2-) +B2+B3*B6

FIGURE 3: THIS CELL LIST IS A PRINTOUT of the cell contents in Figure 1. You can use the Classic / Print • Printer • Options • Other • Cell-Formulas command to check on formula contents.

4 Name crucial cells and ranges. Assign range names to cells that contain values you'll use in many formulas. You'll find it a lot easier to figure out a formula if you wrote it with recognizable terms that have been assigned as range names: A cell containing the formula +Cost*Statetax makes more sense than a cell containing +H50*AB73.

In release 4.x you can use the Navigator in formula

building. When you create a formula, insert a range name by clicking the Navigator button and selecting the name from the list. You'll reduce errors caused by range name misspellings.

Test with sample data. Test a formula with normal data, and then with data beyond the expected limits, before you make decisions based on the results.

First use data whose results you already know and experiment with one variable. If you increase sales by 10 percent for the third quarter and profits increase by 80 percent for year-end, something may be wrong with your year-end formula. Repeat the test using different variables. Make sure you test for negative as well as positive numbers. If you enter negative results such as a net loss, are your formulas able to calculate correctly?

Next, test your model with extreme data. Ask yourself what it would take to have a record year. Does inputting those values create the expected results in your formulas?

6 Protect formulas from accidents. If you share many of your worksheets with other people, you can protect data and formulas that you don't want them to accidentally overwrite.

In release 4.x for Windows, use the Style • Protection command and click the Keep data unprotected after file is sealed check box. Specify the cells and ranges that you will allow others to change and click OK. Then use the File • Protect command. Click the Seal file check box and click OK. Enter a password and veri-

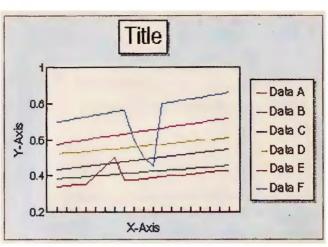


FIGURE 4: CREATE A QUICK GRAPH of your data to reveal any unexpected outlying values.

fy it. Then save the file. Anyone can open the file, but if someone attempts to alter an entry in a protected cell, the message 'Protected cell' will appear. Keep in mind that you must unseal the file to unprotect or protect any additional cells, then reseal it.

In 1-2-3/DOS, use the /Worksheet • Global • Protection • Enable command with the /Range • Unprot command to unprotect the cells you want others to be able to change.

To seal a file in release 3.x, first turn on global protection and unprotect the cells that others can change. Then use the |File • Admin • Seal • File command, entering a password and confirmation when prompted. Remember that you must know the password to unseal a file. Unfortunately, you cannot seal a release 2.x worksheet.

Graphing large amounts of data helps you quickly spot outlying values. A spike in a line graph may indicate a mistyped entry. You can graph 6 data ranges in 1-2-3/DOS and 23 in release 4.x for Windows. The graph in FIGURE 4 shows two unexpected spikes.

Build cross-tabs. You can double-check totals by adding across each row and down each column of a worksheet. Sometimes a worksheet calls for subtotals, as well as a grand total. If there is more than one way to get the result, use both. If you included a particular value twice or forgot to include a cell in a calculation, you'll see the discrepancy in the cross-tabulation.

Use absolute references for constants.

Unless you specify otherwise, cell references are relative: 1-2-3 automatically adjusts cell references in a copied formula to reflect its new location. When you copy +A2*G4 from cell A10 to cell B10, 1-2-3 adjusts the cell references so the formula reads +B2*H4. Absolute cell references stay the same when you copy a formula to a new location. For example, if you want to copy the formula above but you want to keep the reference to cell A2, edit it to read +\$A\$2*G4, then copy it to cell B10. The formula in cell B10 now reads +\$A\$2*H4.

Don't forget to treat range names likewise if you want references to them to remain absolute. For example, cell D3 is named Test1 and cell E5 contains the formula +Test1*A5. If you copy the contents of cell E5 to range E6..E7, cell E6 will contain +D4*A6; and cell E7, +D5*A7. If you precede the range name with a dollar sign in cell E5 (+\$Test1*A5) and then copy the formulas to range E6..E7, the formulas in E6 and E7 will refer to Test1 (cell D3) and will adjust only the reference to cell A5.

Let Auditor help. Use Auditor when you need to analyze a worksheet by finding and highlighting all formulas, tracing the relationships between values and formulas, and pinpointing certain formula errors.

Auditor can find circular references, precedent cells (the cells that a formula uses in its calculations), dependents (formulas that use a specific cell in their calculations), and cells that contain only formulas.

You'll find Auditor as a built-in function in release 4.x for Windows and as an add-in with releases 2.3, 2.4, 3.1, 3.1+, and 3.4. In release 4.x for Windows, select *Tools* • *Audit*. In release 2.x, select /*Add-In* • *Attach* and choose *AUDITOR.ADN*. In release 3.x, press Alt>-<F10>, select *Load*, and choose *AUDITOR.PLC*.

By Carrle Thomas

Carrie Thomas is a senior associate editor for PC World Lotus Edition.

Macro Variables Add Flexibility



henever I write a macro, I keep in mind a lesson I learned years ago from a fellow programmer. He wrote an article describing a bowling league program he built in BASIC. The author used the value 5 (the number of teams in his league) in calculations throughout the program. The next year, a new team joined the league. The author attempted to modify his program and realized he hadn't written a bowling league program, he'd written a bowling-league-

What he should have done was to include the statement Teams=5 near the beginning of the program and use the word *Teams* in the calcula-

with-five-teams program.

tions. In the statement, the number 5 is a literal and the word *Teams* is a variable. By using the variable *Teams* throughout the program, our programmer could have adapted his program for a six-team league by simply changing the statement to Teams=6.

Variables make a program easier to understand, maintain, and modify. This principle holds for 1-2-3 macros. But macro programming requires a few different approaches to handling variables, and some aren't obvious.

Important Assignments

You may already be familiar with assigning variables, even if you never thought of calling them that. For example, you probably know that when you use the command {GETLABEL "Enter first name: ",fname}, you must also assign the name Fname to a cell. Creating that range name assigns a variable.

Technically, it's valid to use a cell address such as M15 as a variable, but in practice this is a poor idea. Always assign a meaningful range name to a cell you plan to use as a variable.

One difference between a 1-2-3 macro and a program in a traditional language such as BASIC is how the vari-

ables are assigned. You generally assign macro variables manually before you run the program, whereas a traditional language contains commands that assign variables when the program is run. The BASIC instruction Teams=5 assigns the variable *Teams*. It also sets the variable, or gives it a value.

You could set a macro variable by entering a label or number before you run the program, but it's more common to have the program's instructions set variables. {GETLABEL} provides one way to set a variable because it stores

Always assign a meaningful range name to a worksheet cell or range that you plan to use as a variable within a macro.

what the user enters as a left-aligned label in the cell that you have assigned as a variable. 1-2-3's other user-input commands—{GETNUMBER}, which is available in all releases of 1-2-3, and the {GET-FORMULA}, {GET-RANGE}, {CHOOSE-ITEM}, {CHOOSE-FILE}, {CHOOSE-ONE}, and {CHOOSE-MANY} commands, all available in release 4.x for Windows—also set variables.

Macros can set variables without intervention. {LET} stores a label, a value, the result of a formula, or the current value of another worksheet cell in a variable cell. Use {LET} to initialize a variable (give it a starting value) or to set a variable to a default value if a user cancels a user-input command or enters something invalid.

{DEFINE} also sets variables. Used at the beginning of a subroutine, it stores the string or value passed to the subroutine by the instruction that calls the subroutine. (We looked at subroutines in the March issue.)

Finally, the file-manipulation commands {READ}, {READLN}, {GET-POS}, and {FILESIZE} all set variables by reading information from disk files and storing strings or values in cells.

Home on the Range

Sometimes you'll want to store a range reference in a variable so the macro can later perform an operation on the range or draw information from it. Release 4.x for Windows provides two ways to set range variables. If you design a macro to work on a range you select before running the macro, just include an instruction such as the following at the beginning of the macro:

{LET coords,@INFO("selection")}

This instruction stores the address of the range that you selected in a cell

> named Coords. If you want the macro to prompt the user for a range, use {GET-RANGE}. The instruction {GET-RANGE "Range to apply styles to",coords,, "Styles Macro"} pops up the

dialog box shown in **FIGURE 1** and stores the range you specify in the Coords cell. You can specify a range by clicking the arrow button, which hides the dialog box, and highlighting the range with the mouse; by using the mouse to highlight the range with the dialog box visible; or by typing its address or name in

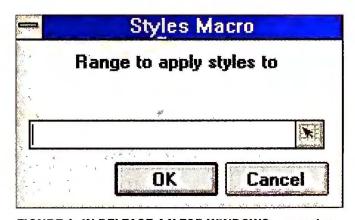


FIGURE 1: IN RELEASE 4.X FOR WINDOWS, prompt a user for a range using a dialog box similar to this one.

the edit box. With the latter approach, {GET-RANGE} stores whatever you type, whether it's a valid range or not. To be safe, follow a {GET-RANGE} command with something like {IF @ISERR(@@(coords))}{BRANCH rangeprompt}, where Rangeprompt represents the name of the cell containing the {GET-RANGE} command.

Setting range variables is more diffi-

```
A B C D E F G

1 \r {ABS}{LET coords,@CELLPOINTER("address")}..

2 {LET coords,@CELLPOINTER("address")&".."&coords}~

3
4 coords
```

FIGURE 2: STORE A RANGE ADDRESS in a variable with this release 2.x code.

cult in releases 2.3 and 2.4. You can store the address of the range selected before you run the macro by instructing the program to store the address of the lower-right corner, make the opposite corner the current cell, and concatenate that address, two periods, and the already-stored address.

The macro in FIGURE 2 does this. To see how it works, enter the labels shown, and then select /Range Name Labels Right and specify range A1..A4. Move the cell pointer to an empty area of your worksheet, press <F4> to anchor the pointer, move the pointer a few cells down and a few cells to the right, and then press <Enter>. (Or you can highlight the range with the mouse.) Press <Alt>-R. The macro stores the address of the range you highlighted.

This technique will not work in 1-2-3 release 3.x, where running a macro always deselects a range.

Getting Your Data Back

Have you ever played a computer game that prompted you for your name and then called you by it? ('Would you like to play again, Martha?') That's an example of using a variable, in this case

by concatenating it with other text and displaying the text.

Macros can use variables as arguments in calculations, as file names, and as ranges in worksheet operations. How you incorporate variables into instructions once the variables have been set depends on what you want to do.

Using numbers stored in variables is simple. Consider a program that figures

A B C D E F

1 \f {GETLABEL "Enter new file name: ",fname}

2 /FSx{ESC}{fname}~

3

4 fname

FIGURE 3: USE A SUBROUTINE CALL TO INCORPORATE A VARIABLE into a menu sequence. This macro lets you specify a file name, then save the current file under this new name.

the average earnings per week during a sales campaign. The code might read: {GETNUMBER "Earnings during campaign:", earnings}

{GETNUMBER "Length of campaign (weeks):", weeks}

{LET avg_earn,earnings/weeks}

The above macro fragment sets two variables by prompting the user for val-

ues, then sets a third by performing math on the first two.

Other uses for variables can be a bit trickier, especially if you want to incorporate them into menu sequences. FIG-URE 3, for example, shows a simple macro for the DOS versions of 1-2-3 that lets you specify a file name, then saves the current file under that new name. Cell B2 starts by issuing the commands /File Save. The characters x{ESC} clear whatever text follows the file name prompt. (This trick works in all releases of 1-2-3, but in release 3.x, you can replace x{ESC} with {CE}.) Then the instruction {fname} types the characters stored in the cell named Fname by calling it as a subroutine.

The tilde (~), which is the same as pressing <Enter>, completes the file-save operation.

There are two things to remember when you use a subroutine call to incorporate a variable into a menu sequence.

First, the braces are essential. The instructions /FSx{ESC}fname~ would save the file as FNAME.WK1 or FNAME.WK3 rather than use the name stored in Fname. Second, you *must* make sure the cell immediately below the variable is empty.

FIGURE 4 illustrates a different approach to this task. Cell B3 appears to contain

the commands to save the file under the name MYFILE. In fact, it contains this stringreturning formula:

+"/FSx{ESC}"&fname&"~"

If cell B5 contained the label *hisfile*, cell B3 would return an instruction to save the file as HISFILE.

Release 4.x for Windows is better suited to working with variables, so you don't have to bother with subroutine calls or with string-returning formulas.

FIGURE 5 illustrates how the file-save macro would appear. The {FILE-SAVE} command saves

MACRO BASICS

Variables Versus Literals

Any time you use a literal value in a macro, a bell should go off.

Suppose you work for a retail chain that owns and operates four stores. One of the tasks you want a macro to accomplish is to compute the average perstore sale, so you write the command {LET avgsales,totsales/4}. Ring!

This is a perfect occasion to use a variable. Go back to near the beginning and add {LET numstores,4}, and then change the averaging instruction shown above to {LET avgsales,totsales/numstores}. That way, If the retail chain expands, you won't have to track down and change every 4 in the program.

Do this for every value that could possibly change in the future. Obviously, you can handle some values as literals; there's no need to use {LET weeks,52} to set the number of weeks in a year.

If you're a stickler for structured programming, put all the {LET} instructions in a subroutine called Setvars and include the Instruction {setvars} in the master program.

Prompting for Ranges

Prompting for a range is tricky in 1-2-3/DOS. One way to do it is to fool 1-2-3 into displaying the prompt 'Enter data range'. You do this by having the macro select/Data • Sort • Data Range and store the range address the user specifies. Next, use the keyword {BREAK} to make the macro cancel the operation without sorting anything.

The figure shows a release 2.x macro. To set it up, enter the labels, then assign range names using the labels in column A. Enter the following string-returning formula in cell B3:

```
@IF(kpress="~","~",

@IF(kpress="{ESC}",

"",kpress)&"{BRANCH getkey}")
```

In release 3.x, modify the macro by inserting a row at row 3, moving the contents of cell B2 to cell B3, and entering the following command into cell B2:

{IF @INFO("mode")=3}D{BS}

Assign the labels in column A as range names for column B,

and enter this string-returning formula in cell B4:

@IF(kpress="~","~",kpress&"
{BRANCH getkey}")

Try out the macro by moving the pointer to an empty area and pressing <Alt>-R. The prompt 'Enter data range' appears, followed by the current address

```
В
                                            Ē
                                                    F
        A
1
                 /DSD{BS}.
2
                 {GET kpress}{RECALC keyaction}
    getkey
3
    keyaction
4
                 D{LET coords, @CELLPOINTER("address")}...
5
                 {LET coords, @CELLPOINTER("address")&".."&coords}
6
                 {BREAK}
7
8
    kpress
9
10
    coords
```

PROMPT FOR A RANGE in 1-2-3 for DOS with this release 2.x workaround.

(for example, B12..B12). You can adjust the range as you do whenever 1-2-3 prompts you for a range: Move the cell pointer to expand the range, then press <Backspace> to unanchor the pointer, and type a period to reanchor the pointer or type the range address or name. (You

can't, however, use the mouse.)

When you complete the process by pressing <Enter>, 1-2-3 stores the address. Note that if you enter an invalid address or a nonexistent range name, the macro terminates and returns the message 'Invalid cell or range address'.

the file under the name stored in Fname. (If you want {FILE-SAVE} to save a file under a specific name instead of using what's in a cell, make the file name a literal by enclosing it in quotes, as in {FILE-SAVE "myfile"}.)

Working on Ranges

If your macro stores range variables, you can use the variables in menu sequences as you use file name variables. For example, the instruction: FCBG {coords}~ assigns a green background to the range referenced in Coords. (Wysiwyg must be attached in 1-2-3/DOS.) Again, be sure to include the braces.

In release 4.x, you can use {STYLE-INTERIOR 68,,,,,+coords} to color the range stored in Coords. Note the plus sign. In all versions of 1-2-3, include a range variable in an advanced macro command by prefacing it with a plus sign. The plus sign tells 1-2-3 to use the result of a calculation to determine which range to color. If Coords contains the label A:B15..A:H30, the expression +coords evaluates to A:B15..A:H30. 1-2-3 calculates the expression and uses

the result as the range to color. In other words, the plus sign instructs 1-2-3 to use the range referenced in Coords, not Coords itself. The instruction {BLANK +coords} empties the range referenced in Coords, while {BLANK coords} erases the label in Coords. (You need to use the plus sign here and not in the {FILE-SAVE} command because

{STYLE-INTER-IOR} is designed to operate on ranges.)

These techniques perform actions on ranges. But what about getting information from ranges? For example, let's suppose you wrote code to store the address of a range, and now you want the macro to count the number of entries in that range.

For that, use the @@ function, which lets a formula refer

to a range indirectly. Suppose Coords contains the label B15..H30. The expression @COUNT(@@(coords)) returns the same number as @COUNT (B15..H30). Therefore, {LET entries, @COUNT(@@(coords))} stores in Entries the number of entries in the range referenced in Coords.

By Richard Cranford

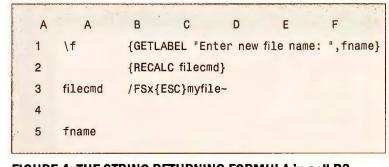


FIGURE 4: THE STRING-RETURNING FORMULA in cell B3 returns the file name you enter at the prompt.

	Α	В	С	D		E	F
1	\f	{GETLABEL	"Enter	new	file	name:	",fname}
2		{FILE-SAV	E fname	}			
3							
4	fname						

FIGURE 5: THE {FILE-SAVE} COMMAND in release 4.x lets you avoid subroutine calls and string-returning formulas.



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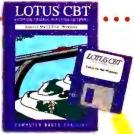
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Counting Sheets, Mousing Around



Counting Sheets

I'm trying to create a formula that will return a label indicating the current sheet's number and the total number of sheets in a multisheet file. For example, I want a label like 'Sheet 1 of 2 Total Sheets' to appear at the top of each sheet in the file. Can you help? Bill Eddings, Birmingham, Alabama

To do this, you need to create a formula that includes the @CELL function. @CELL("attribute",location) returns information about the specified attribute (such as the width or format) assigned to location. For example, the formula @CELL("width",C3) returns 11 when the width of column C is set to 11. The "sheet" attribute returns the number of the current worksheet.

To follow the example, begin in a new worksheet and insert five sheets after sheet A. In 1-2-3 release 4.x click the New Sheet button five times. In release 3.x select /Worksheet Insert Sheet After and enter 5. To calculate the current sheet's number and the total number of worksheets in the file, you must first assign a range name to any cell in the first and last sheet in the worksheet. Assign the name first to cell A:B1, and assign the name last to cell B1 of the last sheet in the worksheet.

Next, enter the following formula in cell A:G1: +"Sheet "&@STRING(@CELL("sheet", first),0)&" of "&@STRING(@CELL("sheet",\$last),0) &" Sheets"

To display the label at the top of each sheet in the worksheet, copy cell A:G1 to range B:G1..F:G1. If you need additional sheets, insert them between sheets A and F, and copy the formula to cell G1 of the new sheets.

Mousing Around

I have created a customized menu for one of my worksheets. The menu works fine when I select options with the keyboard, but when I click the mouse on an option, I get no response. How do I make the mouse work with my customized menus?

Sultan Muhammad, Islamabad, Pakistan

Unfortunately, releases 2.x and 3.x do not allow you to use your mouse with custom menus. 1-2-3 release 4.x for Windows, however, introduces several new macro commands that let you create and manipulate custom pull-down menus or add commands to the 1-2-3 menu:

{Menu-Command-Add}

{Menu-Command-Disable}

{Menu-Command-Enable}

{Menu-Command-Remove}

{Menu-Create}

{Menu-Insert}

{Menu-Reset}

You can also use the Dialog Box Editor to create interactive custom dialog boxes that will work with your macros and respond to the mouse.

Has Deductible Been Met?

I'm trying to create a worksheet to help me keep track of medical expenses. The deductible for my plan is \$300, and the reimbursement for expenses is 80 percent thereafter. I'm having a problem coming up with a formula to consider the deductible before calculating the 80 percent payment. The worksheet shown at the top of the next column shows my progress so far.

	A	В	C
1	The Victorian	Total	Total
2		Cost	Ins Pays
3 -	Desc.	\$440	\$352
4	==========		
5	Dr Office	50	40
6	Rx #12345	350	280
7	Lab Work	40	32
The Alexander			

I think I'm on the right track using the @IF function, but something is not quite right. I can't figure out why the formulas @IF(B3>300,B5*0.8,0) and @IF(B3<300,0,B5*0.8) don't work.

James E. Rutledge, Pasadena, Texas

You are on the right track. Before calculating the 80 percent payment you must first test to see if the \$300 deductible has been met. But rather than test the total expenses, as you did in your formulas, you must instead test each individual bill.

To follow along, recreate the figure shown below. Enter the labels shown in column A and in range B1..C2. Enter the formula @SUM(B5..B7) in cell B3, and copy it to cell C3. To create the dotted line in range A4..C4, enter a backslash and an equal sign (\=) in cell A4 and copy it to range B4..C4. Enter the values shown in, range B5..B7. Enter the following formula in C5: @IF(C4=0,@IF(B5+@SUM(\$B\$4..B4)>300,(B5+@SUM(\$B\$4..B4)-300)*0.8,0),B5*0.8).

Copy the formula to range C6..C7.

The formula in cell C5 contains the nested @IF formula you were looking for. Here's how it works: First the formula checks to see if the cell above it evaluates to zero. If it does, this means

	A	В	С
1		Total	Total
2		Cost	Ins Pays
3	Desc.	\$440	\$112
. 4	=========		=======
5	Dr Office	50	0
6	Rx #12345	350	80
7	Lab Work	40	32

you have not yet met your deductible of \$300. The formula then checks to see if the total of the new amount in column B plus all the amounts above it in column B is greater than \$300. If it isn't, the formula returns a zero because you still have not met your deductible.

If the amount is more than \$300, you have met your deductible. The term (B5+@SUM(\$B\$4..B4)-300)*0.8 adds all the values in column B, subtracts the deductible, and multiplies the remainder by 80 percent to return the amount that you will be reimbursed. From here down, column B no longer displays a zero, so the last term in the formula, B5*0.8, simply multiplies the latest amount in column B by 80 percent.

To accommodate additional expenses, enter the descriptions in column A, enter the costs in column B, and copy the formula in column C down as many rows as you need. You'll also need to edit the formulas in range B3..C3 to include the new rows of data.

Allways Revisited

Thank you for responding to my letter ["Styles and Fonts," *Lotus Q&A*, November 1993], but you didn't answer my question.

I asked why in release 2.4, the Wysiwyg: Text•Align•Center command, which is supposed to align a label over several adjacent columns, didn't work in worksheets created in release 2.2 with the Allways add-in. You suggested that I precede the label I'm trying to center with two carets, but when I tried that, 1-2-3 centered the label within the cell, just as Allways does.

I deleted the corresponding ALL format file hoping that it would solve the problem, but it did not. Again I ask: Can a worksheet created in 1-2-3 release 2.2 with Allways use the Wysiwyg: Text•Align•Center command? Hal Turchin, Miami, Florida

1-2-3 usually converts the format settings from Allways to Wysiwyg with few problems. However, as you've found, the ALL file disables Wysiwyg's :'Text•Align•Center command. Deleting the ALL file should have solved.

your problem, but our guess is that before you deleted the file, you retrieved your worksheet into release 2.4 with Wysiwyg, attempted to center the text, and, when it didn't work, saved and then closed the worksheet. When you saved the file, 1-2-3 saved the unwanted Allways style of centering text in the Wysiwyg FMT format file.

Now you must delete the FMT file. The next time you retrieve your file, :Text•Align•Center will work.

Data Fill and Date Calculations

I use the following worksheet to record admissions, discharges, and other data relating to patients in our drug and alcohol rehabilitation program.

district of	3		Α	В	C	D
と	1		Acc. No.	Admit.Date	Disch.Date	# of Days
	2		1000	11/20/93	12/15/93	25
	3	H	1001	11/20/93	11/29/93	9
The state of the s	4	.0	1002	11/24/93	12/01/93	7

I hope you can answer three questions and make this worksheet easier to use. First, how do I get 1-2-3 to automatically fill a column with numbers? Second, can I enter dates without first entering the apostrophe? Finally, how do I calculate the number of days a patient has been in our care, including the admission date but excluding the discharge date?

Alvin E. Rubenstein, Newtown, Pennsylvania The Data•Fill command in 1-2-3 releases 2.x and 3.x automatically fills a range of worksheet cells with values. For example, to fill range A2..A40 with values beginning at 1000 and incremented by 1, choose |Data•Fill|, specify range A2..A40 as the fill range, enter 1000 as the start number, and press <Enter> twice to accept the default step value of 1 and the default stop value of 8191. 1-2-3 fills range A2..A40 with the values 1000 through 1038. If you're using 1-2-3 release 4.x for Windows, preselect range A2..A40, choose Range• Fill, enter 1000 as the start value in the Fill dialog box, and click OK.

The answers to your last two questions are related. Before you can calcu-

late the number of days between admission and discharge dates, you must change the way you are entering dates. When you precede a date with an apostrophe,

1-2-3 interprets the entry as a label and assigns it a value of 0. 1-2-3 performs calculations on dates only when they are entered as date values.

In order to enter a date as a value in 1-2-3 release 2.x, you must use the @DATE(yy,mm,dd) function. You can then use the Range•Format command to make the date serial number look like a date. For example, to enter the date 11/20/93 in cell B2, first you type @DATE(93,11,20) and press <Enter>. Next

COOD IDEAS

Sum Positive and Negative Values
Here's a simple way to sum positive and negative values separately when they're in the same list. To try it, enter the values shown in range A1...A7 of the figure at right. Then enter the formula @MAX(A1,0) in cell B1 and the formula @MIN(A1,0) in cell C1. Copy range B1...C1 to range B2...B7.

The @MAX formulas in column B return the values in column A that are greater than zero. The @MIN formulas in column C return the values in column A that are less than zero. To calculate the

	A	В	- C	
1	-19	Ø	- 19	A STATE OF THE RESIDENCE
2	23	23	Ø	
3	-43	Ø	-43	
4	-23	Ø	-23	
-5	56	56	0	
6	34	34	Ø	
7	- 23	Ø	-23	
8		113	-108	

totals, enter the formula @SUM(B1..B7) in cell B8 and copy it to cell C8.

Product Support Department, Lotus

Development, Cambridge, Massachusetts

you select /Range • Format • Date • 4 and press **<Enter>**. 1-2-3 will then display the date 11/20/93 in the cell.

It's easier to enter dates in release 3.x. Simply enter the date using the slash key to separate month, day, and year. For example, when you enter 11/20/93 in a cell, 1-2-3 automatically interprets this entry as a date value. All you need to do is assign a numeric format to the number of days between the admission date and the discharge date, excluding the last day.

Remove Unsightly ERRs

When the @VLOOKUP formula in column C of my worksheet (shown at left) can't find an entry in the lookup table in F1..G7, the formula results in 'ERR'. Can I instruct 1-2-3 to return

> 'NA' or '0' instead? R. Scheffler, LaBelle, Florida

Af you want to re-place 'ERR' with another result, create a formula that combines the @VLOOKUP function with the @ISERR and @IF functions. The

@ISERR function returns '1' (true) when the specified cell contains 'ERR', '0' (false) when it doesn't.

To replace 'ERR' with 'NA', you enter the following formula in cell C2: @IF(@ISERR(@VLOOKUP(A2,F1..G7,1)),@NA, @VLOOKUP(A2,F1..G7,1)).

Copy the formula to range C3..C8. If you want the @VLOOKUP formula to return '0' instead of 'NA' when it

	Α	В	G
1	Truck In	Time In Ra	adio
2	8423	04:30 AM	80
3	8424	04:30 AM	85
4	8426	04:30 AM	82
5	8432	06:39 AM	NA
6	8425	07:24 AM	91
7	8430	08:50 AM	NA
8	8427	09:17 AM	NA
A .			

doesn't find a specified label or value, replace the '@NA' in the formula with 0.

If @VLOOKUP returns 'ERR', then the formula returns 'NA' or '0'. If @VLOOKUP does not return 'ERR', 1-2-3 displays the result of the function.

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	A	В	C	D E		G
1	Truck In	Time In	Radio		Truck #	Radio #
2	8423	04:30 AM	80		8421	27
3	8424	04:30 AM	85		8422	84
4	8426	04:30 AM	82		8423	80
5	8432	06:39 AM	ERR		8424	85
6	8425	07:24 AM	91		8425	91
7	8430	08:50 AM	ERR		8426	82
8	8427	09:17 AM	ERR			

date by selecting /Range • Format • Date • 4. You enter dates the same way in release 4.x, but you don't have to assign a date format to the entry. Release 4.x does that automatically.

Now that you have entered your dates as date numbers, you can easily calculate the number of days between these dates. In the example, the formula +C2-B2 in cell D2 returns 25, the

GOOD IDEAS

Matrix Multiplication The quickest way to increase or decrease every value in a column by a specific factor is to use matrix multiplication. A matrix is simply a range made up of columns and rows. A column containing 200 values is a 200-by-1 matrix. A single cell is a 1-by-1 matrix. For example, here's how to increase each value in range A1..A5 by a factor of 5. To begin, enter the values shown in range A1..B5 of the figure below.

· · · · · · · · · · · · · · · · · · ·	May be said in the	Sent San . Land Childe	
	A	В	
1 -	10	5	
2	5		
3	15		
4	20		
5	25		

In DOS versions of 1-2-3 you select /Data • Matrix • Multiply, specify range A1..A5 as the first range to multiply, cell B1 as the second range, and cell C1 as the output range. In 1-2-3 release 4.x for Windows, select Range • Analyze • Multiply Matrix, specify range A1..A5 as the first

matrix, cell B1 as the second matrix, and cell C1 as the resulting matrix, and click OK. 1-2-3 multiplies each of the values in column A by 5 and

50 25 3 75 4 100 125

places the result in column C, as shown in the figure above.

To overwrite the original range, specify cell A1 as the first cell of the output range (called the resulting matrix in 1-2-3/W).

Make sure there aren't any blank cells located in the first range that you're multiplying, or you'll get the error message 'Invalid matrix'.

Product Support Department, Lotus Development, Cambridge, Massachusetts

Copying Wysiwyg Formatting

In "Combining Wysiwyg Formatting" [Lotus Q&A, September 1993], you described several ways to copy Wysiwyg formatting from multiple files into different ranges of a new worksheet. But you didn't mention a simple method that works in 1-2-3 release 3.x. You can use the :Special Copy command to copy selected formats from one open worksheet to another open worksheet.

Steve Malerich, Marion, Iowa



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spacing chance
2. Press Shift + Fa (Format) Shift 150
A) Press AR + = OR
3. Select L (Line)
5. Type spacing
2 = Double Space
7. Press F7 (return to document) CENTERING TEXT BEFORE TYPING TEXT
CENTERING TEXT
BEFORE TYPING TEXT
Place cursor at beginning of line. Press Shift + F6 (Carned)
1. Place cursor at beginning of line. 2. Press Shift + F6 (Center)
A) Press AR + = OR B) Select L (Layout) C) Select A (Allient)
A (Align)
D) Select C (Center)
4. Enter
5. Repeat steps 1-4 for additional lines.

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Installing Notes on a Remote PC

f you're like most people these days, you're always working, but you're not always working in the office. You may be toiling away at home, in a hotel room, or at a client's office, but that's no reason to be left out of the Notes loop. If you have a modem, you can set up your computer as a remote workstation and still feel like one of the gang.

Installing Notes

Before you get started, you'll need to gather a few things to ensure a smooth connection. Naturally, you'll need a copy of the software. You'll also need your Notes ID file (on disk) and your password. (You can get a copy of your Notes ID file from your Notes administrator.) Finally, you must have the server's full name and phone number (ask your Notes administrator for these too).

Once you've collected this information, you're ready to install Notes. To begin, insert the disk labeled Program Disk 1 and start the Install program.

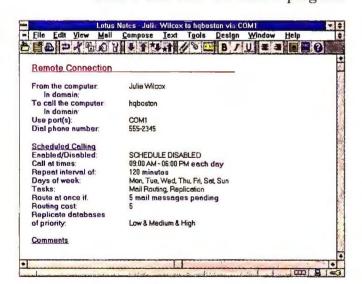


FIGURE 1: THE REMOTE CONNECTION DOCUMENT that Notes created in your Personal Name & Address Book database contains the information you provided during workstation setup.

(How you start the program depends on whether you're using Windows, OS/2, or a Macintosh.) When the Install Main Menu appears, select *Install Workstation software on this system* and click *OK*. In the Specifying Directories for the Notes Files dialog box, select the files you want to install (probably everything

if you have the disk space), select the drive on which the files should be installed, and click *OK*.

When the installation is complete, click Launch Notes. In the Workstation Setup dialog box, select Remote Connection (via modem). (If you plan to use the same computer with both your network and your modem, select Network and remote connections.) Select Your Notes user ID has been supplied to you in a file and click OK. Specify the location of your ID file and click OK. Enter your password when prompted and click OK. When asked if you want your ID file copied to the Notes directory on your hard disk, click OK.

Setting Up the Remote Connection

The Remote Workstation Setup dialog box is where you tell Notes how to access the server. Your user name probably appears in this dialog box; if it doesn't, you can enter it now. The next two fields-Home Server Name and Home Server Phone Number—are the most important. In the name field, enter the full name of your home server. In the phone number field, enter the server's phone number, including the area code and any required prefix (such as 9 for an outside line or 1170 to disable call waiting). Select your modem type from the drop-down list. If your type isn't listed, select the Auto Configure option. Finally, specify the port to which your modem is connected (probably COM1), and click OK.

Notes creates a Personal Name & Address Book and adds its icon to your work space. It then creates a Remote Connection document for your home server in your Personal Name & Address Book and enables your modem port. Then it creates an empty replica of your mail database as well as an outgoing mail database and adds these databases to your work space. The replica mail database will be populated with documents the first time you call the server. The final step is to select your time zone and click *OK*.

Modifying the Setup

During installation, Notes configured your workstation for remote access. To double-check or redefine some of the settings, use the Tools•Setup commands. For example, if you have problems calling your home server, choose Tools•Setup•Port and verify that the correct port setting is enabled (an asterisk appears next to the enabled ports). Click the Additional Setup button and try setting the Maximum Speed to a lower baud rate. You can also turn down your modem's speaker volume.

To check how Notes defined your remote location, choose Tools • Setup • Location. Because you're working remotely, the Workstation-based mail option in the Location Setup dialog box is automatically selected. If necessary, enter a dialing prefix—such as an area code, telephone exchange, or calling card number—in the Phone Dialing Prefix field. If you need to redefine your location every time you start Notes, select Do location setup every time Notes is started. This is important if you use your computer both on the LAN and with your modem.

As previously mentioned, Notes creates a Remote Connection document for your home server in your Personal Name & Address Book. To modify this document's information, open your Personal Name & Address Book and select View • Connections. Find the connection document for your server, highlight it, and choose Edit Document. The first section of the document contains the information for your server (see FIGURE 1). The Scheduled Calling section lets you set up Background Replication for your databases, which means the workstation will automatically call the server at specified intervals. When you finish viewing the document, choose File• Save followed by File • Close Window.

Making a Call

As a remote user, you have two different options for working in Notes. Either you can work directly with the server, or

Tools Replicate
Ser <u>v</u> er hqboston Lancel
Replicate All databases in common Selected database(s) Receive documents from server Send documents to server Replicate database templates Exchange document Read Marks
 ✓ Iransfer outgoing mail ✓ Hang up when done ✓ Run In Background

FIGURE 2: THE TOOLS REPLICATE DIALOG BOX lets you decide how you want to synchronize the databases on your remote workstation and your home server.

you can work locally and then replicate all of the changes you made back to the database on the server.

In most cases, you'll work locally; however, you may sometimes need to call the server and work interactively. To do this, first choose Tools • Call. The Call Server dialog box displays the servers for which a Remote Connection document exists in your Personal Name & Address Book. Next, from the Server section of the dialog box, highlight the name of your home server. When you select the server name, the dialing prefix and the telephone number should automatically appear; if they don't, enter them in the appropriate fields. Make sure that the Port setting reflects your modem setup. The final step is to click the Auto Dial button to call the server.

The Call Server dialog box remains on screen until a connection is made. The status bar at the bottom of the screen displays the current status of the call. When a connection is made, the dialog box disappears and the Notes work space reappears.

At this point, you can work with Notes databases directly from the server. When you're ready to disconnect from the server, choose *Tools* • *Hang Up*. The Hang Up dialog box is displayed; it contains a list of enabled ports and the server to which you're attached. Highlight the active communication port and click *Hang Up* to disconnect.

Getting Your Mail

Once your remote workstation is set up, you're ready to replicate your mail database. During installation, Notes created a replica of your mail database and an outgoing mailbox. Before you can use these databases, you must first replicate your mail database on the server.

So what is replication? It's the process of synchronizing information between two copies of a database—in this case,

the database on the server and the database on your local workstation. During replication, these databases exchange their updates and modifications so that they both contain the same information.

Before you replicate the mail database, you need to define the replication options for your local mail database. Choose *Tools • Setup • Mail* and click the *Replication* button. The first option in this dialog box allows you to modify or

mail documents, first click the mail database icon on the work space and choose File Database Information. Click the Replication button and the Selective button. Now, in the Copy Documents Selected By field, enter the formula Select ComposedDate >= [5/12/94]. This formula copies only those documents sent on or after May 12, 1994. You can also create formulas that limit replication to documents created by a particular author or pertaining to a particular topic.

Next, select the mail database icon and choose Tools • Replicate. The Tools Replicate dialog box is displayed, as in FIGURE 2. The Server field should already contain the name of your home server. If it doesn't, click the arrow to the right of the field and select your home server. In the Replicate section, choose the Selected database(s) check box to replicate your selected mail database only. Choose Receive documents from server to copy the new mail documents from your mail database on the server to your local mail database. The bottom three options transfer the mail messages from the local database to the database on

> the server, hang up the telephone as soon as replication has been completed, and allow you to keep on working while

your mail database is replicating.

Click *OK* to start replication. The phone is dialed, the Lotus Notes Background window is opened, and a connection is established. When the replication is complete, the message 'Waiting for next request' appears in the Lotus Notes Background window.

Now you can read and send mail as you would in your office. Next month we'll discuss replication in more detail, including replicating other databases.

By Catherine Kenny

Catherine Kenny is an assistant editor for PC World Lotus Edition. Special thanks to Stephen Londergan of Lotus Development for ensuring the technical accuracy of this article.

Before you can use your mail database, you must replicate (exchange information with) the database on the Notes server.

delete documents in your local mail database without affecting the documents in your mail database on the server. If you would rather replicate these changes back to the mail database on the server, deselect this option. The next option, *Only copy first part of large documents and do not copy attachments*, is crucial for the remote user. Select this option to truncate large messages and remove attachments (which can take significant amounts of transmission time) from documents. Click *OK* when you finish.

The next step is to limit the number of mail documents to replicate. When you're out of the office, you typically need only the most recent documents in the database. To limit the number of



Designing Page Layouts in Ami Pro

hile Ami Pro provides templates for many common business documents, you may want to stray from these norms. You might prefer to use newspaper-style columns for a monthly sales report, or you may want to create alternating

you may want to create alternating headers and footers for the chapters in a book. You can accomplish these tasks and more by modifying the page layout.

Modify Page Layout **●** Margins O Page Clear Tabs Margins O Lines 1 Iop: O Header ♣ 0.50 ★ Bottom: C Eootes ● All 01 03 05 07 O Right @2 O4 O6 OB O Left Gutter width: Minor ₩ 0.17 OK Ocumn balance

CONTROL THE APPEARANCE OF THE ENTIRE PAGE by selecting from the options in this dialog box.

Every Ami Pro style sheet contains a single page layout. The page layout controls the appearance of the entire page—margins, tabs, columns, size, and orientation. In this article we present the options that enable you to design your own page layouts.

To get started, choose *Page Modify Page Layout*. If the Modify Page Layout command is grayed out, you're probably working in Draft mode; press **Ctrl>-M** to switch back to Layout mode.

The Modify Page Layout dialog box is displayed (see the figure). The Modify section of the dialog box represents the five page attributes you can change. The Pages options allow you to select the pages to modify: all pages, right-hand pages, or left-hand pages. Select the Mirror option when you want the page layout settings to appear as mirror images on each page in the document. As you make changes to the page lay-

out, keep an eye on the sample box in the lower right corner of the dialog box. This area shows how the document will look with the current settings.

Margins, Tabs, and Columns

To change the margins for a document, enter the measurements in the Margins text boxes or use the arrows to increase or decrease the margin settings.

You can also use the ruler to change the left and right margins of the docu-

ment. To do so, click and drag the margin marker to the appropriate position on the ruler. Note that Ami Pro measures the margin from the edge of the page. For example, if you want to set the left and right margins to 1 inch, drag the left and right margin markers to 1 inch and 7.5 inches, respectively.

Most page layouts already contain default tab settings that are displayed in the ruler. To remove a tab, click and drag the tab icon down off the ruler. To move a tab, drag the tab icon to the new location. To clear all tabs, click

Clear Tabs. To set a tab, first click the icon representing the tab you want to set, then drag the icon to the ruler.

You can also create tabs manually. To do so, first make sure the Units button reflects the correct unit of measurement. For example, to measure tabs in picas, click *Units* until the Picas label is displayed. Select the tab type you want to create, enter the measurement, and click *Set Tab*.

To define columns, just click the appropriate radio button in the Number of columns section. If you would like each column to display text of equal lengths, select the Column balance check box. The Gutter width setting determines the amount of space between columns. You adjust the gutter either by dragging the column markers that appear on the lower half of the ruler or by entering a specific measurement in the Gutter width text box.

Page Settings and Lines

The Page settings option lets you specify a page's size and orientation. Ami supports a variety of paper sizes and lets you enter a custom size. The Orientation option controls whether your page appears in Portrait or Landscape mode.

The Lines option lets you add lines to the left, right, top, or bottom margin or to all four sides of the page. You can also add lines between columns and choose the lines' thickness and color.

Headers and Footers

The margins for the headers and footers are a subset of the top and bottom margins for the entire page, and they are set separately from the rest of the document. When you increase or decrease the margins for the main text area, the header and footer margins remain constant; therefore, you may lose some header and footer text if you increase the margins for the main text area.

The Begin on Second Page option forces the header and footer text onto the second page of the document—handy when the first page in your document is the title page.

Creating Your Own Page Layouts

The standard page layout defines the settings for the entire document. If you want to use different page layouts, just insert them in the document. Each inserted page layout affects all pages from this one forward.

To insert a page layout, position the cursor where you want it to appear, and choose Page • Insert Page Layout • Insert. Ami Pro inserts a page break and displays the Modify Page Layout dialog box. You define the settings of an inserted page layout in the same manner.

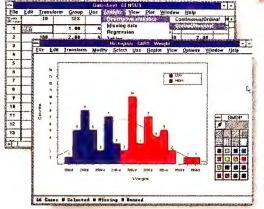
To remove an inserted page layout, position the cursor on the page in which the page layout resides and choose Page Insert Page Layout Remove. To return to the settings defined by the standard page layout, simply choose Page Insert Page Layout Revert.

By Catherine Kenny

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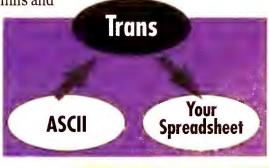
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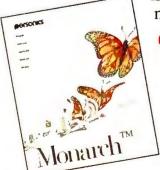


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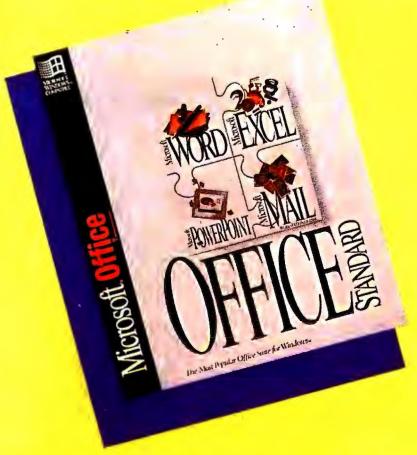
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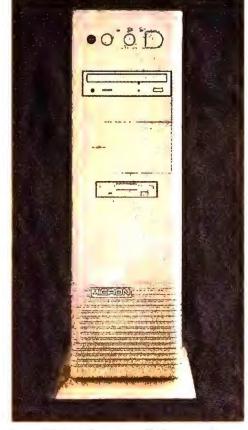
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Looking for the cheapest way to buy high-quality software? Borland, Lotus,

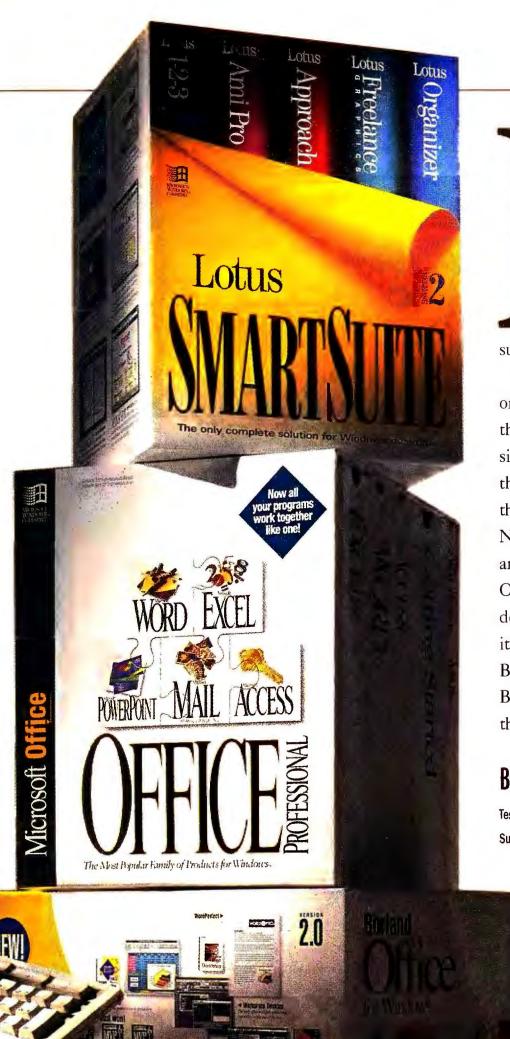
Suites

and Microsoft now offer aggressively priced collections of their key applications—

Morth

all yours if you're willing to live and die with one vendor. Should you?

142



for Windows

WordPerfect and Borland, the complete Office

ere's a given. Any article about suites—collections of bundled applications that at minimum include a full-featured word processor, spreadsheet, and database—will be dripping with sickly suite puns. So let's get it over with: suite success, bitter

suite, suite nothings, suite deals, and so on.

Such treacly matters dispensed with, we can get on with the more pressing business of looking at the new Borland Office suite and the latest versions of Lotus SmartSuite and Microsoft Office—three giant software collections that have started thudding onto computer store shelves nationwide. Not that suites are anything new; they've been around since 1988, when Microsoft introduced Office for the Macintosh. Microsoft Office for Windows followed in 1990, and Lotus countered with its SmartSuite in 1992. Completing the puzzle, Borland and WordPerfect teamed up to produce Borland Office 2.0 in January of this year. So why the sudden buzz over a five-year-old phenomenon?

By George Campbell and John Walkenbach

Testing and research by George Campbell, Steve Fox, Tom Grubb, Bryan Hastings, Susan Silvius, Lincoln Spector, Jennifer Spock, and John Walkenbach



ROBERT PERRY

WINDOWS SUITES

Part of the answer is market hype. Sure, they're great deals. But the vendors insist the real benefit is integration—the applications' capability to share data and interact within a suite in ways they can't do alone. And increased integration enhances productivity.

Maybe it's not just hype. Certainly all three collections offer an unprecedented number of bytes for the buck, with street prices ranging from \$360 for Borland's entry to \$650 for the Professional version of Microsoft Office. But we weren't so sure about the grandiose claims of increased productivity. Plus we were well aware of these suites' drawbacks: Not everyone has 80MB of free disk space or unlimited RAM. Considering all this, are suites worth it?

We began by listing the eight features we'd like to see in a perfect Windows-based application suite. On our wish list:1) A low price, 2) a high level of integration among applications, 3) economical use of your PC's resources, 4) ease of use, 5) automation and customization strengths, 6) the capability to share information easily with

other users, 7) easy installation, and 8) excellent documentation and technical support. In considering these goals, we evaluated the suites as if each were a single product, as the three vendors claim, not simply a collection of applications. (The quality of each suite's individual applications is also important, of course; for an examination of each program, see the "Application Rundown" section for each suite.)

How do the Borland, Lotus, and Microsoft suites stack up against this wish list? Not surprisingly, the existing suites fell short of the mark: Today's suites simply don't work together nearly as well as the vendors would have you believe.

Our conclusion: Don't buy suites for the highly touted integration. You may find some of

this—especially in Microsoft Office—but you'll probably be disappointed. That doesn't mean we wouldn't recommend any suites, however. In fact, the more we examined these behemoths, the more impressed we were with what great deals they really are.

So if you're thinking of upgrading an application, spring for the very few extra dollars and upgrade to a suite. Then wait a few years, and upgrade again when suites truly offer benefits beyond price.

Editor's note: At press time, Novell announced that it was acquiring WordPerfect and purchasing Borland's Quattro Pro. (See News Monitor, page 57.) Currently, Novell will continue to sell Borland Office; marketing plans for later this year were unavailable at press time. For further information, call Novell at 800/638-9273.

George Campbell is a contributing editor for PC World and author of The Power User's Pocket Guide: WordPerfect 6 (Brady Books, New York City, 1993). John Walkenbach is a frequent contributor to PC World and author of eight spreadsheet books. Bronwyn Fryer is a contributing editor for PC World.

Goal 1: Inexpensive Applications

The ideal suite would offer a substantial collection of applications at little cost for each.

All three suites pull down decent grades in this category (see "Suites on the Street," below). Based on street price—who pays list price nowadays?—Lotus fetches \$100 per application; Borland gets about \$120 per, and each application in the Microsoft Office is \$166, or \$162 for the pieces in Office Professional. And if you can prove that you own a competitor's word processor or spreadsheet, you qualify for a competitive upgrade price from Microsoft, Lotus, or Borland. Also often very cheap is the conventional upgrade from an earlier version of the same application suite. (These street upgrade prices are an average from retail and direct outlets as of March 1994, but pricing changes from month to month and from location to loca-

Applications	Street price	Street price (if bought separately)	Competitive upgrade/ version upgrade (street)
Borland Office 2.0 WordPerfect 6.0 for Windows; Quattro Pro 5.0 for Windows, Workgroup Edition; Paradox 4.5 for Windows, Workgroup Edition	\$359	\$1132	\$236/\$277
Lotus SmartSuite 2.1 Ami Pro 3.01, 1-2-3 release 4.0 for Windows, Approach 2.1 for Windows, Freelance Graphics 2.01, Organizer 1.1	\$499	\$1186	\$296/\$296
Microsoft Office 4 Word 6.0 for Windows, Excel 5.0, PowerPoint 4.01	\$499	5987	\$287/\$254
Microsoft Office 4 Professional Word 6.0 for Windows, Excel 5.0, PowerPoint 4.0, Access 1.1*	\$649	\$1316	\$299/\$299

tion. Shop around for the best deals.)

In any case, it will cost you less to buy these products as part of a suite than individually. The street price for the separate Microsoft applications, for instance, is \$329 each; Lotus products will go for between \$99 for Organizer and \$329 for Ami Pro and 1-2-3. Word-Perfect for Windows is \$269 and the standard versions of Quattro Pro and Paradox are \$42 and \$149, respectively—\$460 for all three. If you want the same work-group—enabled editions of Quattro (\$495) and Paradox (\$368) that come in Borland Office, however, the price jumps to \$1132.

REPORT CARD—PRICE	
Borland Office	A
Lotus ImartLuite	Ā
Microsoft Office Professional	13+

Goal 2: Perfect Integration

The perfect suite would have a centralized suite manager to oversee its team of programs and would offer shared tools for performing common operations. All component applications would be able to exchange data without glitches.

Every suite sports a suite manager—a central control panel that gives you instant access to all its applications. Borland Office 2.0 takes the paternal approach with DAD (Desktop Application Director), a mini tool bar that either sits in the title bar of the foreground application or floats freely. DAD is a friendly fellow and highly customizable. You can quickly cycle through four sets of tools as well as create your own. DAD's tools give you one-click access to applications, execute macros to help programs share information, and provide other forms of integration. For example, one of DAD's tools launches WordPerfect's handy Quick Files dialog box for locating and loading a file, or you can access the same tool to open worksheets from within Quattro Pro.

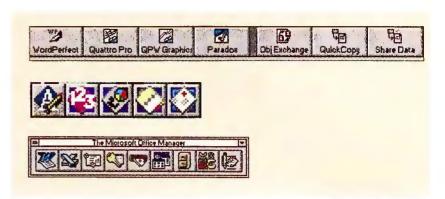
Microsoft Office Manager—MOM—is the head of the household. Like Borland's DAD, MOM is an ever-present mini tool bar that gives you one-click access to the suite's applications. Also as with its Borland Office counterpart, you can customize MOM by adding new icons or changing the menus to launch other applications. MOM plays a big role in installation—it's where you choose which applications to install or uninstall. Cue cards explain how to maneuver around MOM and offer pointers on sharing information among suite applications.

Until Lotus ships a full-fledged suite manager (probably by June of this year), SmartSuite users will have to make do with the Lotus Applications Manager (LAM)—really just an Ami Pro macro that displays five application icons at the top of the screen. These icons provide a fast way to zip to a suite application—though they disappear if you close down Ami Pro. Even without the suite manager and an appropriately family-oriented acronym, Ami Pro's macro language lets you perform all kinds of slick integrative functions, such as tiling selected Lotus applications, building a Freelance Graphics slide show from Ami Pro text, synchronizing text styles between Ami Pro and 1-2-3, and even creating a monthly calendar using Organizer data.

Let's Have That File

Integration starts with sharing data, and the most straightforward way to do that is to open another application's document. For file sharing to work consistently, an application must have the capability to read its suite mates' file formats. Borland Office encounters no problems here; WordPerfect can import Quattro Pro and Paradox files either as static information or as data dynamically linked to the original file. Both programs can perform queries to import selected Paradox records. Quattro Pro is especially good with foreign file formats; it can retrieve more types of files than any other spreadsheet.

SmartSuite's Ami Pro and Freelance Graphics will effortlessly scarf up 1-2-3's WK4 files, but finicky Approach won't look at them in this format. To retrieve them, you must first convert the files to DBF format using the suite's clumsy DOS-based translation utility before shuttling them into Approach.



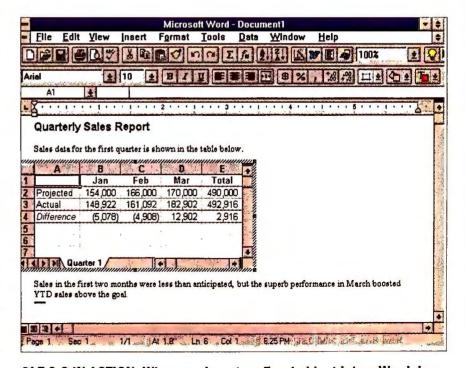
MISSION CONTROL TAKES A SIMILAR FORM in the three suites a collection of icons for navigating among the applications. Borland's Desktop Application Director (part of which is shown at the top) and the Microsoft Office Manager (bottom) are always active. For the Lotus Applications Manager to appear, Ami Pro must be open.

Microsoft Office reads its applications' files with ease. You can create a PowerPoint presentation using a Word or an Excel outline, perform a mail merge using Access or Excel files, and load an Excel file directly into Word. The Microsoft Office applications are also surprisingly good at importing foreign file formats, using a set of common import filters to do so.

Misadventures in Copy and Paste

If you want data from another application but don't need the whole file, the Windows Clipboard's copy and paste is the way to go—when it works. In Borland Office, copy and paste is a hit-or-miss affair. For example, if you copy a range of cells from Quattro Pro to WordPerfect, the data appears as a formatted table—but the colors are different. Copying a WordPerfect table to Quattro Pro is messy: In our tests, the second row of the table invariably appeared in the first row whenever we copied the table. And WordPerfect charts copied to Quattro Pro often look odd. The chart, for example, may partially obscure the chart title.

SmartSuite's copy and paste is more reliable. Pasting a range of cells from 1-2-3 to Ami Pro strips away the former's "designer" frames, but at least the table remains in its original format. On the



OLE 2.0 IN ACTION: When you insert an Excel object into a Word document and double-click it, you can edit the worksheet without leaving Word. The two applications negotiate for menu real estate. Note the Excel-specific menu item Data, third from right.

WINDOWS SUITES

downside, Ami Pro whacks off the ends of oversized ranges, forcing you to adjust columns to fit. Copying from Ami Pro into 1-2-3 serves up some nasty surprises, however. If you try to paste a block of Ami Pro text into a 1-2-3 worksheet, the first 511 characters of text are dumped into a single cell, and the rest is ignored. Charts and graphics move without a hitch between 1-2-3 and Ami Pro, but Ami Pro tables pasted into 1-2-3 lose their formatting.

Provided that you remember to use the command Edit•Paste

Special, pasting a range of 1-2-3 cells into a Freelance document is a piece of cake. You can either keep the existing formatting or apply formatting from the current Freelance template. Copying 1-2-3 charts to Freelance also works well. The chart is pasted as a chart rather than a static graphic and can be modified from within Freelance. In fact, Freelance can import charts directly and work with named ranges from 1-2-3 files.

Approach has the most limited copy-and-paste options. It uses the Clipboard for graphics or individual fields only; you can't, for exam-

ple, perform a query on a database and copy the results to 1-2-3 or Ami Pro.

Within Microsoft Office applications, standard copy-andpaste procedures generally work well.

Copy a range of data from Excel into Word, and you get a table that retains the formatting. Copy a Word table into Excel, however, and the formatting is ignored. Copying information to and from Power-Point is extremely reliable. Copying rows from a table in Access to Word, however, produces tab-delimited text, requiring an additional step to convert it into a table. Copying the same information to Excel works fine.

Passing Data Behind the Scenes

When copy and paste isn't enough, applications can use Dynamic Data Exchange (DDE) to share data. DDE links documents so that a change in one is automatically reflected in another. For example, if numbers in a word processing document are DDE-linked to cells in a spreadsheet, any changes in the spreadsheet cells will show up in the text file.

REPORT CARD SUMMARY Lotus Microsoft A 13+ 1. Price B A-2. Integration 13+ B 3. Resource Economy 4. Ease of Use/Ease of Learning A 13 5. Customization and Automation 13+ 13 13+ 6. Work-Group Features 7. Installation 13-13-13+ 8. Jechnical Assistance B+

While the nascent industry standard OpenDoc is expected to give it

How DDE-worthy are these three suites? In Borland Office, creating text or chart DDE links from Quattro Pro or Paradox to WordPerfect works like a charm. However, you can't paste links from Word-Perfect to either of the other two applications. Paradox and Quattro Pro work particularly well together, allowing links in both directions.

In Lotus SmartSuite, all of the applications except Organizer support DDE to some extent. It's a breeze to link a range or chart from 1-2-3 to Freelance or Ami Pro; the same goes for linking a page

from Freelance to 1-2-3 or Ami Pro. However, Approach is a disappointment because you can't link data via DDE; you can link only objects such as descriptive text or graphics.

Microsoft Office has the most complete DDE support of the bunch. Creating DDE links is relatively straightforward, and the process operates consistently across PowerPoint, Excel, and Word. After you copy data to the Clipboard, selecting the Edit• Paste Special command displays a dialog box that shows your current options. Depending on the data copied, you can choose to

paste it unlinked, with a DDE link, or as an OLE (embedded) object. Access supports DDE as both a client and a server—that is, it can receive and initiate DDE links.

stiff competition, Microsoft's OLE protocol is still the reigning king of object embedders—and all the suites support it to some degree.

You need to write macros to set up DDE links with Access data, however, which is typically beyond the ability of all but the most sophisticated user.

Object Lessons

We've now arrived at the most advanced development in application data exchange: Object Linking and Embedding (OLE), which lets you treat an entire document (or part of it) as an object and place it into another application's document. This means you can view any inserted objects in the context of the document you're working on—no toggling between programs. Applications that are OLE servers donate OLE objects; OLE clients (also called *containers*) receive these objects. While the nascent industry standard OpenDoc is expected to give it stiff competition, Microsoft's OLE protocol is the reigning king of object embedders, and all the suites

Application Rundown: Borland Office 2.0

There is more commonality between this suite's applications (WordPerfect 6.0 for Windows and the work-group editions of **Quattro Pro 5.0 for Windows and Paradox** 4.5 for Windows) than we had expected-surprising since the Borland Office 2.0 apps come from two companies. All three programs proved to be heavy-duty performers, and Paradox and WordPerfect share one other trait: They can be bears to learn.

WordPerfect 6.0 for Windows

This veteran word processor offers tremendous processing power to anyone with a hefty computer and the patience to plod around a sometimes confusing interface. The latest version offers the most robust and customizable feature set of any of the other word processors: tables with a full-scale spreadsheet formula set, oodles of border styles, charting tools, Coaches (which walk you through projects), impressive-looking templates, and a configure-it-yourself button bar that can hold any program command or function.

The program also offers sharp file management tools, extensive charting and printing options, excellent bookmark functions, and unparalleled capability to set up text styles. No question about it-this is one of the most powerful word processors going. But if you want to get up and running quickly, consider Ami Pro or Word for Windows.

Quattro Pro 5.0, Workgroup Edition

If there was ever a serious rival to Excel 5.0, Quattro Pro is it. Borland's spreadsheet is a snap to learn, thanks to interactive Tutors that guide you through common procedures. Yet it's feature-packed, including a scenario manager, multidimensional data modeling, and analysis tools that equal or exceed Excel's. You can also link via DDE or paste

the results of queries from external databases into a worksheet range, manipulate and summarize database data, customize the icon tool bars via drag-anddrop, and share the data with other workgroup members via various messaging services. Quattro Pro 5.0 won our kudosand a Best Buy in our February 1994 review-for letting

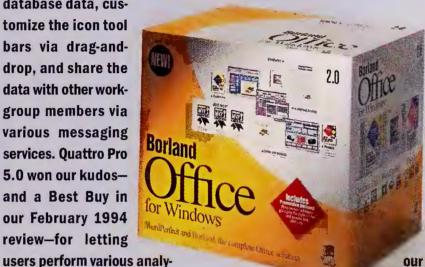
ses with a few mouse clicks and insert charts easily into a worksheet; it even assists you in picking the chart type most appropriate for certain data. A complicated menu is its only major drawback.

Paradox 4.5 for Windows, Workgroup Edition

Ideal for the power user, this relational database is harder to learn and use than Lotus Approach, but those who brave the storm will enjoy the benefits of Paradox's extra features. There are plenty of default form and report layouts to pick from, and version 4.5's new style sheets make it easier than ever to get a custom look.

Paradox also offers loads of time-savers, such as easy-to-configure data-entry checks; the capability to right-click for custom style menus; and the ever-popular Query by Example. Paradox even offers field types that hold spreadsheets, sound, graphics, OLE objects, bit-mapped pictures, and formatted memos. You can also link directly to most SQL datawhich you can work with as if it were stored in the default Paradox format-and share

A trio of industrial-strength programs courtesy of **Borland and WordPerfect**



reports, forms, tables, and queries with other Paradox and Quattro Pro users across a network or via electronic mail. Microsoft's Access nosed out Paradox 1.0 for Windows for a Best Buy in our June 1993 review; this version-Paradox 4.5 for Windows, **Workgroup Edition** -would almost certainly have gotten

our Best Buy nod as well.

Quattro Presents

Borland doesn't offer a separate presenter but instead relies on the presentation talents of Quattro Pro. On the upside, it offers superb integration with the host spreadsheet. Since a presentation is part of a notebook file, you can simply drag Quattro Pro objects into your presentation. Creating text slides is much trickler. Quattro's Presentation Advisor applet offers some fancy features. Choose presentation templates from thumbnail previews, or set mood options, such as formal or entertaining. On the downside, this presenter lacks such basics as an outliner, speaker notes, and the capability to change the look of a presentation by applying a global format. The program is tougher to learn than PowerPoint or Freelance Graphics for Windows, and its Interactive Tutors are deficient. Quattro Pro's presentation feature may be acceptable for the occasional inoffice report, but look to a dedicated package if you regularly need to create spiffy presentations.

support it to some degree. Some of the latest applications, particularly those from Microsoft, use OLE 2.0, a vastly improved version of the clunky original.

In our ideal suite, all applications would be able to donate and accept OLE 2.0 objects, adjust them smoothly and automatically to the format of the target document, and let you drag and drop objects anywhere your heart desires. Microsoft Office, with its support for OLE 2.0 and compound documents (documents within a

document), takes object linking one big step further. You can drag a range from Excel directly into a Word or PowerPoint document in order to create an embedded worksheet. Then you double-click on the embedded object to display Excel's menus and tool bars right in Word or PowerPoint. Access is the only Microsoft Office Professional application that doesn't support OLE 2.0.

Applications in the other two suites are still saddled with OLE 1.0, though they are reportedly moving to OLE 2.0 in upcoming

Application Rundown: Lotus SmartSuite 2.1

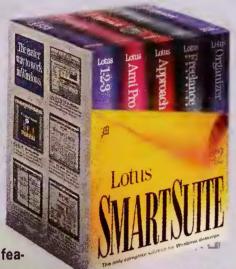
Lotus is pushing quantity these days: You get five fullfledged applications-Ami Pro, 1-2-3, Approach, Freelance, and the personal information manager Organizer-for the same price as Microsoft's three. But what about quality? The applications are competent, though judging from PC World's recent reviews, Lotus's applications may be lagging in the features race. Upcoming versions of the SmartSuite applications fea-

turing support for OLE 2.0, a common scripting language (LotusScript), and enhanced work-group tools should help Lotus catch up. A major overhaul of Approach, possibly as early as this month, will make it a full-fledged member of the suite instead of the distant cousin it now resembles. As we go to press, however, Lotus may give you the most, but not always the best.

Ami Pro 3.01

The program's designers knew what they were doing when they put ami—French for friend—in the word processor's name. Ami Pro's sensible menu structure and masterful handling of

Plenty of apps and a pair of Best Buys



only 15MB of hard disk space and performs acceptably even on low-end 386 systems with 4MB of memory.

complex page layouts

make it easy to warm

up to. Particularly

strong in layout, desk-

top publishing, and

graphics handling, Ami

Pro makes creating a

chart, importing and

positioning graphics,

and even setting book-

marks a snap. The

same goes for creating

a multicolumn docu-

ment. Ami Pro is no

memory glutton, either.

The program asks for

Ami Pro did not, however, garner a Best Buy in our March 1994 review, chiefly because its more recently revised competitors have leapfrogged it in features. For example, Ami Pro lacks text art tools and OLE 2.0 support. A new version of Ami Pro, due out this year, should help restore the balance.

1-2-3 release 4.0 for Windows

Excel 5.0 and Quattro Pro 5.0 for Windows nudged out the latest version of 1-2-3 for a Best Buy in *PC World's* February 1994

roundup. Not a bad spreadsheet, we concluded, but not as feature-rich as the competition.

Lotus gave 1-2-3 a serious interface lift, adding single-click access to context-sensitive shortcut menus and tool bars, drag-and-drop for copy and move operations, the capability to view and change cell properties using the status bar on screen, and in-cell editing. Database querying is also a magnitude simpler; a query dialog box spares you from messing around with criterion and output ranges. 1-2-3's crowning achievement is the Version Manager, which lets you create different scenarios with selected worksheet data—ideal for tasks like figuring car or house payments. Then you can create what-if scenarios and save and label them.

1-2-3 fell down in data cross-tabbing and analysis tools, its limited import and export options, and its restriction of one window per file. 1-2-3 4.0 for Windows will satisfy all but the most demanding spreadsheet users.

Approach 2.1 for Windows

When Approach appeared several years ago, it lit the Windows database scene on fire with its ease of use and ability to handle dBASE, Paradox, FoxPro, Oracle, and SQL Server data. Version 2.1 still carries the torch, winning a Best Buy in June 1993 as the most straightforward nonprogrammable database. An end-

revisions. Double-click on an OLE 1.0–embedded object to open the server application for editing. You must select a command in order to update the object and return to your original document. In Borland Office, WordPerfect and Quattro Pro work as both OLE 1.0 client and server. Even so, the object-linking road between word processor and spreadsheet has some rough patches. WordPerfect can donate text, charts, and graphics, but those charts and graphics, if embedded in Quattro Pro, are huge and must be resized. Quattro Pro can offer spreadsheet ranges and charts, but ranges appear in WordPerfect with the characteristic spreadsheet row and column borders displayed—not usually what you want. Paradox supports OLE as a client only.

In SmartSuite, one of Ami Pro's macros lets you copy data from 1-2-3, Freelance, or Improv and paste it into Ami Pro using OLE 1.0. This macro prompts you along the way, easing an otherwise confusing linking process. On the other hand, this procedure always dumps the results into a new document. Since this is not what you generally want, you often need to do some additional copying and pasting. Inserting an Ami Pro document into 1-2-3 yields only an icon representing the document.

One Tool for All

Applications increasingly perform many of the same kinds of functions—spell checking, graphing, and querying, to name a few. In these cases, it makes sense to have one tool that all applications within a suite can use. By sharing such resources, applications save hard disk space, and users save precious time by learning how to use a given tool only once.

To their credit, Quattro Pro and WordPerfect share a spelling dictionary, but when we specified a personal dictionary file (to hold added words), we discovered that the two products use different formats for their personal dictionaries. Add a word to the dictionary in Quattro Pro, and WordPerfect won't recognize it. All three Borland Office applications have their own charting features, and each app has its own procedures for creating and editing charts.

Integration between Quattro Pro's presentation module and WordPerfect is severely deficient. You can't use a WordPerfect outline as the basis of a presentation—a feature that's standard fare in the other suites.

SmartSuite handles tool-sharing much better. For example, Ami Pro, Freelance, and 1-2-3 share the same spelling checker, and you

user tool, Approach is best with small to midsize database projects. Like the original Approach, version 2.1 is still friendly, with an easily customizable tool bar of Lotus Smartlcons that lets you point-and-click your way through tasks like adding data entry checks, joining data files, and defining macros.

Typical of Approach's friendliness is its streamlined menu system. The menu command set remains the same whether you're in Browse, Design, Preview, or Find mode. There are no complicated menu trees to tangle with: If the command you need is dimmed, just change modes to make it active. And where most relational databases force you to carefully set up indexes or keys for your files before you can link them, Approach 2.1 lets you join files on any field common to two files.

With Approach 3.0, due out by the time you read this, Lotus promises more ease-of-use tools and vastly improved integration with other Lotus applications. According to Lotus, the new Approach will use a common Lotus menu structure, add support for the two most common mail protocols (VIM and MAPI), dynamically support 1-2-3 formats, and have a full Wysiwyg report writer, cross-tab talents, and the capability to read Notes data. It will feature full OLE 2.0 support and tighter integration with Ami Pro; specifically, you'll be able to paste Approach data into Ami Pro

without first converting it into dBASE format. The new Approach will be the first SmartSuite app to use Lotus's common charting engine.

Freelance Graphics 2.01

After winning awards everywhere in 1993 for its stunning ease of use, Freelance Just missed a PC World Best Buy in April 1994. As with Ami Pro, the lack of a few featuresnotably strong interactive presentation capabilities-cost Freelance the crown. However, anyone with two brain cells to rub together can learn this program. Creating a presentation is just a matter of selecting a template, choosing a layout (title, bullet, chart slide, and so on), and clicking the text prompts to fill in the blanks. It's full of help, including an online tutorial. Ami Pro and 1-2-3 for Windows users will find Freelance easy to pick up, since it uses an identical Smartlcons button bar and sports similar interface options. Freelance imports presentation outlines from Ami Pro with aplomb and is adept at handling spreadsheet data as well-you can select a spreadsheet from Inside a presentation and highlight just the data needed for a chart. You can even include sound and motion video.

Organizer 1.1

Lotus tried to make its personal information manager look exactly like what it's supposed

to replace—a paper date book—and succeeded. On the strength of its ease of use, Organizer booked a Best Buy in our August 1993 personal information manager (PIM) roundup. To create an appointment, you open the calendar and click on a day. Then you can enter an appointment description, set alarms, make the appointment a recurring event, mark it confidential, even set another program to run at a given time. Tabs in this electronic Day-Timer let you jump among the program's address, calendar, to-do, notepad, anniversary, and year-planner sections.

Organizer's simplicity is matched by its intelligence. Among other things, it detects conflicts for recurring appointments; lets you create links between addresses, appointments, and other elements; and prints in a number of formats. Organizer's biggest weaknesses are a sparse, uncustomizable address book, no accommodation of overlapping appointments, and no monthly view. The next version of Organizer, due out in the fall, should resolve the last two complaints and will include tighter integration with Notes.

By the time you read this, SmartSuite will probably have added Lotus ScreenCam, a handy little application for creating tutorials. You simply record actions as they happen on screen with voice-over and save them in a file anyone can view even without the program.

can create a custom dictionary that all three products share. Other tools shared by two or more of the applications include a dialog box editor and multimedia utilities.

Microsoft Office has a clever tool strategy. Many of its tools are OLE 2.0 servers, so any of the OLE 2.0 applications can use them (OLE 1.0 apps can use these tools as well, but the tools will act as OLE 1.0 servers). Among the most useful of these tools are the new ClipArt Gallery, which lets you preview clip art by category, and WordArt, which graphically manipulates small amounts of text. Other Microsoft Office OLE server applets include a graphing tool (OLE 2.0), an equation editor (OLE 2.0), and an organization chart utility (OLE 1.0).



Goal 3: Economical Use of Resources

In an ideal world, suites would perform efficiently on any Windows-capable PC, they wouldn't take a massive bite out of disk space, and they wouldn't drain Windows System Resources.

If we all had 32MB of RAM, gigabyte-size hard disks, and Pentium processors, resource economy wouldn't be a concern. Unfortunately we don't, and it is. For an even harsher reality check, take a look at networked environments, where users are often saddled with very slow machines. Welcome to the suite game, where you need 8MB of RAM and more than 60MB of disk space to get decent performance. The bottom line: Suites suck up enormous resources. We recommend at least a 486 with 8MB of RAM and a 200MB hard disk if you want to run several applications at once.

Wimpy CPUs, Minimal RAM Need Not Apply

While the applications in SmartSuite will run better than Borland's or Microsoft's on a slow 386, 386SX, or 286, continued on page 125









Weekdays 8 am to 11 pm Weekends 10 am to 7 pm (ET)



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- ✓ 486DA4, 100 MHz
 ✓ Upgradable to Intel®
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- hard disk 6 drive bays
- ✓ Fast PCI ĬDE controller
- ✓ PCI graphics accelerator, 2MB
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 ✓ 3.5" 1.44MB diskette drive

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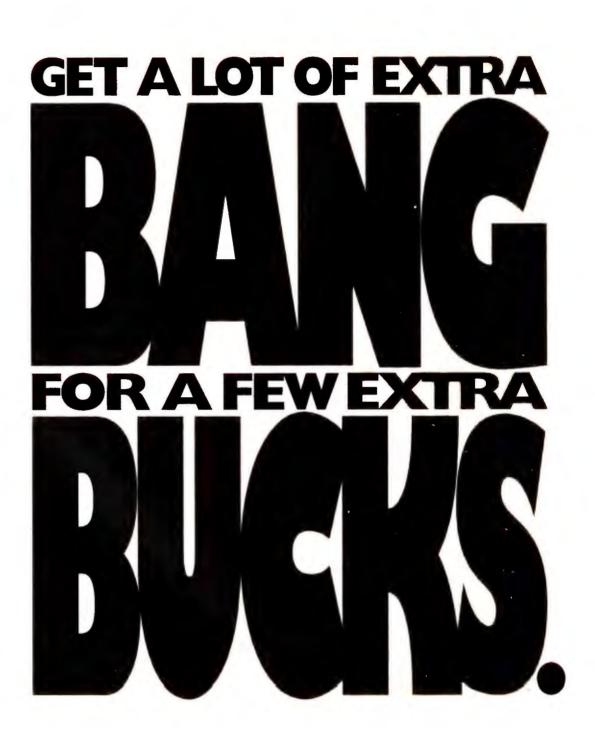
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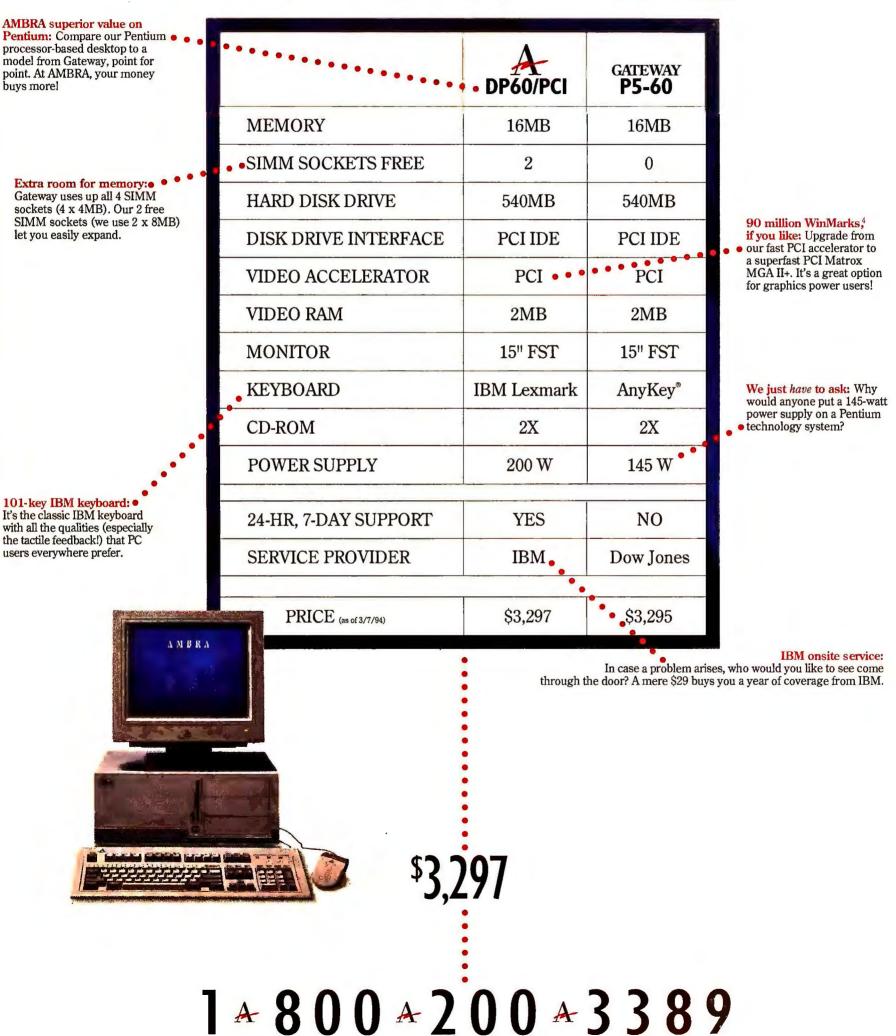
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√ 4MB RAM

✓ 3 16-bit ISA slots

✓ 240MB (15ms) IDE hard disk

✓ 3 drive bays

✓ 32-bit IDE controller

✓ 32-bit graphics accelerator, 1MB ✓ 14" SVGA color monitor, LR

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D466DXA

✓ 486DX2, 66 MHz ✓ 128KB L2 cache, max: 256KB

✓ 4MB RAM, max: 36MB

✓ 5 16-bit ISA slots

✓ 340MB (15ms) IDE hard disk

✓ 5 drive bays
✓ 32-bit IDE controller
✓ 32-bit graphics accelerator,

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✓ 5 drive bays✓ Local bus IDE controller

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✓ 7 16-bit ISA, 1 32-bit VL bus slot

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D41001/VL

✓ 486DX4, 100 MHz

✓ 16KB L1 cache ✓ 256KB WriteBack L2 cache

✓ 8MB RAM, max: 64MB ✓ 4 16-bit ISA, 1 32-bit VL bus slot

✓ Easy upgrade to PCI ✓ 440MB (12ms) IDE hard disk

√ 5 drive bays

✓ Local bus IDE controller

✓ Local bus graphics acceler-

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✓ 540MB (12ms) IDE hard disk

✓ 7 16-bit ISA, 1 32-bit VL bus slot ✓ 6 drive bays

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✓ 16MB RAM

✓ 540MB (12ms) IDE hard disk

✓ PCI Diamond Viper graphics accelerator, 2MB VRAM

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✓ 200MB hard disk

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1 PCMCIA slot, Type III

✓ 86-key keyboard ✓ Integrated 16mm trackball

✓ MS-DOS, Windows 3.1

✓ Carrying case ✓ 6.6 lbs, including battery

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the process will be annoyingly time-consuming, especially when multitasking. For best results, you'll need a 33-MHz 486 or better.

Similarly, the stated minimum memory requirements for these suites—Lotus and Microsoft specify 4MB, while Borland asks for 6MB—are generally a pipe dream. Of the three contestants, Lotus SmartSuite takes it easiest on RAM. Its applications run reasonably with 4MB, though performance is certainly better with 8MB.

Both Borland Office and Microsoft Office are more demanding: Figure on at least 8MB, and 16MB for superior performance.

Disk Space, a Precious Commodity

If it seems like your hard disk is getting smaller by the day, don't check your glasses; get out your checkbook. These suites need hard drive real estate—and plenty of it. Borland Office's three applications require a minimum of 16MB of hard disk space, with a full installation demanding 80MB. Lotus SmartSuite, with five applications, needs at least 24.5MB, with a maximum of 62MB. Microsoft Office Professional's four components cost you a minimum of 27MB, then shoot up to 62MB for complete installation.

In reality, you'll need even more disk space—another 20MB on average—since you'll need room for data files, plus temporary files created as you work. No wonder Microsoft included compression technology in its last version of DOS.

The vendors can certainly do better. While all these suites save a little disk space by sharing spelling checkers between applications, they generally don't share nearly as much as we'd like. Microsoft is the most conscientious in this regard, using OLE 2.0 technology to share most mini-apps between components. And while Borland shares a query engine between Paradox and Quattro Pro, and Lotus manages to conserve disk space by having smaller applications, only the future will tell whether shared modules manage to keep application size in check.

Running on Empty

Even if you're one of the lucky ones with plenty of disk space and memory, you're not out of the woods. Regardless of how much RAM you have, Windows 3.1 has limited resources for running simultaneous applications. To see what percentage of Windows' resources any particular application is grabbing, check in Program Manager or File Manager by selecting *Help • About*. On a typical system, with Windows running in enhanced mode and nothing but Program Manager loaded, available System Resources will register about 80 to 85 percent free. Open one of these large suite applications, and that figure will drop by 10 to 20 percent. On our test systems, for example, WordPerfect 6.0 gobbled up 17 percent of available resources; Word for Windows grabbed 16 percent; and Ami Pro, the thriftiest, used only 7 percent of free resources. In fact, every time you run another program, add a graphic image or chart, increase the size of your worksheet, or use DDE or OLE links to move data from one application to another, you use up precious resources. Load a few special modules, like charting or drawing, and resources dip even lower.

When you get down to about 15 percent of available resources free, Windows starts to choke and turn blue. In all three suites, you can run all the apps at once, but when you start loading documents, worksheets, and data files, you often run up against a brick wall.

You can get a pretty clear idea of resource use by loading the three

major applications simultaneously. Even with no data files loaded, Microsoft Office gobbles up 36 percent of free resources. Borland Office uses 40 percent. Lotus SmartSuite is the economy champ here, using a thrifty 24 percent of resources. And even when you exit the three applications, you find they've retained some of your resources. The only way to retrieve these resources is to restart Windows. Again, Borland Office is the chief offender, absconding with 7 percent of resources. Microsoft Office holds on to 5 percent, while Lotus SmartSuite retains only 4 percent.

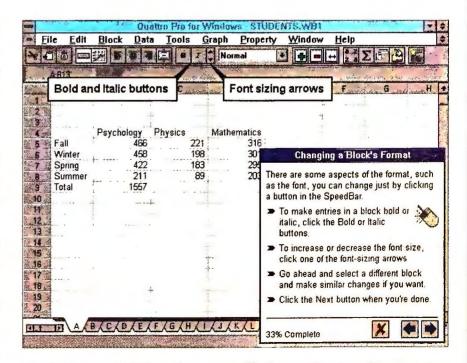


Goal 4: Easy to Learn, Easy to Use

The ideal suite would hand-hold as appropriate, offering everything from interactive tutorials to integrated context-sensitive help.

What makes a suite easy to learn and use? Intuitive commands and procedures are a big factor, but our "intuitive" may be your "incomprehensible." Personal taste also plays a big role here. So while some applications may be indisputably harder than others (and we'll tell you which those are), the best way to evaluate ease of use and ease of learning across an entire suite is to examine consistency across applications, along with on-screen instruction.

When we say consistency, we're talking about a similar (or even identical) menu structure in all programs—tool bars, dialog boxes, and accelerator keys that work alike—and identical procedures for modifying and customizing elements of the interface. After all, when all the parts of a suite look and work the same way, you need to learn procedures only once. And for instruction, we want to see tutorials that lead you step by step through operations, and online



QUATTRO PRO AND WORDPERFECT offer interactive tutorials that step you through tricky operations.

Application Rundown: Microsoft Office 4

You have to hand it to Microsoft: It makes great applications. Three of the four apps in Microsoft Office won Best Buys when we last reviewed them. The exception, PowerPoint, hasn't been put through a full-scale *PC World* review yet, though we previewed a prerelease version of it in our

In looking over these reviews, one theme kept coming up: Wizards. In a Microsoft application, a Wizard is a series of dialog boxes that walks you through a complicated procedure. All four apps have Wizards.

Word 6.0 for Windows

April presentations review.

When we reviewed Windows word processors in March 1994, there was no question of a tie. Word 6.0 won the Best Buy hands down—if you have the hardware, that is. We found that WinWord 6.0 requires at least a very fast 386 with 8MB of RAM to perform at a comfortable speed.

Once again, we found the Wizards exceptionally helpful. These include a Letter Wizard that walks you through the entire job of writing a letter, from entering address information, to helping you choose a layout, to creating the envelope. Excellent documentation, both on disk and printed, makes Win-Word easy to learn and use.

Other features make WinWord 6.0 easy to work with. One is AutoCorrect, which spots and fixes common typographical errors as you enter them. You can add your own frequent mistakes to those that come in the box and even use AutoCorrect to turn abbreviations into full words. There's also 100-level undo, terrific outlining and master-doc-

A Fistful of Best Buys



ument tools, a BASIC-like macro language, OLE 2.0 support, and both paragraph and character styles.

Not that the program's perfect. Laying out multicolumn sections can be tricky, there's no simple way to wrap text around a graphic's contours, and Word redraws your page frequently, which causes imported graphics to flash.

Excel 5.0

We looked at Excel 5.0 in our February 1994 spreadsheet review, where it tied with Borland's Quattro Pro 5.0 for Windows for Best Buy honors. The program has nearly every feature one would expect in a spreadsheet, yet it is remarkably easy to learn. It has Wizards for everything from importing text to helping you build worksheet functions. There's even a Wizard that notices when you've done something in a roundabout way and offers a more efficient alternative. But if you're used to older versions of Excel, the menus and tool bars may throw you; they resemble Word for Windows, not Excel 4.0.

Excel was the last major Windows spreadsheet to go 3-D, and it's done it in a big way. A file holds as many pages as memory allows, and you can create worksheet pages, macro pages, chart pages, or pages that hold custom dialog boxes. Also: data-table pivoting, simple and intuitive data filtering, OLE 2.0 support, and Visual Basic for Applications—a built-in programming language destined to appear in all Microsoft apps.

Access 1.1

We last reviewed Windows databases in June 1993, giving separate Best Buys for light-weight, middleweight, and heavyweight win-

ners. In the heavyweight category, Microsoft Access 1.0 beat out Paradox 1.0 for Windows by a hair. Access 1.1, which currently ships with Microsoft Office, isn't much different from that version. A more important upgrade, Access 2.0—with full OLE 2.0 support—may be out by the time you read this.

Despite marketing hype that casts Access as an easy program for beginners, we found that it takes some learning, especially for people who aren't experienced database users. Once you've figured out how it works, however, its treasure trove of features can lighten your data management chores.

Once again, Wizards go a long way toward helping you learn and use the program. Such complex tasks as creating relational forms and reports are much easier when you can step through them an option at a time.

PowerPoint 4.0

You probably don't use presentation programs on a daily basis, which makes ease of use all the more important. After all, when you haven't seen a program in a while, it's easy to forget how it works. Not so with PowerPoint. In addition to being an extremely powerful and feature-rich program, it's exceptionally easy to use.

First of all, there's an animated tutorial called Quick Previews. And as in the rest of the Microsoft suite, Wizards can take you through the more complex tasks. For instance, an AutoContent Wizard lets you set the tone and look of your presentation on the basis of preset conditions. You can choose a style designed for a sales presentation, for conveying bad news, or for another scenario. The program then creates a mock presentation. It doesn't get much easier than that.

We asked William Harrel, who wrote our April review, how PowerPoint would have fared if it had been available for that review. "It would probably have blown the rest of the packages out of the water," he said.

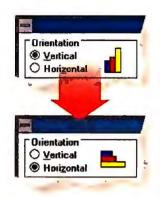
help systems that pop up when needed, especially as you're performing operations across applications.

View From the Review

In a series of *PC World* reviews over the last year, we've evaluated the relative ease of use and ease of learning for spreadsheets, word

processors, databases, presentation graphics packages, and personal information managers. Overall winners here are the individual applications in SmartSuite: Ami Pro, Organizer, and Freelance are all child's play; Approach is the most comprehensible relational database going; and 1-2-3 is only a step below Excel for usability. Borland Office didn't fare nearly as well; both Paradox and Word-

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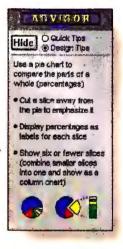
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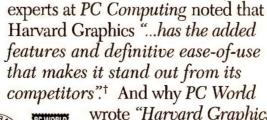
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WINDOWS SUITES

Perfect were tagged as tough to learn and tricky to use. Not so Quattro Pro, however, which earned high marks for being the easiest spreadsheet to learn.

For the title of easiest spreadsheet to use, however, our reviewers favored Microsoft Excel. Word nipped at Ami Pro's heels for the crown of word processing champ. Access was tricky, we found, though a bit easier to comprehend than Paradox; and the new PowerPoint looked remarkably straightforward. For more information on how these applications fared in our reviews, see the "Application Rundown" sections.

What's on the Menu?

Even if a single application proves slippery to learn, an entire suite can benefit from sharing that application's conventions and interface—once you've mastered the first program, its suite mates will pose little challenge. Unfortunately, the menus for the Borland Office applications have little in common with each other; even the dialog boxes tend to look different. Although all the applications

share some of the same accelerator keys, many of the keystroke combinations perform different functions depending on the program. For example, <Ctrl>-B makes a

If it seems like your computer's hard disk is getting smaller by the day, don't check your glasses; get out your checkbook. All three of these software suites need hard drive real estate—and plenty of it.

selection bold in WordPerfect, deletes the current selection in Quattro Pro, and gets nothing but a blank stare from Paradox. In all the Borland Office programs, right-clicking the selection pops up a shortcut menu, but what appears on those menus varies from application to application.

The SmartSuite components blend much more smoothly than Borland's, though some lumps remain. Screen layouts are similar between apps; for example, all but Organizer feature a live status bar at the bottom of the screen. The three primary applications in the suite have some common top-level menus, although the submenus differ. For example, the command to update DDE links is Edit•Link Options in Ami Pro and Objects•Links in Approach. And while the dialog boxes in 1-2-3, Ami Pro, and Freelance are generally consistent and usually include a question mark icon in the upper-right corner to summon help, the question mark appears inconsistently in Approach and Organizer. Right-clicking the mouse brings up a context-sensitive shortcut menu in 1-2-3 and Freelance Graphics, a formatting dialog box in Ami Pro, and nothing at all in Organizer; in Approach, a right-click displays a shortcut menu only in the Design view.

Microsoft Office is the clear consistency winner—Excel, Word, and PowerPoint are three peas in the giant Office pod. Eight of the nine top-level menus are identical across these three applications (only the third menu from the right differs), and even the submenu commands vary only slightly. Dialog boxes also share a common look, and the programs have many—though not all—of the same keyboard shortcuts (for example, <F4> repeats the last command in both Word and Excel, but not in PowerPoint). Access is the one oddball, with an interface that doesn't yet conform to the Microsoft standard. Version 2.0, when it ships, will undoubtedly fall in step.

The Right Tool Bar

It's easy to overdose on tool bars in Borland Office. WordPerfect and Quattro Pro fairly bristle with them, and the suite manager—DAD—throws four more of them at you. True, you can choose WordPerfect-style tool bars in Quattro Pro, but tool bar behavior still varies dramatically between the two applications. Moving the mouse over tool icons in Quattro Pro and Paradox displays their function in the status bar at the bottom of the screen; in Word-Perfect, the display is in the application's title bar; in DAD, descriptions pop up in yellow as you drag the mouse across the buttons. Furthermore, right-clicking on tool bar icons yields different results in all three products.

SmartSuite's tool bars, which Lotus refers to as SmartIcon palettes, have a common look and feel across all applications: You can right-click on an icon to display a description in the title bar. You customize icon palettes the same way in all suite components, though if you select a large icon size in one application, this preference is not carried over to the other applications in the suite.

Microsoft Office excels in consistency. Its applications share many common tool bar icons, and procedures to customize the content of the tool bars are consistent across

all applications except Access. As with the Lotus SmartSuite apps, you can choose the size of the icons in Word and Excel (though, oddly, not in PowerPoint). Unfortunately, the suite manager, MOM, won't allow you to set global tool bar preferences.

A Tutorial by Any Other Name...

If you've ever done a mail merge or tried to consolidate spreadsheet data, you can appreciate the need for on-screen guidance. Borland Office is a strong performer here. WordPerfect, for instance, has interactive Coaches that, when requested, remain on screen while you perform certain common tasks. Quattro Pro's interactive Tutors perform a similar function, teaching you how to perform an operation. And if you're more interested in getting quick results than in learning about a feature, Quattro has Experts that perform complex procedures for you. The Loan Amortization Expert, for example, asks you some questions to gather necessary information, then generates a complete worksheet. Quattro also offers Presentation Advisors that suggest which chart types and fonts would be appropriate for your presentation. Don't look to Paradox for this sort of assistance, however.

Key to Microsoft's help strategy are the omnipresent Wizards, automated instructions that ask you questions and then step you through various procedures. Sometimes they pop up in response to a specific command; other times they simply appear. For example, you can choose a Wizard anytime you select File•New in Word, whereas the Text Import Wizard magically appears whenever you attempt to load a text file into Excel. These Wizards are generally helpful, if occasionally a trifle intrusive.

None of the Lotus applications have interactive assistance that approaches Borland's Coaches and Experts **continued on page 133**

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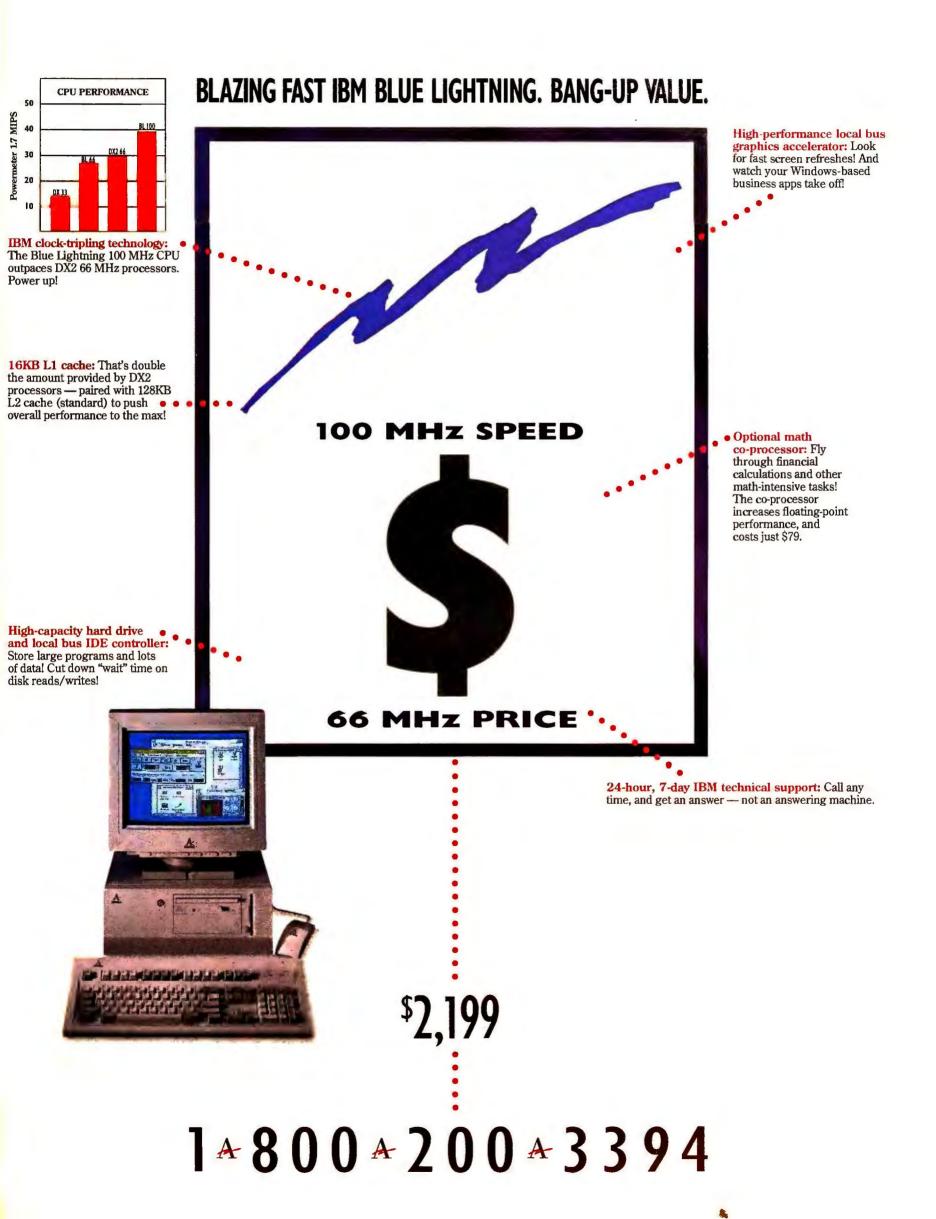
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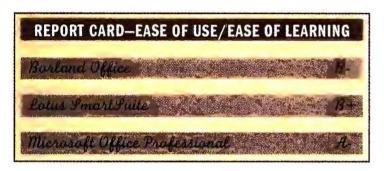
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or Microsoft's Wizards. Ami Pro, 1-2-3, and Freelance have decent interactive tutorials, readily accessible from the help menu, but they each have their own look and feel.

A Cry for Help

When Coaches, Wizards, Experts, and tutorials don't do the trick, there's always good old-fashioned help. All three suites' online help systems need work. Borland Office, for example, offers help in all applications, including DAD, but the programs' help files don't address interapplication tasks. For example, Quattro Pro's help doesn't mention WordPerfect (and vice versa).

SmartSuite isn't too smart either: There's no specific information about using the suite applications together. Microsoft's help is the best of the batch, with online assistance consistently accessible across all applications. For interapplication help, MOM offers some assistance in integrating the applications in the suite, but the help covers only a few basic procedures.



Goal 5: Customized (and Automated)

Right out of the box, interface elements should be easy to modify. And changes made to one program in the suite should be portable to the others. Finally, it should be easy to link to nonsuite applications.

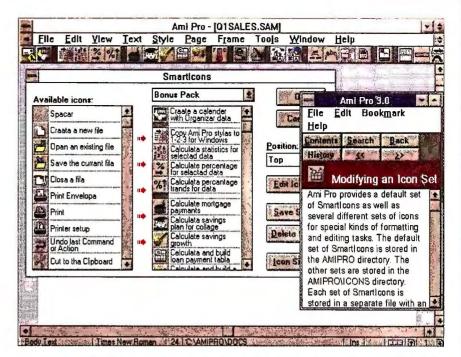
Macro languages are important, but there's also a powerful need to customize applications across a corporation—to simplify training requirements and produce a uniform document appearance. Borland Office lets users choose common icons for tool bars from a set based on either WordPerfect or Borland apps. WordPerfect offers the ultimate in flexibility: Every element of the program's interface can be altered, from keystrokes to menus, either across the network or individually. Paradox and Quattro Pro are customizable as well, although you customize the three apps slightly differently.

Lotus SmartSuite's Ami Pro and 1-2-3 share customizable iconbased tool bars, as well as a common menu logic. But even though you can add icons and commands, those changes aren't reflected in the remaining applications. Freelance, Approach, and Organizer offer similar but separate customization tools.

Microsoft Office applications are the most customizable of those in the three suites. Except for Access, they offer consistent methods for altering menus and tool bars, and even let you create custom dialog boxes using the macro languages in each program.

Waiting for Common Ground

Why must you generally customize the applications in a suite separately? Because none of these suites has a cross-application macro or scripting language yet. A common language would, for instance, let



TO CUSTOMIZE THE SMARTICON PALETTE, you can drag and drop within the Smartlcons dialog box. Removing an icon is more straightforward: Press < Ctrl> and drag the unwanted icon off the bar.

users and corporate programmers produce customized systems to automate operations and improve productivity: One could create a single script to lead workers through assembly and publication of quarterly or annual reports. Common languages also would make it easier for third-party developers to create vertical applications for users, both individual and corporate, who don't want to develop their own applications. Microsoft holds the edge right now, with Visual Basic for Applications (VBA) built into Excel; later versions of WinWord and Access also promise VBA. Developers can use Win-Word's WordBasic and Access's AccessBasic to link to other applications via OLE and DDE. Lotus's upcoming LotusScript implementation will help, and in the meantime Ami Pro's BASIC-like macro language offers links to the other applications in the suite. Borland plans a suitewide macro language, called Object Automater, while WordPerfect's current macro language has similar, though more limited, capabilities than Ami Pro's. So all three suites get an incomplete here, but the future holds great promise.

Working Outside

OLE 2.0—implemented only in Microsoft Office's Excel, Win-Word, and PowerPoint—is the most promising resource for linking to nonsuite applications. While the list of OLE 2.0–compliant applications is still fairly short, scores of companies see OLE 2.0 in their future, and Borland and Lotus promise OLE 2.0 support sometime soon. Once this technology is widely available in Windows applications, you'll be able to link to and use just about any program right from your central application. In the meantime, it's a waiting game, with Microsoft at a distinct advantage.





Goal 6: Working Together-A Team Effort

The ideal suite would make it simple to share information among users. It would allow transparent access to data from any source—while ensuring security—and would track and manage changes from version to version.

The simplest way to share data among users is via E-mail. Indeed, all three suites let you send files, using all the most popular E-mail systems, from within any application. It's a workable but clumsy solution. Less awkward is Microsoft's OLE 2.0, probably the most widely accepted data-sharing solution today. But wide support alone may not be enough, especially in light of more elegant strategies. Apple, Borland, IBM, Novell, and others are touting OpenDoc, an as-yet-unreleased OLE 2.0 competitor; all three of the Borland Office applications already offer Borland's OBEX (Object Exchange). Lotus also has an alternative to OLE called TOOLS (Technology for Object-Oriented Linking and Sharing), which is currently available in Ami Pro only. It allows in-document editing using Ami Pro's own charting and drawing tools. The company is also committed to an ambitious data-sharing technology called Notes F/X (Notes Field Exchange), which requires Lotus Notes.

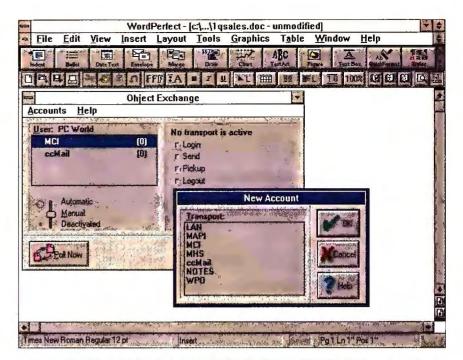
The Workgroup Desktop, which uses OBEX tools, gives Borland Office a slight edge in moving data around a work group. Using nearly any transmission method, OBEX lets you "publish" data across the LAN, local E-mail, or even public message systems like MCI Mail. Once published, other work-group users can "subscribe" to get the latest data. Updates are automatic, and the system can even handle multiple versions of the same data. Future versions of Borland Office will enhance OBEX as well as support OLE 2.0.

SmartSuite's approach to sharing data relies on Lotus Notes, a separate (and expensive) application. Notes F/X stores shared objects as fields in a Notes database. Changes made in any object are reflected in all applications linked to that field. Lotus also plans full OLE 2.0 support to aid in smooth data transfer. The flaw: If you don't have Notes, you're left with clunky old E-mail as a fallback.

OLE 2.0 is the foundation of Microsoft's data-sharing strategy. Using OLE 2.0, objects stored in one document update automatically when changed in another application. Still, there's no automatic version control, as there is in OBEX. OLE demands that embedded objects reside on the same network drive as the document containing them, and you can't embed an OLE object that's larger than a single page. For E-mail, Microsoft has finally decided to accept the inevitable by supporting the VIM protocol (used by Lotus's cc:Mail and others), as well as its own MAPI protocol (used by Microsoft Mail). A license for Microsoft Mail comes with the suite, though you'll still need Mail installed on the network.

Fortunately, all three suites have excellent tools for importing data from a wide spectrum of applications. Additionally, they all access SQL server data or database information in almost any format.

When a group works on a project, each member of the group should be able to edit documents knowing those changes will be identified and tracked. The suites' word processors all contain hefty revision-tracking and annotation tools to aid in this process. Word and Ami Pro lead here, with automatic revision marking and tracking and easily identifiable annotations in documents. WordPerfect relies on a less-transparent revision marking scheme that requires



WORK-GROUP MEMBERS CAN AUTOMATICALLY UPDATE each other's data, such as spreadsheet pages, using Borland's OBEX system. OBEX works over most common electronic mail systems.

users to compare two saved documents, but it offers fine annotation and document information tools. All three spreadsheet applications also store notes with ease, and 1-2-3 includes Version Manager, which lets users save and name annotated versions of worksheets.

For keeping data updated across the network, Borland is tops. Using OBEX, data creators can publish multiple versions of the same data. Subscribers to that data (other work-group members) can either incorporate the current data or step back to an earlier version. Lotus relies on Notes for tracking (not a realistic solution for most SmartSuite users), and Microsoft expects you to compare multiple versions of data files to keep track of changes.

Security: Keeping Private Information Private

Security means more than just keeping data safe from unauthorized people; it also means protecting against inadvertent changes made by work-group members. All three suites provide password-based encryption tools for simple security. Protecting data from inadvertent changes, however, is still the responsibility of the network manager or work-group leader. Clearly more automation is needed.



Goal 7: Headache-Free Installation

In the best of all possible worlds, installation would be a one-step, set-it-and-forget-it process.

The ideal way to install one of these massive suites would be to slip a single CD ROM in a drive and type **INSTALL**. Forget it. At the time of this writing, none of these suites offered that option. So plan to

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WINDOWS SUITES

spend 45 minutes to an hour at your computer installing one of these beasts. However, Microsoft should have a CD ROM version of Office by the time you read this, Lotus will likely offer a CD ROM version by this summer, and Borland's may be available by the time you read this. In the meantime, we continue to play the floppy disk shuffle.

Borland Office makes the process relatively straightforward: Except for Quattro Pro's Presentation Advisers add-ons, you can install all the Borland Office applications from a single program. When you start the installation, you can select which applications to install, and choose default (full), minimal, or custom installation (in which you choose the options you want to include) for each component. If you already own a particular product in the suite, you can specify the existing directory in order to update the old version. Installation goes smoothly. Floppy count: 22 disks.

When the next major revision of SmartSuite ships (likely by summer) users will have the benefit of a single integrated installation program. Until then, loading SmartSuite on your PC will continue

Buying in Bulk: Software Isn't the Issue

When it comes to selecting software by the suite, organizations looking to purchase hundreds or thousands of software licenses don't base their decisions on gee-whiz features like drag-and-drop editing, customizable tool bars, or slick mail merge. And for good reason: As vendors constantly leapfrog each other in an effort to improve ease of use and integration, corporate buyers feel it's hard to go wrong with any of the bestselling word processing, spreadsheet, and database products. "The 'best of breed' comes and goes," says Richard Koppel, a managing partner of technology at New York-based accounting glant Coopers and Lybrand. "Our suite choice had little to do with the software features themselves."

This sentiment is echoed by other quantity buyers, who also say they're generally unswayed by small differences in price. Phil Chang, an industrial engineering manager with the county of Alameda in Oakland, Callfornia, says it was more Important to find a suite that would simplify the transition from **DOS to Windows for 85 networked users** than it was to finagle a super-low price. "One suite would have cost about \$5 more per user, which wasn't enough of a difference for us to worry about," he notes.

So what are the primary concerns for the corporate buyers of suites? Integration with existing standard applications, such as E-mail, is at the very top of the list, says Chang. For example, the county of Alameda needed to purchase a suite that would operate seamlessly with its countywide installation of Microsoft Mail, as well as with other standard applications. "What's most impor-

> tant to us is that we can all pass documents effortlessly back and forth over E-mail," he notes.

> Since Chang was also seeking a solution that would make it easier for Paradox and WordPerfect for DOS users to migrate to Windows, any suite that eliminated file-conversion steps stood a better chance. "If users don't have to do a Save As to a new file format, that's one less hassle in their day," he notes. Since Borland Office worked well with Microsoft Mail and automatically converted Word-Perfect DOS files to WordPerfect for Windows format, the county ultimately opted for the Borland entry.

Mammoth companies like Coopers and Lybrand have even loftier considerations. The firm

recently reorganized into teams so that its international management staff could work on projects for Fortune 500 clients. For that reason, explains Koppel, the company wanted to select a vendor whose technology supported work-group applications. Since 5000 of the company's users already worked with **Lotus Notes, selecting Lotus SmartSuite** wasn't exactly a soul-wrenching or surprising choice. "Microsoft makes fine, rich products, but we needed a set of products that would support large numbers of people working together, and that's what Lotus is all about," says Koppel. Microsoft Office supports Notes, but the feeling at Coopers and Lybrand was that Lotus's support would be more reliable, since Notes was one of their own. But what if Koppel's company hadn't already standardized on Notes? "The decision would have been more difficult."

Koppel also cites vendors' "corporate view" as figuring in his company's decision. Although Coopers and Lybrand's employees were heavy users of WordPerfect prior to the selection of SmartSuite, Borland Office was immediately removed from the running. "If Borland and WordPerfect had really merged, Borland Office would have been a solution for us," notes Koppel. "But they simply joined up in a defensive position against Microsoft and Lotus, and one day they may decide they're competitors again." It was the "potentially competitive" combination that made the offering suspect to him.

Koppel advises companies evaluating software suites to give careful thought to how their business works. "You need to ask deep questions about your own business processes," he notes. "If you don't understand those, you might as well let everyone buy what they want."

-Bronwyn Fryer

ERIC MILLETTE



Phil Chang may be sitting in the lotus position, but when he had to pick the best software suite for 85 networked users in California's Alameda County, he chose Borland.



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to be a tedious, although not difficult, process that involves installing each one of the apps separately. Floppy count: 26 disks.

If you don't believe computing requires brawn as well as brains, try hefting one of these suite packages. Borland Office comes with 11 manuals; Lotus SmartSuite, 13; Microsoft Office Professional, 10.

Microsoft Office

Professional's one-step, integrated installation program is marred only by Access, which must be installed separately. You can choose complete, custom, or minimal installation. You can also use the Setup program to uninstall all or part of Microsoft Office. The installation program creates a new program group and also installs several new TrueType fonts. In our experience, the suite installs without a hitch. Floppy count: 33 disks.

Network Installation: Tricky Business

In the ideal suite, a sophisticated installation program would detect your network's architecture and let you set up workstation installations with a few mouse clicks. None of the suites reviewed here attain such heights.

All three suites can be run from a server on individual network nodes or installed in their entirety, via a server, on individual workstations. Putting Borland Office 2.0 on the LAN is a complex procedure best left to an experienced network administrator. And that administrator will need plenty of patience; the details on network installation span three manuals.

Lotus SmartSuite network installation, on the other hand, is straightforward. At setup, each component asks if you would like to install it on a network—a procedure that turns out to be fairly uncomplicated. But as with single-user installation, each product requires a separate installation. For ease of installation on a network, Microsoft Office is the clear winner. It's not much harder than installing on a single system, and you can automate the process by creating a custom script.



Goal 8: Lend Assistance

When the software doesn't provide enough guidance, the ideal suite will offer clear documentation and free technical support via a toll-free number.

If you don't believe modern computing requires brawn as well as brains, try hefting one of these suite packages. Borland Office comes with 11 manuals, uniformly well done and color-coded by application. The "Getting Started" booklet offers a clear explanation of how to use the DAD suite manager and covers techniques for sharing data among applications. Even so, "Building Spreadsheet Applications," "Database Desktop Guide," and the "Quick Refer-

ence Guide" are all missing from Quattro Pro, though the information is available via online help. The three manuals will run you \$14.95.

Lotus SmartSuite

is also awash in documentation—13 booklets' worth. In addition to a getting-started guide for the overall suite, each of the five suite programs has its own manual and a slew of extra booklets. While the manuals themselves are fine, they're not particularly consistent. For instance, the package includes quick reference cards for only two of the applications.

Microsoft Office Professional's documentation weighs in at 10 manuals. Each product has its own manual, and a hefty "Getting Started" manual provides installation instructions, an overview of the applications in the suite, and lots of specific examples on how to use the products together.

Talking to Tech

Sometimes all the Coaches, Wizards, Tutorials, and documentation in the world aren't enough. That's when you just need plain old-fashioned human tech support. If you own Borland Office, you have to pony up an annual fee of \$129 for Quattro Pro and Paradox support. WordPerfect support is free for the first 180 days, then costs \$2.50 per minute, with a maximum of \$25 per phone call. You can call a single help line for installation and configuration information. For product-specific help, you must call either WordPerfect or Borland. Borland Office does, however, offer a variety of free tech services including help with installation, toll-free automated support and fax-backs, a bulletin board, and forums on CompuServe, GEnie, BIX, and Internet.

Lotus comes through with toll-free telephone support for the first three months at no charge, but after that it's \$129 per year. Worse, you have to call different numbers for each application. And while support for 1-2-3 runs 24 hours a day, the other applications offer only 11½-hour-per-day, five-day-a-week support. Fax-back service and automated support are free and available 24 hours a day via toll-free numbers. Lotus also maintains a bulletin board service and a support forum on CompuServe.

Microsoft Office's helping hand has by far the longest reach, with free, unlimited support via a single tech support number. The downside: It's a toll call, and help is available only on weekdays for 12 hours per day. You can also get free help via a toll-free fax-back service, through an automated voice-support system, or through CompuServe and Internet. Microsoft offers a variety of other options, from \$2-per-minute, 24-hour-a-day priority service, to yearly technical support contracts.



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- S3[™] 805 graphics accelerator
- 6 slots (2 VESA-VL, 4 ISA)

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DECpc LPx 560

Pentium 60MHz processor
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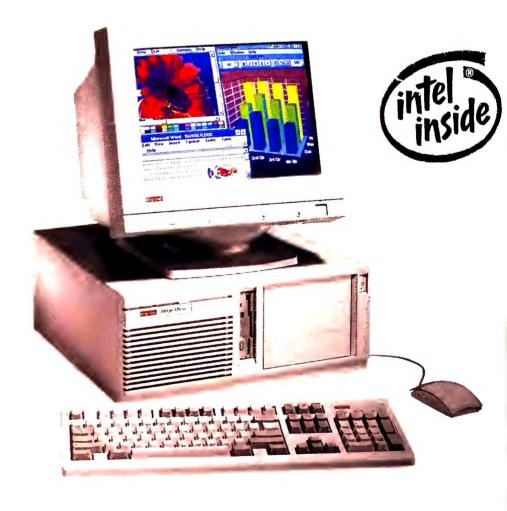
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The Wall Street Journal, October 15, 1993-McKinsey & Co. and Intelliquest Inc.

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50 WORD PROCESSING

So you think you know your word processor? Hah. Today's word processing apps are so feature-packed, most users only scratch the surface of their program's capabilities. With new versions arriving every 12 months or so, there's more you don't know all the time.

And we're not talking about weird stuff like adjusting kerning pairs inside footnotes we're talking about eminently practical features that could make your daily work life easier and more productive.

So whatcha gonna do? If you're smart, you'll take a good long look through the pages that follow. We've collected a bunch of tips for the three Windows packages our readers use most-Microsoft's Word for Windows, Lotus's Ami Pro, and WordPerfect for Windows. For you DOS diehards, we also collected a small batch of tricks for the venerable WordPerfect for DOS.

We were looking for three kinds of tips: those that take advantage of new features, those that put existing tools to new uses, and those that overcome each program's deficiencies. So read on. You may not root out all there is to know about your word processor, but you should be a step closer.

WORD FOR WINDOWS

Formats Found. Every user should know how to find and replace formatting such as paragraphs and tabs. In Word 2.0, just select Edit • Replace, then, in the Find What box, enter the appropriate code for the formatting you want to find. For example, ^p finds paragraph marks, "t finds tabs, and "w finds any combination of spaces, tabs, and paragraph marks (for other coding, check "Searching for tabs, paragraph marks, and other special characters" in Word's Help). In Word 6.0, the search is easier: Just select Edit • Find • Special and pick the formatting you want from the list.

Best Footer Forward. Want to create a \angle footer that reads 'Page *n* of *nnn*', where nnn is the total number of pages in the document? To do this in Word for Windows, select View • Header/Footer and type Page followed by a space. Click the @ icon to insert the current page number, then type a space followed by of and another space. Now select Insert • Field and choose NumPages from the Field Names list. Click OK, and you're done.

3 Funny Characters. In the past, Word users who wanted to insert international characters into their documents had to use the Insert Symbol dialog box or have a good memory for ANSI character codes. In Word 6.0, these characters are an easy keyboard

shortcut away. The trick is to use the <Ctrl> key in combination with certain punctuation marks, followed by the letter you want accented. For example, to put a tilde over an n, press < Ctrl>-~, then n. See the list below to find the key combinations for the most common accents and characters. You'll find a complete list of special-character keystrokes on page 49 of the Word 6.0 manual.

By default, Word supports accents on lowercase letters only. To accent uppercase letters, select Tools • Options • Edit, then check Allow Accented Uppercase and select OK. Also, some fonts don't support accents; if these keystrokes don't produce the character you want, you may have to try another font.

CHARACTER	EXAMPLE	KEYSTROKES	
grave accent	à	<ctrl>-`a</ctrl>	
acute accent	é	<ctrl>-'e</ctrl>	
circumflex	ô	<ctrl>-^o</ctrl>	
tilde	ñ	<ctrl>-~n</ctrl>	
umlaut	ü	<ctrl>-:u</ctrl>	
circle over a	å	<ctrl>-@a <ctrl>-,c</ctrl></ctrl>	
cedilla	Ç		
slashed o	Ø	<ctrl>-/o</ctrl>	
inverted?	خ	<ctrl>-<alt>-?</alt></ctrl>	
inverted!	i	<ctrl>-<alt>-!</alt></ctrl>	
German double-s	ß	<ctrl>-&s</ctrl>	

Line Up Those Captions. The trick to align-4 ing captions precisely under graphics is to use a two-cell table. Import the graphic into the upper cell, type the caption in the cell below, and voilà—perfect alignment.

To do this in Word for Windows, choose Table Insert Table to create a table one column wide and two rows high. Set the Column Width to Auto. Then select Table • Cell Height and Width and set the height of both rows to Auto. Use Insert • Picture to insert a graphic in the top row, then move to the cell below and enter your caption.

Typing Shorthand. Word for Windows 6.0's biggest wow feature is AutoCorrect: If you type teh followed by a space or punctuation mark, you'll get the. But AutoCorrect's talents don't stop there.

For example, if you frequently use hardto-type words like esophagogastroduodenoscopy, or boilerplate entries like 'the party of the first part, hereinafter referred to as PLAINTIFF', AutoCorrect could make your life easier. Highlight the oft-typed word, phrase, or even sentence, select Tools • AutoCorrect, and type an easy-toremember letter combination—say, ee for esophagogastroduodenoscopy-into the Replace box. Make sure the Replace Text as You Type option is checked, and click OK. Now, whenever you type your shorthand entry followed by a space or punctuation mark, Word will insert your replacement.

The one downside to this technique: Word saves your AutoCorrect entries in the NORMAL.DOT style template; on some systems, Word will slow to a crawl if this template gets too large. However, we know some users who are up to 800 AutoCorrect

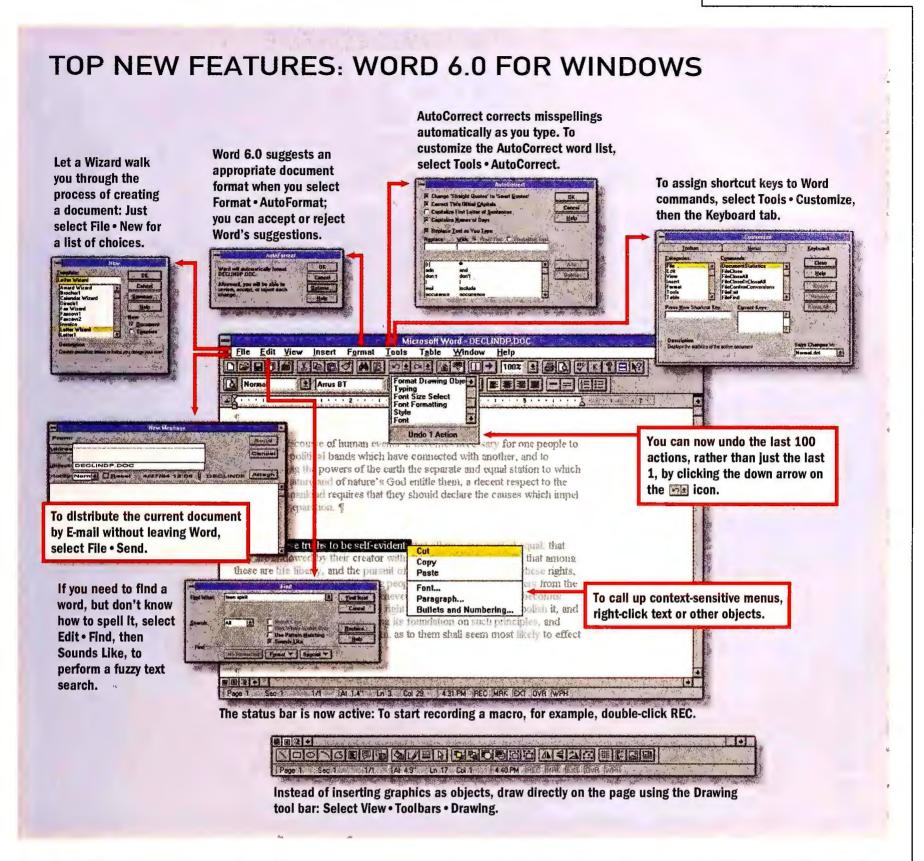
> entries-some of them four sentences long-

with no ill effects.

SMARTCUTS Word 6.0 for Windows

ACTION	KEYSTROKE
Select one word	Double-click word
Select multiple words	Double-click first word, hold down left mouse button and drag
Select one paragraph	Triple-click paragraph
Select multiple paragraphs	Triple-click first paragraph, hold down left mouse button and drag
Select whole document	<ctrl>-A</ctrl>
Auto-format	<ctrl>-K</ctrl>
Copy formatting	<ctrl>-<shift>-C</shift></ctrl>
Paste formatting	<ctrl>-<shift>-V</shift></ctrl>
Change letter's case	<shift>-<f3></f3></shift>
Select font	<ctrl>-<shift>-F</shift></ctrl>
Select font size	<ctrl>-<shift>-P</shift></ctrl>
Select style	<ctrl>-<shift>-S</shift></ctrl>
Apply normal style	<ctrl>-<shift>-N</shift></ctrl>
Move to previous revision	<shift>-<f5></f5></shift>

Capital Advice. Auto-Correct automatically fixes one of the most common typing errors: starting a word with two capital letters when only the first should be uppercase. Unfortunately, Word applies the rule uniformly, so correctly double-capped entries such as PCs and MHz are changed to the incorrect Pcs and Mhz. You could turn the Correct TWo INitial CApitals option off in the Tools • Auto-Correct dialog box, but



then AutoCorrect wouldn't fix the double caps you don't want. The solution? In the AutoCorrect dialog box, under Replace, type **Pcs**, and in the With box, type **Pcs**. Follow this procedure for any exceptions you encounter regularly.

7 Signing Bonus. AutoCorrect tip number three: Are you wearing out your hand signing 50 letters a day? Use AutoCorrect to drop your signature (or any other graphics image you use often) into your documents.

To pull off this neat little trick, open any Word document that contains your scanned-in signature; if necessary, insert your signature from a graphics file into a blank Word document. Click the signature to select it, and then choose *Tools • AutoCorrect*. Word

will automatically place the selected graphic in the With box (although you may not be able to see it). All you have to do is type a shorthand abbreviation in the Replace box and then select *OK*. One note, though: Don't use a valid word as the abbreviation, or you'll have your signature popping up every time you type that word. One good way to avoid this is to add a number to a word. Try abbreviations such as logo1 or image2 to avoid problems.

Footers Continued. It looks slick to have the word *Continued* at the bottom of the page, but how do you get it to print on every page except the last? In Word 2.0, select *View • Header/Footer • Footer • OK*. In the footer display, press **Ctrl>-<F9>** to insert field

braces, and type IF inside the braces. Press <Ctrl>-<F9> again and type NUMPAGES inside the resulting field braces. Press the <Right> cursor key once to position the cursor outside the closing brace of the NUMPAGES field, and type >. Then press <Ctrl>-<F9> and type PAGE inside these field braces. Press the <Right> cursor key once to position the cursor outside the closing brace of the PAGE field, and type a space followed by "Continued". The finished entry should look like {IF{NUMPAGES}>{PAGE} "Continued"}. Press <Ctrl>-R to right-justify the footer, then select Close, and you're ready to print.

The steps are similar if you're using Word 6.0. Just make sure you remove any extra spaces that Word inserts when you type text in the Footers box.

WINDOWS WORD PROCESSING

9 Customized Menus. If you access a particular file regularly from Word 6.0, why not make it a permanent fixture in the File menu? To do so, start by pressing **Ctrl>-<Alt>-<Equal>**. When the pointer becomes a plus sign, select *File • Open*. Click your file's name once, then choose *Cancel*. The name of the file will now appear in the File menu, right below Exit.

To remove your new menu entry, press <**Ctrl>**-<**Alt>**-<**Hyphen>**. Your cursor will become a minus sign. From the File menu, choose the file name, and the entry will be gone. You need to be careful about using this

removal technique: If you choose something like File•Open by mistake, you'll erase Open from your File menu.

10 Faster Shortcut Assignments. It's often a lot faster to hit a key combination than to dig through menus. Word 6.0 gives you a quick and easy way to assign shortcut keystrokes to commands.

Start by pressing **<Ctrl>-<Alt>-<Gray Plus>**. This will change the cursor into **%**. Then select the desired menu item or icon. When the Customize dialog box opens, hold down **<Ctrl>** and/or **<Alt>** and/or **<Shift>** plus a char-

acter key. That key combination will appear in the Press New Shortcut Key box. Below the box you'll see the action the key combination currently designates. If you don't want to use that key combination, press **<Backspace>** and try a different one. When you have what you want, select Assign • Close—your command will be just a couple of keystrokes away.

11 Getting the Length. Word's File • Summary Info • Statistics dialog box tells you the number of characters in an entire document. To get a character count for just

WORDPERFECT FOR DOS

Running Smarter. You should have at least 4MB of disk space to run Word-Perfect 6.0 for DOS. The required minimum memory is 480K if you're using text mode, and 520K for graphics and page modes. But these are bare minimums. In reality, you should free up at least 500K for text mode and 550K for graphics and page modes.

One way to save memory: Don't start Word-Perfect 6.0 from a DOS shell. Launching the program from the DOS prompt can give you as much as 100K more conventional memory, depending on which shell program you use. For example, version 4.0 of the Word-Perfect shell limits WordPerfect 6.0's memory usage to about 40 percent of what's available, to allow use of hot keys.

Some of version 6.0's optional functions can bring a marginal system (a 286 or 386) to its knees. To speed things up, turn off the unnecessary add-ons. Select *View* and turn off the ribbon, outline bar, button bar, horizontal scroll bar, and vertical scroll bar. Next, be sure hyphenation is turned off. Press <Shift>-<F8> and then 1 (or L) to see the Line setup box. If hyphenation is on, press 6 to toggle it off.

Quick Cutting. There's more to cutting and pasting than many users realize. Let's say you want to cut a block of text and paste several copies of it elsewhere. Select the block (see tip 14 for quick blocking techniques), cut it by pressing <Backspace> (followed by Y in version 5.1), move to the first insertion point, and paste the block by pressing <F1>R. To repaste the same block, move to the second insertion point and

press <F1>R again. WordPerfect stores the last three cuts you made. To paste the second or third of these cuts, press <F1>P until the text you want appears at the insertion point; then press R.

14 'Round the Block. How well do you block? Most users press <Alt>-<F4>, then use the cursor keys to block text. But there's always been a smarter way to do it. Use one of the keystroke sequences in the list below instead.

<alt>-<f4> THEN</f4></alt>	SELECTS
Any character	everything to next instance of that character
<space></space>	to next word
<period></period>	to next sentence
<enter></enter>	to next paragraph
<home><end></end></home>	to end of line
<home><down></down></home>	to end of screen
<home><home><down></down></home></home>	to end of document

15 Adding Multiple Attributes to Text. Ever wanted to add multiple attributes such as boldface and underlining to a block of text? Here's a quick way. Select the phrase you want to format (see tip 14). Press <F6> to boldface the selection; then, without moving the cursor, press <Alt>-<F4>, followed by <Ctrl>-<Home> twice, to reblock the text. Then press <F8> to add underlining.

16 Many Happy Returns. Want to see hard returns in a document without opening the Reveal Codes window? The DOS versions of WordPerfect not only let you see hard returns in the editing window, they also

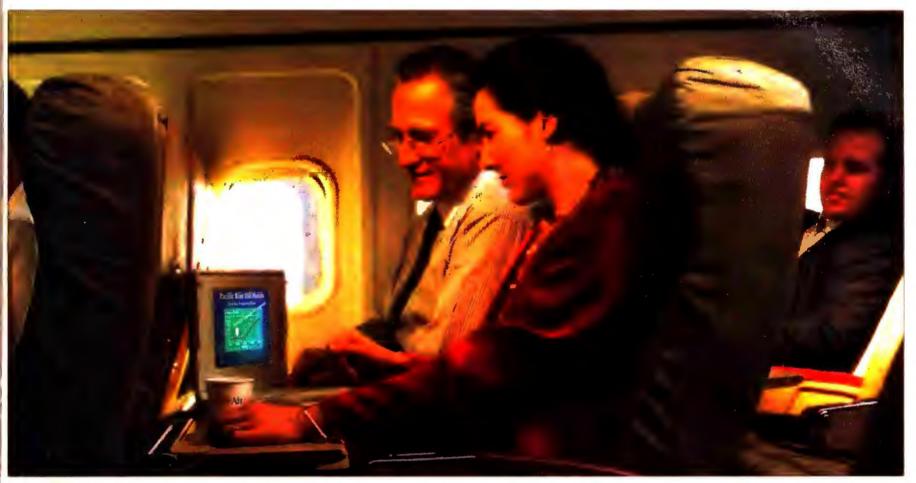


let you specify which character will stand in for the returns. To do this in version 5.1, press <Shift>-<F1>DEH to get to the Hard Return Character prompt. Now press <Ctrl>-2 to enter compose mode. To specify the return character, enter the number code for any character in any WordPerfect character set—4,2, say, to get a small black box (consult your WordPerfect manual for a list of character codes).

In version 6.0, press <Alt>-V, and then ND<Enter>. You can press <Ctrl>-2 to enter compose mode and then compose a character, as in version 5.1, or you can press <Ctrl>-W, then S, pick a character set from the list, and select a character from your chosen set.

Numeric Variables. To repeat an oftused word or phrase quickly in Word-Perfect, assign it to a numbered variable. Start by highlighting the phrase (it can be up to 128 characters long). Press <Ctrl><Page Up>. In version 5.1, enter the number you want to assign to the phrase and press <Enter>; in version 6.0, press 1 to select Assign Variable, and then enter the number in the Variable box. To recall the text in either version, hold down <Alt> and type the number you assigned. The phrase will appear at the cursor location.

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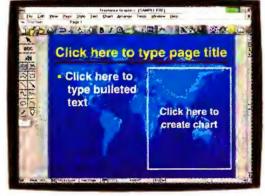


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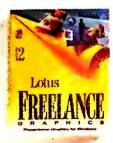
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WINDOWS WORD PROCESSING

part of a document, you can create a short macro. Start by selecting *Tools • Macro* and typing a name in the Macro Name box (try **CharCountPartial**). Click *Edit* if you're using Word 2.x, *Create* if you're running Word 6.0. Between the lines Sub Main and End Sub, add the line **Print Len(Selection\$())**. Close the macro window, and select *Yes* to save the macro. If you wish, you can assign a shortcut key or icon to the macro using Tools • Options (Word 2.x) or Tools • Customize (Word 6.0).

To count characters, just highlight a section of text and run the macro. The count for the selected section will appear on your status line. Note that while Word's built-in document statistics utility counts printing characters only, this macro counts both printing and nonprinting characters (such as spaces, tabs, and hard returns).

18 Dashing Documents When you want to show a range, as in 1994–1995, do you use a plain old hyphen? To be typographically correct, you should try using an en dash (—) instead. To insert an en dash using Word 2.x, hold down the <Alt> key and, with Num Lock on, press 0150 on the numeric keypad. When your document calls for an em dash (—), try <Alt>-<NumPad 0151>. Word 6.0 makes inserting dashes even easier. For an en dash, press <Ctrl>-<Gray Minus>; for an em dash, press <Ctrl>-<Alt>-<Gray Minus>. (This tip works with other word processors, too.)

19 When Smaller Is Better. If you insert a graphic into a document, Word 6.0 stores a copy of the graphic in your word processing file. While this is OK when you're sending the document to another user, it can

When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected the earth t nature and the opinio causes whi We hold th created eq certain uni and the pu governmen owers fro form of go the right of the people to alter or abolish it, and to institute new government, laying its foundation on such principles, and

WORD 6.0 FOR WINDOWS' AUTOCORRECT does more than fix typos; use it to create shorthand entries for oft-typed words (see Tip 5).

create huge document files and waste disk space on your PC. If you'll be the only one working on the document, and the graphics files will always be in the same subdirectory, you should set up a link to it instead.

To establish this link, start by selecting Insert • Picture. Click the image's file name one time. Now check Link to File, uncheck Save Picture in Document,

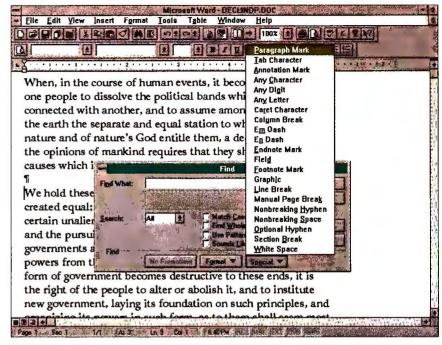
and select OK to finish the job. Unfortunately, you can't make these options the default; you have to create a link for each picture in each Word document.

20 Open Says Me. Want Word to automatically open the last file saved or opened in your previous session? Select the Word icon in Program Manager, press -<Enter">Alt>-<Enter to bring up the Program Item Properties dialog box, and, in the Command Line box, add /mFile1 to the end of the existing line. A typical entry would then read: C:\WINWORD\WINWORD.EXE/mFile1. The next time you start Word, the last file you worked on will be open and ready for you.

21 Directions to a Directory. Word is egotistical: It always displays the Win-Word directory first when you save or open a

file. If you routinely look elsewhere for documents, why not just change the Word default file locations?

In Word 6.0, you select *Tools • Options* and click *File Locations*. In the File Types list box, you choose *Documents*, click *Modify*, and select the directory of your choice in the Modify Location dialog box. Click *OK • Close*.



FINDING AND REPLACING FORMATTING in Word 6.0 for Windows is simple—just select Edit • Find • Special (see Tip 1).

Word 2.x takes a somewhat clunkier approach: Again, start by selecting Tools • Options, then press W to view Word's start-up options in the WIN.INI file. Highlight the text in the Option box, and overwrite it by typing DOC-path. Tab to the Setting box and type the name of the drive and directory you want Word to go to first. Click Set • Close, then exit and restart Word.

Word for Windows with inches as the default measurement. That's fine until you need to work with another unit of measurement, such as points (for line spacing) or centimeters (for a metric paper size). Don't despair—you don't have to change the units of measurement for your entire document. Just type the number, followed by the appropriate abbreviation, in any dialog box that asks for measurements, and Word will calculate the equivalent measurement in inches. See the table below for a list of the abbreviations to use.

MEASUREMENT	ABBREVIATION	
Centimeters	cm	
Inches	in	
Lines	li	
Picas	pį	
Points	pt	

23 The Well-Centered Document. Single-page documents generally look best centered vertically on the page. This was a bear of a job in previous versions of Word, but version 6.0 has tamed the beast. Position the cursor on the page you want to alter. Se-

THE COMM PROGRAM FOR THOSE WHO INSIST ON TAKING THE EASY WAY OUT.

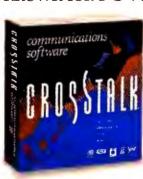
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COMPAQ AND MICROSOFT. THE CONNECTION THAT'S MAKING "PLUG AND PLAY" A REALITY.

ust about everyone who's ever used a computer has experienced the same thought: Wouldn't it be great if setting up or upgrading your machine was as easy as turning it on?

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Which means no more configuration headaches. No more hidden switches, cryptic codes or mystery.

Even today, Compaq is shipping computers that will take full advantage of Plug and Play technology as soon as the forthcoming version of Windows is available. So the Compaq & Windows combination will quickly become the standard for Plug and Play computing. A welcome reassurance for people who buy computers.

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WINDOWS WORD PROCESSING

lect File • Page Setup, select the Layout tab, and choose Genter or Justified in the Vertical Alignment drop-down list. The Center setting positions the block of text in the middle of the page. Justified distributes the spacing so the first line abuts the top margin, and the last line sits on the bottom margin.

When you select OK, Word automatically adds any necessary section breaks to the document and adjusts the spacing. If you don't see the new alignment on your screen, select $View \bullet Page\ Layout$. If you want to adjust the vertical alignment for multiple pages, select the text on the pages you want to realign before choosing $File \bullet Page\ Setup \bullet Layout$.

AMI PRO

24 Formats Found. Ami Pro's formatting search tools aren't as extensive as Word's. To find and replace paragraph marks, choose *Edit* • *Find* & *Replace* and, with the insertion point in the Find box, press < Ctrl> < Enter>. To find and replace tabs, follow the same procedure, but use < Ctrl> < Tab> in the Find box instead.

25 Best Footer Forward. To create a 'Page n of nnn' footer in Ami Pro 3.0, first select $Page \bullet Header/Footer \bullet Footer \bullet OK$. Then select $Page \bullet Page$ Numbering. In the Leading text box, type Page followed by a space, and click OK. Add another space and type the word of followed by another space. Choose $Edit \bullet Insert \bullet Doc Info Field$, then select Number of Pages from the scrolling list, and click $Insert \bullet Caucel \bullet OK$.

ASSIGN DIFFERENT COLORS TO DIFFERENT STYLES in Ami Pro to make sure that they're appearing where you want them (see Tip 28).

Funny Characters. 40 If you want to use accented or other special characters in Ami Pro, your simplest option is to run the TYPECHAR-.SMM macro that comes with Ami Pro. Select Tools • Macros • Playback, pick TYPECHAR.SMM from the list of macros in the Macro directory, and then click OK. TYPE-CHAR.SMM adds a new menu item, Chars, to the menu bar.

Now, to add a special character, all you do is select *Chars* • *Select Characters* and then pick the character you want from the list. To add more than one character, click *Insert*, then select the next character; you finish by clicking *OK*. You can easily access characters that you use often by

adding them to the Chars menu or assigning them shortcut keyboard combinations.

27 Line Up Those Captions. The trick to aligning captions under graphics in Ami Pro is generally the same as in Word, but the details change.

Choose *Tools • Tables*, and in the Create Table dialog box, specify a table one column wide and two rows deep, then click

OK. Next, you select Table • Modify Table Layout, then uncheck the Automatic box in the Default Rows section, and click OK. Use the mouse to resize the top cell as needed to fit your graphic, and choose File • Import Picture to import the graphic you want to use. When the graphic is in place, just type the caption text in the cell below, and you're done.

SMARTCUTS Ami Pro 3.01

ACTION	KEYSTROKE
Select word	Double-click word
Select one sentence	<ctrl>-click sentence</ctrl>
Select multiple sentences	<ctrl>-click first sentence, hold down left mouse button and drag</ctrl>
Select one paragraph	<ctrl>-double-click paragraph</ctrl>
Select multiple paragraphs	<ctrl>-double-click first paragraph, hold down left mouse button and drag</ctrl>
Move to beginning of sentence	<ctrl>-<comma></comma></ctrl>
Move to beginning of next sentence	<ctrl>-<period></period></ctrl>
Search and replace text	<ctrl>-F</ctrl>
Insert glossary entry	<ctrl>-K</ctrl>
Move paragraph below the next paragraph	<alt>-<down></down></alt>
Move paragraph above the preceding paragraph	<alt>-<up></up></alt>
Modify style	<ctrl>-A</ctrl>
Apply normal style	<ctrl>-N</ctrl>
Auto-format	<ctrl>-T</ctrl>
Toggle between full-page and page-layout views	<ctrl>-D</ctrl>
Display draft view	<ctrl>-M</ctrl>

28 Color Your Styles. If your document contains two alternate paragraph styles (such as questions and answers), you can temporarily change the colors for each style—from black, say, to red and blue. It makes the whole thing much easier to proof; you can instantly see a misplaced style, and you can easily change the colors back to black at any time. Use the same technique to draw attention to section headers, quotations, and other special text while editing your document.

29 Check the Spelling Checker. Sometimes errors and duplicate words can creep into your user dictionary. How do you fix them? Spell check the spelling checker.

Start by renaming the user dictionary file, LTSUSER1.DIC (which should be in the \AMIPRO directory), as CHECK.DIC. Load Ami Pro, choose File Open, select Email as the file type, and then select CHECK.DIC as the file to open. Choose Tools Spell Check to check the file. As Ami Pro checks CHECK.DIC, it will stop at each entry to ask if you want to replace the word, skip it, or add it to the user dictionary. Each time Ami Pro stops, check the word's spelling yourself. If it is spelled correctly, click Add

to dictionary; if not, click Skip. If Ami Pro tells you a word is the same as the one before it, don't add it to the dictionary. Ami Pro will automatically create a new copy of LTSUSER1.DIC containing a correctly spelled, unduplicated version of your custom word list.

30 Speed Up Screen Scrolling. Imported graphics in a document can cause the screen to repaint slowly when you edit or scroll through. To speed up the process, try this: Choose *Tools • SmartIcons* and locate the Show/Hide pictures icon in the Available icons list box. Drag the icon to the current icon palette and choose *OK*.

The next time you need to edit a file with a bunch of graphics images, or to move graphics frames, just click the *Show/Hide pictures* icon so that the 'X' disappears from its face. All frames containing graphics will now appear with a large 'X' in place of the picture. When you're ready to display the pictures again, click the icon so the 'X' appears again.

31 Layout Grid. If you use Ami Pro for page layout, you may want a grid to help align frames and other elements. While Ami Pro doesn't have formal grid tools, you can use the border of the Styles box as a straight-edge ruler.

To do so, choose View • Show Styles Box, then size the box into a thin rectangle stretching across or up and down the page. To position the box precisely on the page, use Ami Pro's built-in rulers: Choose View • View Preferences • Vertical ruler • OK and select View • Show Ruler. You can now align the Styles box with the appropriate ruler. Just position the mouse pointer in the Styles box's title area and drag the box to the desired position on the page.

32 More Information From the Status Bar. You can use the status bar on the bottom of your Ami Pro window to get all kinds of information. Just click anywhere in the section of the status bar to the right of the font box to display the path and file name of the current document, the time and date, and the current line, column, and page.

33 Hard Spaces. Use a nonbreaking space to tell Ami Pro to keep two or more words on the same line. For example, to have *New York* always appear on one line,

type New, press <Ctrl>-<Space>, and then type York. From now on, the paired words will stay together on the same line.

34 Text Repellent. Want to make sure text doesn't stray into certain areas of a page—say, the upper part of your letterhead where your logo goes? Use a frame. First, select Frame • Create Frame. Next, click Manual and use the mouse to size and position the frame in the area you want to keep clear. Now choose Frame • Modify Frame Layout and select either Wrap around (if you want to allow text next to the frame) or Nowrap beside (if you don't). Finally, click Lines & shadows, deselect all the check boxes in the Lines section, select None under Shadow, and click OK.

35 Improving Printing Speed. If you want to regain control of your system when printing in Ami Pro, select Tools • User Setup • Options and make sure Print in background is checked. This setting will slow down printing slightly, but will also let you get back to work sooner. If you're more concerned with getting your printouts as quickly as possible and don't mind relinquishing your system for a bit, disable this background printing option.

In either case, it's important for you to turn off the Windows Print Manager; enabling both Ami Pro's Print in background option and the Print Manager will result in the longest printing times.

36 A Better Place for Smarticons. Ami Pro's SmartIcons are great but can sometimes get in the way, particularly if you

have to reduce the Ami Pro window to keep another application visible. If you have a high-resolution display, here's a technique that will let you move the icons out of the way without getting rid of them altogether.

Start by selecting Tools • SmartIcons.

Next, in the Position drop-down list, choose the Floating option, then click OK. Make sure that

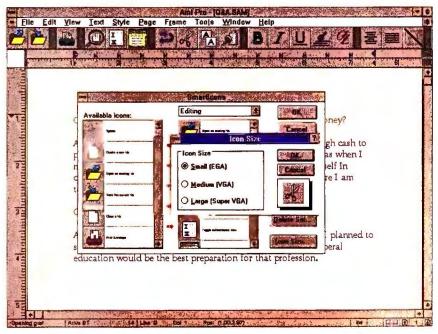
you've resized the Ami Pro window so it doesn't fill your entire screen, then just drag the SmartIcon bar off the Ami Pro Window and onto your desktop. All the buttons still work, but you'll have more room in the Ami Pro window for your documents. Another option: Press **<Ctrl>-Q** to toggle the Smart-Icons on and off.

37 Mo' Better Icons. Frustrated because you can't see as many icons as you'd like on the SmartIcon bar? Fret not, we may have a solution for you. Select Tools • SmartIcons and click the Icon Size button in the SmartIcons dialog box. Then choose the Small (EGA) option in the next dialog box. You can use these tiny icons on any VGA-orbetter monitor and you'll even have room to add more icons to each SmartIcon set.

Specifying a Backup Directory. If you've been finding that errant Ami Pro document files are turning up in your root directory, it may be because you have the Auto backup option selected in the Tools•User Setup dialog box but haven't specified a backup directory. In order to rectify the situation, choose Tools•User Setup•Paths, enter an appropriate path in the Backup box, and click OK.

39 Put the Custom Styles First. Tired of wading through the long list of Ami Pro's built-in style sheets to find your custom style sheets when you select File•New? You can make yours appear first just by renaming them.

The names of the files containing Ami Pro's style sheets all start with an under-



FIT MORE ICONS ON THE SCREEN in Ami Pro by making them smaller; use Tools • Smartlcons • Icon Size (see Tip 37).





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advanced communications

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score (_default.sty, for example). When DOS sorts, it puts symbol characters—including the underscore—ahead of letters or numbers. To make your own style sheets appear at the top of the list, just start their names with a symbol that displays before the underscore. These symbols include !, #, \$, %, &, (, and ^. With any one of them as the first character in each of your sheets' file names, your styles will come out on top of the File•New style sheet list.

40 Customize Your Style List. To make the list of style sheet files less cumbersome, create a new directory, C:\AMIPRO\STYLES2. Now move all but your most frequently used style sheets into this new directory. The moved styles will still be available, but won't clutter up your screen. If you want to use a style sheet from the STYLES2 directory, choose Tools • User Setup • Paths and specify C:\AMIPRO\STYLES2 as the style sheet path.

WORDPERFECT FOR WINDOWS

41 Formats Found. WordPerfect for Windows gives you more options for replacing formatting than Ami Pro or Word. In version 5.2, press <F2> to bring up the Search dialog box, click *Codes*, and pick the

formatting code you want from the list. In version 6.0 you get to the code list by selecting *Match • Codes* in the Search dialog box.

Best Footer Forward. WordPerfect 5.2 42 for Windows doesn't have an easy way to create a 'Page *n* of *nnn*' footer. But the job is simple in version 6.0, thanks to its PAGEXOFY.WPM macro. Just before you're ready to print your document, select Tools • Macro • Play. (If you did a custom installation of WordPerfect and didn't install the macros, you'll have to run Install again to add them.) Press < F4> to display a list of available macros, pick PAGEXOFY.WPM from the File Name list in the Select File dialog box, and then click OK. Click Play in the Play Macro dialog box. In the Page X of Y Macro dialog box, click the Position button to place your page numbers. Drop down the Format list to choose a layout. When you're done, click OK.

43 Funny Characters. It's a snap to insert special characters if you use Word-Perfect 5.2 and 6.0 for Windows, because both versions of the program ship with a healthy selection of unusual character sets, including the Arabic, Greek, Hebrew, and Cyrillic alphabets.

To insert a special character, start by pressing **<Ctrl>-W**. Then pick the character

set you want from the pop-up list; for accented characters, *Multinational* (in 6.0) or *Multinational* 1 (in 5.2) are good bets. Scroll through the character list until you find the one you want, then select *Insert* to insert the character, or select *Insert* and Close to insert the character and close the dialog box.

Line Up Those Captions. The trick of using a table to align captions and graphics described for Word and Ami Pro works in Word-Perfect for Windows, too. Here's how to do it:

To start, select *Table* • *Create* (in 6.0) or *Lay-out* • *Tables* • *Create* (in

5.2). Specify one column and two rows, and click *OK*. Next, select *Graphics* • *Figure* (in 6.0) or *Graphics* • *Figure* • *Retrieve* (in 5.2) and select the graphics file you want to insert in the upper cell. To finish, enter your caption text in the lower cell.

45 Editing Tool Bar Icons. The icon-editing feature in WordPerfect 6.0 for Windows' tool bars can be handy, but editing the icons is no trivial task. Here's how to do it: Right-click the button you want to edit, and click Edit in the pop-up menu. With the Button Bar Editor dialog box on screen, move the pointer back to the button bar and double-click the button. When the Customize Button dialog box appears, click Edit to bring up the Button Bar Image Editor, which works much like any graphics editor. Pick a color from the palette, select the draw or fill option, and then just click and drag the mouse pointer. When you're satisfied with the look of your redesigned button, select OK, and you're done.

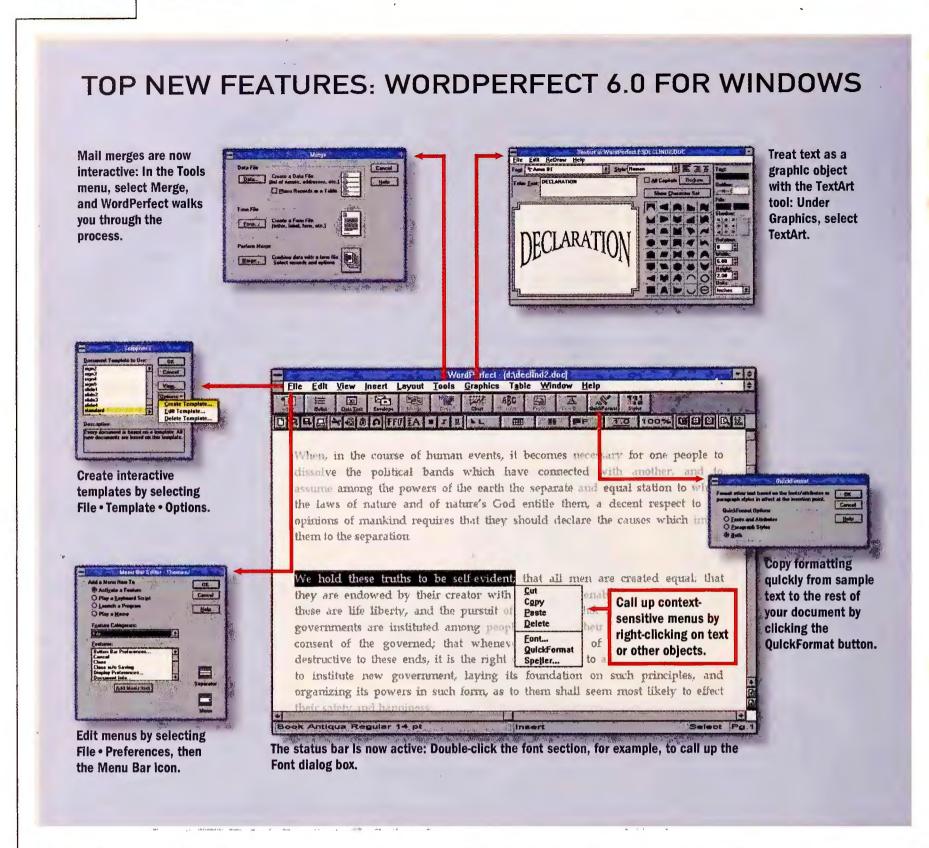
46 feature is one of the coolest new tools in both the DOS and Windows versions of WordPerfect 6.0. You can use a QuickMark to mark a location in your document, then return instantly to that location from anywhere in the document. To set a QuickMark in the Windows version, press <Ctrl>-<Shift>-Q. To return the cursor to your QuickMark, press <Ctrl>-Q. In the DOS version, set a QuickMark by pressing <Ctrl>-Q and jump to it by pressing <Ctrl>-F. One caution, though: You can have only one QuickMark at a time; setting a new one deletes the previous mark.

47 Picking Up Where You Left Off. How would you like WordPerfect to load the documents you were working on when you last shut down, with the cursor in exactly the same position? WordPerfect 6.0 for Windows can do just that.

Start by selecting File • Preferences, then double-click the Environment icon in the Preferences dialog box. In the bottom left corner of the Environment Preferences dialog box, select one of the Save Workspace options. Prompt on Exit is probably your best choice: Each time you exit the program, it will ask whether you want the current work space loaded the next time you start up. When you're done, just click OK and Close in the Preferences dialog box.

SMARTCUTS WordPerfect 6.0 for Windows

ACTION	KEYSTROKE
Select word	Double-click word
Select sentence	Triple-click sentence or click left margin
Select paragraph	Quadruple-click paragraph or double-click left margin
Search for text	<f2></f2>
Search and replace text	<ctrl>-<f2></f2></ctrl>
Change font	<f9></f9>
Set margins	<ctrl>-<f8></f8></ctrl>
Select a style	<alt>-<f8></f8></alt>
Save open file to a different name, directory, or format	<f3></f3>
Spelling checker	<ctrl>-<f1></f1></ctrl>
Thesaurus	<alt>-<f1></f1></alt>
Grammar checker	<alt>-<shift>-<f1></f1></shift></alt>
Show/hide ruler bar	<alt>-<shift>-<f3></f3></shift></alt>
Show/hide menu, scroll, ruler, power, button, and status bars	<alt>-<shift>-<f5></f5></shift></alt>
Show/hide nonprinting characters	<ctrl>-<shift>-<f3></f3></shift></ctrl>



48 Working With 256-Color Displays. If you have trouble running WordPerfect 6.0 for Windows in 256-color video mode, try this: With WordPerfect not running, click the program's icon once to select it in the Windows Program Manager. Select File • Properties, move to the Command Line text box, and type a space and /FL at the end of the current command line. The /FL parameter helps WordPerfect work with certain video display drivers. Your screen may flash a bit when you edit and scroll, but it's better than crashing.

49 Where's the BIF? WordPerfect 6.0 for Windows uses a BIF file to store its parameters. If WordPerfect experiences a general protection fault, this BIF file can become corrupted, and, as a result, Word-

Perfect won't run. The only solution is to delete the file. Of course, deleting the BIF file means you'll lose all of your customized preference settings. That's why you should be sure to back up your BIF file regularly.

For New and Improved? One of the best features of WordPerfect 5.2 for Windows was its built-in file manager. Unfortunately, WordPerfect chose to replace that utility with a new file manager in version 6.0 of the program. If you're one of the users who would rather not use the new file manager, you can replace it with Windows' own WINFILE. EXE or any other file management utility.

To make this substitution, right-click the button bar from which you want to launch the new file manager. Select *Edit* from the

pop-up menu and Launch a Program from the Button Bar Editor dialog box. Click Select File and enter winfile.exe (or the name of another file manager) in the Filename box. Click $OK \bullet OK$.

Dan Miller is an assistant editor for PC World. Contributors include the staffs of Lotus Word Processing Division, Microsoft Corporation, and WordPerfect Corporation; Tony Bryer (via CompuServe); George Campbell (PC World contributing editor); Jake Colman (via CompuServe); Kate Edson (via CompuServe); Thom Foulks (contributor to PC World); Steve Fox (PC World senior editor, features); Ken Johnson (director, Chicago Computer Society); Elizabeth Swoope Johnston (via CompuServe); and Rich Zaleski (via CompuServe).

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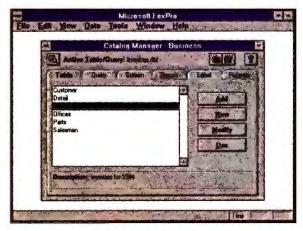
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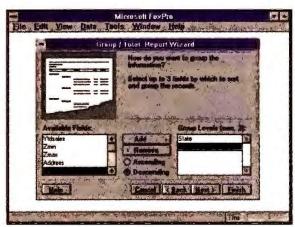
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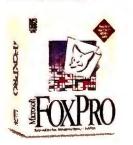
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Top 20 PCs Multiple Choices

This Month's Contenders pg. 163 • Power Desktops pg. 164 • Budget Desktops pg. 170 • Mobile PCs pg. 180

first place to look for the best power and budget desktop and notebook PCs. This month we present a particularly rich mix: everything from a clock tripled 486 to a budget-priced desktop PC equipped with a PCMCIA slot to a strapping 66-MHz Pentium unit. That adds up to a healthy infusion of fresh faces. And we count more new arrivals into our Power Desktops Top 20 than anywhere else. Four of the five systems from this review that break into our Power lineup

are Pentiums – including our first 66-MHz model, the powerful Polywell Poly 586VLB. And of the crème de la crème – the \$4557 Micron P60 PCI PowerStation at number 3 and the \$3599 Insight PCI P60 CD at number 4—join an all-Pentium power Best Buy cast.

In budget desktops, two Best Buy systems are reviewed this month. The \$2295 CompuAdd C466D is the top-rated budget PC; the \$2187 Acma 486DX2-66 PCMCIA System (at number 3) is one of the first desktop units we've reviewed that provides a PCMCIA slot.



From a rich mix of PCs—including the first clock tripled 486, the first 66-MHz

Pentium, and the first PCMCIA-equipped desktop—new winners emerge: the ALR Evolution V,

CompuAdd C466D, IBM ThinkPad 750P, and Toshiba T4600. BY REX FARRANCE

Testing by Dean Andrews, Ulrike Diehlmann, and Susan Silvius; research and support by Gary Van Der Horn.

A brace of IBM ThinkPads comes to the fore on our Top 10 Power Mobile PCs chart. The top system is this month's IBM ThinkPad 750P, a nifty \$4654 unit that can handle pen and keyboard input. The powerful \$5604 ThinkPad 750C color notebook, reviewed in April, is second on our Power list. IBM provided both of these units with 12MB of RAM. You can leave off the extra 8MB of RAM and pay approximately \$900 less for each unit, but performance with systems using the standard 4MB of RAM is significantly lower.

In the market for an economical notebook? The Toshiba I 4600 takes our Budget Top 10 by storm. This nifty system parlays a low \$1995 price and a long 5 hour battery life into an overall value rating that's higher than any other budget mobile PC's.

More than half the systems on the Mobile PCs Top 20 run at 33 MHz, including three of four Best Buys. Four systems on the Power chart have faster processors yet, but the 33s post the best battery lives. All the 25-MHz machines are confined to the Budget Top 10.





Hot New Processors Taking Off

As we said earlier, Pentiums are gaining the upper hand in our power desktop ratings: Half the systems and *all* the Best Buys are now Pentiums. That's up dramatically from last month, and it's obvious that the Pentium-60 is completing its high-end coup—although the DX2-66 now has a lock on our budget desktop Best Buys.

But where do Intel's Pentium-66 and the new clock tripled CPUs from IBM and Intel fit in? This month we review our first 66-MHz Pentium, the Polywell Poly 586VLB. This PC is one of the fastest we've ever reviewed, and you'll see more of these Pentium-66s in the months to come. Don't be surprised if Pentium-66s shoulder many Pentium-60s off our Power Desktops Top 20 in the near future. And guess what? More powerful Pentiums are on the way—

including 90- and 100-MHz models. (See *Top of the News* for an early look at the sizzling Micron Pentium-90.)

The Pentium-66 isn't the only new processor we saw this month: The Eltech Splendor III we reviewed is based on a clock tripled IBM Blue Lightning 25/75 CPU. More systems using this processor will start appearing on the budget market soon and will compete with the DX2-66 in price and performance.

Speaking of clock tripled CPUs, next month we'll review two of the first Intel 486DX4-100s: 100-MHz desktop PCs from Dell and Micron. The new DX4-100 CPUs provide 16K of internal cache and will operate in motherboards running at 33 MHz or 50 MHz and respectively triple or double the clock speed. We'll also look at Texas Instruments' speedy new DX4-75 notebook in June.

Powerful Processors Drive Prices Down

Naturally, you expect faster performance from newer, more powerful processors—and generally speaking you get it. But there's an additional effect: downward price pressure on more mature, less powerful CPUs. When reasonably priced Pentiums came on the market, 486DX2-66 prices dipped to remain competitive. Pentiums are taking over as the business value for power users—as our Power Top 20 shows. Meanwhile budget buyers reap the benefits in budget-priced 486DX2-66s. You're likely to see a similar effect as 486DX4s appear on the market. DX4s should stake out the territory between Pentiums configured for power apps and bargain DX2-66s, potentially putting a heavy squeeze on the lower-powered Pentiums. DX2-66 machines will become even better deals, placing additional pressure on 33-MHz 486s. As prices drop, 25-MHz 486s will join 20-MHz 486s in desktop obsolescence.

Budget desktops are providing either more PC for the money or lower prices. But prices on our Top 20s aren't all falling. We've instituted additional price checks: When we portrayed ourselves as shoppers, we found that many vendor representatives had been giving us "optimistic" quotes—perhaps planning on prices dropping by the time our issues came out. Now we're gathering all direct sys-

Buying Smart: Consumer Tips

Check Money-Back Guarantees Closely

Read the fine print on that money-back guarantee. Many companies impose limitations not apparent in their ads. You may be on the hook for charges totaling hundreds of dollars, including all shipping bills along with restocking fees that can run from 10 to 20 percent or more.

Leave Room for Memory Upgrades

When buying a system, ask whether you can upgrade RAM to at least 16MB without discarding installed SIMMs. Many configurations require discarding at least 4MB to upgrade above 8MB.

Save Cash by Buying More PC Than You Need

Purchase PCs that perform well beyond the minimum needed to run your current applications.

When you move to more demanding software, you won't be forced into an early upgrade.

Use a Credit Card

Use a credit card unless you already have a credit arrangement with the vendor. In case of dispute, the credit card company can help mediate or give a refund if you fail to receive a product.

tem prices anonymously and making multiple calls to vendors selling through dealers to get the most accurate street price estimates.

More CD ROM Drives in Systems

More system vendors are including a CD ROM drive as standard equipment. While you can always add a drive to a system later, many buyers are going for the convenience of a preinstalled unit. So we've increased the value given a CD ROM drive in our ratings.

Almost to a PC, however, we see performance levels drop when CD ROM drives are installed. Tests show the biggest hit comes when the CD ROM driver loads in the first 640K of RAM, often making DX2-66s perform like DX2-50s. Using a memory manager to load the driver in high RAM above 640K can alleviate this effect. But some apps, such as Excel 4.0 and Paradox for Windows, still run perceptibly slower. If you want maximum performance from your system, use DOS 6.0's and later versions' multiconfiguration capabilities to set up a menu allowing you to prevent the CD ROM driver from loading when you don't need to use your drive.

Rex Farrance is an associate editor for PC World. He can be reached on PC World Online (see page 12 for contact information). PC World staff members Mike Desmond, Ulrike Diehlmann, John Goddard, Anita Hamilton, Bryan Hastings, Caroline Jones, Owen Linderholm, and Susan Silvius contributed to this article.

Call 900/903-2972 and use the fax reprint numbers to order an instant fax of up to 3 individual systems' capsule reviews or 1 capsule plus features tables (\$4.95). To order a month's complete review (\$9.95 each), enter its number: December 3012; January 3001; February 3002; March 3003; April 3004; May 3005. For a list of all systems tested by the PC World Test Center for the Top 20s (\$4.95), enter 7. Touch-tone phone required. Charges will appear on your phone bill.

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

This Month's Contenders

Our look at this month's contenders for the Top 20 Power and Budget Desktops and the Top 10 Power and Budget Mobile PCs. Icons show where systems placed on the Top 10 and Top 20 charts.

Acma 486DX2-66 PCMCIA System

PC WORLD TOP 20

BUDGET
DESKTOP

PROS: Good performance, PCMCIA socket

CONS: No free SIMM sockets

This 486DX2-66 minitower may not have the

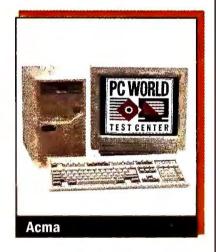
polish of some systems, but it leverages its good price, strong feature set, and solid performance into a Best Buy. It performed well compared with other DX2-66 systems, finishing in the middle of the pack on every benchmark. But the Acma's full features and attractive \$2187 price make it an outstanding budget system.

This is no stripped-down PC, however. Users with notebooks will appreciate the system's PCMCIA Type II slot, which lets you swap peripherals such as credit card—size modems and LAN adapters between systems. You also get 8MB of RAM, a 256K secondary cache, a 340MB hard drive, and a 15-inch monitor. There are three free drive bays, four free 16-bit slots, and a free 8-bit slot.

The system isn't without its rough edges: It accepts 32MB of RAM, but the installed SIMMs fill all eight 30-pin sockets, so you'll

have to discard at least four SIMMs to increase RAM. And the motherboard installation allows a bit more flex than we'd like.

Support policies aren't bad: You get a one-year warranty, a 45-day money-back guarantee, and a year of free on-site service. Average hold times on the toll-free tech support lines were a reasonable 3 minutes, and the technicians were helpful. But responses from Acma



customers to our Reliability and Service Monitor fax surveys indicate that a significant percentage of responding Acma buyers aren't fully satisfied with the way their complaints have been resolved. All the same, its high affordability earns this system a Best Buy and a number 3 ranking on our Budget Desktops Top 20. Acma Computers, 800/786-6888, 510/623-1212 Reader service no. 609

Ambra DP60/PCI

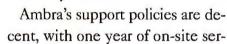
PROS: Bundled CD ROM drive and sound card **CONS:** No free SIMM sockets, poor support

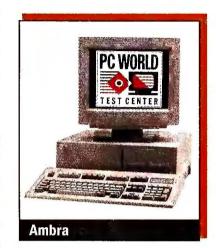
With a Pentium-60 CPU, a case you can orient as a tower or a desktop, and a very good video subsystem, Ambra's \$3658 DP60/PCI multimedia PC has versatility and performance to satisfy demanding Windows buffs. Granted, this system was about 10 percent slower in our tests than a typical 60-MHz Pentium (although still faster than a typical DX2-66). Considering the slowdown caused by the drivers required for any multimedia PC, that's not bad.

The DP60/PCI's base configuration includes 16MB of RAM, a 256K secondary cache, a 425MB hard drive, a double-speed CD

ROM drive, and a SoundBlaster-compatible sound card and speakers. In addition, Ambra supplied us with a 2MB Diamond Viper PCI graphics accelerator and a 15-inch monitor. (On occasion we've encountered confusion with the company about specific supplied components; we advise you to get a list in writing before ordering.) No tools are required to open the system's case, although it fits so tightly that it's hard to undo. The motherboard is clean and unclut-

tered, but all four SIMM sockets are full—so if you think you may need to expand RAM beyond 16MB, ask Ambra to install higher-capacity SIMMs. You can add two PCI cards and three 16-bit boards; if you don't mind giving up one of the PCI slots, you can add a fourth 16-bit card. Two drive bays are free.





vice costing just \$29 and 24-hour toll-free tech support including weekends. But the number of complaints we've received indicates that confused presales service continues to plague this company. That factor contributes to a low support rating and keeps this system off our Power Desktops Top 20. Ambra Computer, 800/252-6272, 800/363-0066 (Canada) Reader service no. 646

AST Premmia 4/66d Multimedia

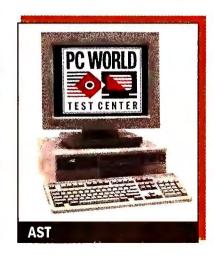
PROS: Upgradable to full Pentium, three-year warranty

CONS: High price, slow for a DX2-66

This \$4196 multimedia DX2-66 is an EISA machine with a solid basic configuration including 8MB of RAM, a 340MB hard drive, a CD ROM drive, a 16-bit sound card, a 1MB integrated local bus graphics accelerator, and a 15-inch monitor. You also get two speakers and multimedia authoring software and clip art on CD ROM.

How can we call a DX2-66 just a *basic* multimedia PC? Simple—if you want good performance on business apps from a multimedia system, you need a DX2-66 or a Pentium. Multimedia peripherals require drivers that take a hefty bite out of the first megabyte of memory. So application speeds take a hit in general, and some programs slow dramatically. The Premmia 4/66d Multimedia complet-

ed our benchmarks about 30 percent slower than a similarly equipped AST business model we reviewed in January. The chief difference affecting performance in this system (other than the lack of a 256K secondary cache) is the presence of multimedia drivers. Adding a secondary cache and bumping RAM to 16MB would significantly increase performance, but it would increase cost, too.



The Premmia's interior is clean and roomy. You can install a secondary cache (512K max) as well as a full Pentium processor via a special slot. Two of the unit's four 72-pin SIMM sockets are free. You also get four free EISA slots and two free drive bays.

THE TOP 20 PC WORLD





ALR Evolution V
Price drop helps put ALR on top.

New this month

No change from last month

▲ Up from last month

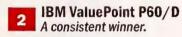
W Down from last month

BEST BUYS	Last month	Months on list	Overall rating	Performance rating	Service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Bus
1 ALR Evolution V	2	3	80	81	80	\$4087	Pentium-60	16	544	ISA
IBM PC Company ValuePoint P60/D	1	4	80	80	81	\$4700	Pentium-60	16	424	ISA
Micron P60 PCI PowerStation		1	79	75	76	\$4557	Pentium-60	16	540	ISA
4 Insight PCI P60 CD	- 1	1	78	79	65	\$3599	Pentium-60	16	516	ISA
5 Austin Power System 60	8	3	78	64	76	\$2999	Pentium-60	8	420	ISA
6 CompuAdd C466D	_	1	78	56	77	\$2295	486DX2-66	8	425	ISA
AST Premmia LX P/60	3	4	78	75	86	\$4930	Pentium-60	16	540	ISA
8 Micron 466VL Magnum	6	3	77	66	76	\$3699	486DX2-66	16	527	ISA
Gateway 2000 P5-60 Best Buy	-	1	77	70	72	\$2795	Pentium-60	8	425	ISA
10 NMC Pro-System PCI	7	2	76	64	66	\$2775	486DX2-66	16	540	ISA
11 V DECpc XL 466d2	4	4	76	63	95	\$5062	486DX2-66	8	1024	ISA
12 Polywell Poly 586VLB	- "	1	76	87	66	\$3371	Pentium-66	16	425	ISA
AST Premmia 4/66d Model 343W	14	4	76	60	86	\$3729	486DX2-66	8	340	EISA
14 ▼ Zeos 486DX2-66	12	4	75	60	77	\$2587	486DX2-66	8	528	ISA
15 AcerPower Series 9000	5	4	75	71	77	\$5444	Pentium-60	16	520	EISA
16 Everex Step VL EISA DX2/66	15	2	75	58	72	\$2442	486DX2-66	8	240	EISA
17 Dell OptiPlex 466/MXV	28	2	75	66	78	\$3618	486DX2-66	16	450	ISA
18 NEC Image 466es	19	4	74	63	78	\$3295	486DX2-66	8	420	ISA
Micro Express MicroFlex-PCI/66	20	2 .	74	60	67	\$2384	486DX2-66	8	256	ISA
20 ALR Evolution V-Q	13	3	74	88	80	\$6326	Pentium-60	16	544	EISA

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features tables (\$4.95); a complete month's review (\$9.95 each; December 3012, January 3001, February 3002, March 3003, April 3004, May 3005); and a list of all systems tested by







Micron P60 PCI
A lot of machine for the money.



Insight PCI P60 CD Good price on fast performer.



Austin Power System 60
Low-cost Pentium starter PC.

Monitor size/ dot pitch	Vendor contact number	Issue reviewed	Fax reprint number *	Comments
14"/.28	800/444-4257	Jan 94	3044	Expandable. Improved support rating and \$200 price drop move it to no. 1.
15"/.28	800/772-2227	Jan 94	3041	Price drops \$300 on this fast, expandable PCI machine. Incredible five-time Best Buy.
17"/.26	800/438-3343	current	3080	CD ROM drive, 4MB caching controller, big monitor: a fast, deluxe Pentium.
15"/.28	800/998-8011	current	3081	Very expandable PCI system with CD ROM drive. Readers report some problems with support.
15"/.28	800/752-1577	Mar 94	3062	Already low-priced, and now even cheaper. Needs more RAM to boost performance.
15"/.28	800/627-1961	current	3082	Low price makes this loaded, expandable DX2-66 stand out. No. 1 Budget Best Buy.
17"/.28	800/876-4278	Feb 94	3049	Fast PCI Pentium box with big monitor, fine support. Price up about \$500 from last month.
17"/.26	800/438-3343	Mar 94	3061	Fastest DX2-66. Excellent customer service satisfaction.
15"/.28	800/846-2065	current	3083	Lowest-priced Pentium we've tested. Get it with 16MB of RAM to improve performance.
15"/.28	800/424-2983	Apr 94	3071	Fast, nicely configured. Price down about \$200 from last month.
15"/.28	800/722-9332	Feb 94	3046	Best service and reliability for this expandable but pricey PCI system.
15"/.28	800/999-1278	current	3084	Blazing fast, expandable 66-MHz Pentium; 4MB caching controller; ordinary service.
17"/.28	800/876-4278	Jan 94	3051	Upgradable to full Pentium. Fast, with large monitor, great support.
14"/.28	800/554-5220	Feb 94	3043	A solid design. Still a fine all-around value.
17"/.28	800/733-2237	Jan 94	3042	Now has double-speed CD ROM drive. Price up more than \$450 from last month.
15"/.28	800/821-0806	Dec 93	3073	EISA DX2-66 with superb RAM expandability; needs larger hard disk to be server. No. 4 Budget Best Buy.
15"/.28	800/247-4739	Apr 94	3085	Nicely configured, fast, features easy-open modular design. Very good support rating.
15"/.28	800/632-4636	Jan 94	3048	Great 15-inch flat monitor, integrated SCSI, three-year warranty. Nice design, but pricey.
14"/.28	800/989-9900	Apr 94	3074	PCI slots. Needs bigger monitor, hard disk. Price down \$500. Poor presales service. No. 5 Budget Desktop Best Buy.
14"/.28	800/444-4257	Mar 94	3066	Pentium server is still the fastest PC we've tested. Big price for a big system.

the PC World Test Center for the Top 20s (\$4.95). Touch-tone phone required. Charges will appear on your telephone bill.

AST's three-year warranty, with a year of free on-site service and 24-hour toll-free technical support, can't be beat. Hold times are under 4 minutes, and technicians are generally accurate. While a number of AST customers responding to our Reliability and Service Monitor reader surveys report problems, most were well satisfied with the company's response. The Premmia 4/66d is a good system from a reliable company. But we like to see better performance in a premium-priced PC—even a multimedia model. *AST Research*, 800/876-4278, 714/727-4141 Reader service no. 610

Blackship BLK 486/33 ANB

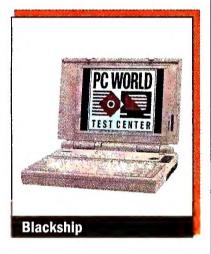
PROS: Rugged design, nice color screen

CONS: Awkward location of trackball, short battery life

The Chaplet-manufactured Blackship BLK 486/33 ANB has enough of a full-size PC's feel to please most desktop users. Contributing to that impression is the 84-key keyboard, which has a positive touch and comfortable keys. And the active-matrix color display is clear and bright. Performance—helped by 8MB of RAM—is solid within the unit's 486DX-33 class. Not bad for \$3475, even if the 120MB hard drive is minimal for Windows use these days.

But away from an AC outlet, this notebook has some disadvantages, including a hefty 8.4-pound traveling weight and a battery life under 2 hours. Also, the trackball could be better located than in the upper right corner of the keyboard, where it's convenient only for

right-handed users. But other design factors on this rugged notebook stand out, from its dime-size rubber footgrips to its cover latches that conform to the shape of a thumb. The access panels covering the memory sockets and the optional fax-modem are both screwed on, and the well-hinged port door flips down to expose clearly labeled ports. There's also a single PCMCIA Type II slot.



Blackship backs this notebook with a one-year warranty and toll-free technical support 9 hours a day, weekdays only. A fairly large number of customers responding to our Reliability and Service Monitor say they've had problems with their Blackship equipment. And while the majority were satisfied with problem resolution, the ratings could be better. All the same, this isn't a bad color notebook; it just doesn't have what it takes to make it into our Power Mobile PCs Top 10. *Blackship Computer Systems*, 800/531-7447, 408/432-7500 Reader service no. 649

Compaq Deskpro XE 433S 270/w

PROS: Easy to use, good RAM expandability

CONS: Telephone support delays

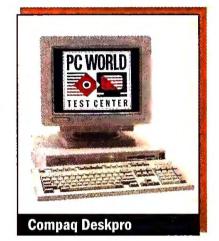
The \$2446 Deskpro XE 433S 270/w is user-friendly, from its iconbased setup menu to its excellent, amply illustrated documentation. Like most new Compaqs, it comes with TabWorks, an intuitive notebooklike alternative to the Windows desktop. And you get Compaq's Business Audio and security management features. Compaq's well-conceived RAM setup allows expansion from 8MB to

32MB without discarding any SIMMs, but there's just one free drive bay and three free 16-bit slots. Slow performance is this Deskpro's major drawback for business users. The system is quick within its class, outpacing its 486SX-33 counterparts by 10 percent to 35 percent. But performance falls far short of a typical DX2-66's.

In light of past experience, we expected tech support to be better. While Compaq's policies, including a three-year warranty, 24-hour toll-free support, a two-day turnaround on factory repairs, and free on-site service, are impressive, users calling tech support lately have

run into 30-minute hold times. The company says its Presario line is so popular, tech support can't keep up. To alleviate the problem, it plans to increase the number of desktop support teams by 30 percent by the time you read this and double it by year-end. Of course, we'll be watching to see if Compaq keeps its promises.

This system doesn't make our Budget Desktops Top 20; \$2446



can buy a better business box these days. But this Deskpro's built-in sound capability and intuitive TabWorks interface make it a very appealing choice as a home computer. *Compaq Computer*, 800/345-1518, 713/398-8820 Reader service no. 611

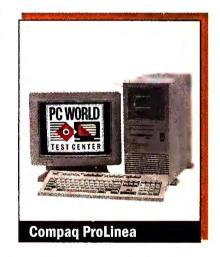
Compaq ProLinea MT 4/66 525/w

PROS: Efficient motherboard design **CONS:** Telephone support delays

This system is one of Compaq's entry-level DX2-66s, but its \$2868 price is a bit high. To Compaq's credit, you do get 8MB of RAM and a sizable 525MB hard drive. And we were impressed by the clean design and roomy interior of this medium tower box. The machine's motherboard layout makes the three free 72-pin SIMM

sockets and five full-length 16-bit slots easily accessible. You get three free externally accessible drive bays, an integrated 1MB 32-bit local bus graphics accelerator, and a 14-inch monitor. You can also add a 128K secondary cache, which we have to recommend: Without it, this PC runs a bit behind typical DX2-66s.

Compaq has a great reputation for support, although lately the



company has had its share of difficulties responding to its many support calls (see the review of the Compaq Deskpro XE 433S 270/w). But the company's three-year warranty, 24-hour toll-free tech support, two-day turnaround on factory repairs, and free on-site service are highly attractive. Also, the number of defective units received at purchase is outstandingly low when compared to all but a handful of PC companies, and readers report a very high rate of satisfactory problem resolution. Compaq's documentation is always outstanding: A complete copy comes preinstalled, along with diagnostic software and TabWorks. The ProLinea MT 4/66 525/w's relatively high



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Circle 160 on reader service card

SYSTEMS TOP 20

price keeps it off our Top 20, but if fine design and high reliability matter most to you, this system may be worth the extra bucks. *Compaq Computer*, 800/345-1518, 713/378-8820 Reader service no. 612

CompuAdd C466D

PC WORLD TOP 20

BUDGET
DESKTOP

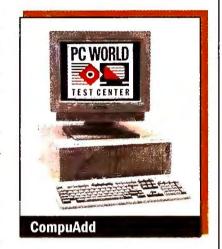
PC WORLD TOP 20 PROS: Great price, outstanding expandability

CONS: None

CompuAdd's C466D earns our number one

Best Buy ranking for budget desktops. How? Well, this \$2295 full-size 486DX2-66 system matches the performance of a typical DX2-

66 while providing 8MB of RAM, a 128K secondary cache, a generous 425MB hard drive, and a 1MB VL bus graphics accelerator. In addition, expandability is outstanding: Six free slots and six free drive bays mean you're highly unlikely to run out of space for adding cards and drives. The 8MB RAM configuration uses just two of the 72-pin SIMM sockets, leaving two sockets free—so you have



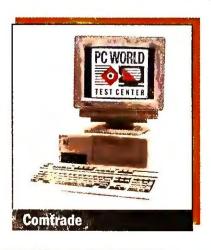
room for future upgrades without having to discard RAM.

CompuAdd supplements its year of free on-site service with 15-hour toll-free tech support, and hold times for support calls average less than 4 minutes. CompuAdd buyers who responded to our Reliability and Service Monitor surveys gave the company a decent rating on reliability. You'll be glad to know that CompuAdd gets even better marks on resolving problems to its customers' satisfaction. When tried-and-true CompuAdd filed for Chapter 11 bankruptcy protection last year, it was a shock to many. However, the company maintained its business flow, stayed afloat through the worst of its troubles, and came out of Chapter 11 in the fall. CompuAdd's quick and classy recovery was impressive, as is this C466D system. It features good performance, a strong design, solid configuration, and an aggressive price. That's what a top budget desktop Best Buy is all about. CompuAdd, 800/627-1961, 512/250-1489 Reader service no. 614

Comtrade VESA Local Bus WinXpress

PROS: Great price, three-year warranty **CONS:** Only 4MB of RAM, poor support

While this super-budget \$1750 DX2-66 completed our benchmarks about 15 percent slower than a typical DX2-66, upgrading from the standard 4MB of RAM will provide a noticeable performance



improvement. We like the low price, spacious 420MB hard drive, and the 9600/2400 fax-modem. However, we would have preferred a larger monitor than the standard 14-inch model.

This compact desktop unit comes with three free externally accessible drive bays, three free 16-bit slots, and one free VL bus slot. Comtrade's long three-year

warranty includes a two-day turnaround on factory repairs. You can buy on-site service for a reasonable \$30 a year. In addition, the company offers 12 hours of weekday tech support as well as Saturday hours. All that sounds good, but the support rating plummeted when we received a number of complaints from readers and experienced poor responsiveness to our own anonymous inquiries. Last month we reported an improvement, but *Consumer Watch* has since received another spate of disturbing complaints. Comtrade customers still report trouble getting tech support and complain of unresolved problems with systems. *Comtrade*, 800/969-2123, 818/961-6688 Reader service no. 615

Eltech Splendor III

PROS: Triple-speed CD ROM drive, nice case

CONS: Cluttered interior

Eltech's \$2873 Splendor III is dressed to impress. If its sleek black minitower case and triple-speed NEC CD ROM drive don't get your attention, take a look inside. You'll find a 420MB Western Digital hard drive, a 16-bit sound card, and a speedy 14,400/9600 fax-modem. The 15-inch monitor comes with built-in speakers and is paired with a 1MB local bus graphics accelerator. The system also includes 8MB of RAM, a 256K secondary cache, and five CD

ROMs, including Microsoft Works for Windows.

The IBM-built, Alaris-designed motherboard comes with a soldered IBM Blue Lightning 25/75 chip and an empty Pentium Over-Drive ZIF socket. The Blue Lightning CPU is clock tripled, has a large 16K built-in cache, and is complemented by a Cyrix math coprocessor. The Splendor III completed our benchmarks with



scores comparable with a multimedia DX2-66's. But it's a mistake to draw overall conclusions about a processor based on its tests in just one system. The Splendor III's minitower case looks great but has a cluttered interior. And you'll find only one free drive bay (externally accessible), although you can add up to three 16-bit cards and one VL bus board.

Eltech's warranty includes a two-day turnaround on factory repairs. We got prompt, accurate responses to our anonymous inquiries. Tech support is available 8½ hours a day, but only on weekdays. This is a nice multimedia system, but its price/performance ratio isn't good enough to make our Power Desktops Top 20. *Eltech Research*, 800/358-8330, 510/438-0990 Reader service no. 616

Gateway 2000 P5-60 Best Buy

PC WORLD TOP 20

9 POWER
DESKTOP

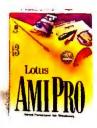
PROS: Very good price, CD ROM drive **CONS:** Lengthy waits for telephone support

At \$2795, Gateway's P5-60 Best Buy doesn't need to jockey for position—it's one of the most affordable Pentiums we've reviewed. Although you get just 8MB of RAM on this powerful Pentium-60, you also get a respectable 425MB hard drive, a CD ROM drive, a 2MB ATI Ultra XLR PCI graphics accelera-

Accelerate Windows and multimedia titles like these



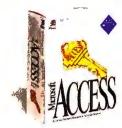
















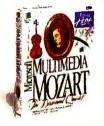








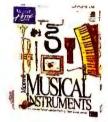




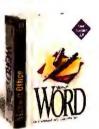


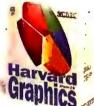


















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DESKTOPS BUDGET



CompuAdd C466D
Fine performance, price; good support.

New this month ▲ Up from last month No change from last month

V Down from last month

BEST BUYS	month	on list	rating	rating	rating			(MB)	(MB)	
CompuAdd C466D	-	1	83	56	77	\$2295	486DX2-66	8	425	ISA
2 A Inmac 466P	3	4	78	53	72	\$2008	486DX2-66	8	170	ISA
Acma 486DX2-66 PCMCIA System		1	78	54	72	\$2187	486DX2-66	8	340	ISA
Everex Step VL EISA DX2/66	- 1	1	78	58	72	\$2442	486DX2-66	8	240	EISA
Micro Express MicroFlex-PCI/66	- /	1	77	60	67	\$2384	486DX2-66	8	256	ISA
6 AST Bravo MT 466d	8 -2	1	77	53	86	\$2222	486DX2-66	8	170	ISA
7 A Insight 486DX2-66 VL	15	4	76	45	65	\$1998	486DX2-66	8	240	ISA
Blackship BLK 486/66LB	4	4	76	52	69	\$1895	486DX2-66	8	244	ISA
9 Axik 486DX2-66PCI	1	3	76	57	65	\$2398	486DX2-66	8	345	ISA
Polywell Poly 4586VR	11	4	76	61	66	\$2295	486DX2-66	8	340	ISA
CompuAdd C433S Low Profile	8	4	76	39	77	\$1794	486SX-33	8	210	ISA
Netis N433VL	5	4	76	38	63	\$1599	486DX-33	8	250	ISA
Netis N 466 VL	9	4	76	51	63	\$1899	486DX2-66	4	250	ISA
NMC 486 VL-Bus Winstation	14	4	75	38	66	\$1731	486DX-33	8	212	ISA
IBM PS/1 Consultant DX2-66	7	4	74	42	83	\$2399	486DX2-66	8	420	ISA
Axik Ace Cache 486DX2-66V	16	4	73	56	65	\$2098	486DX2-66	8	240	ISA
Caliber-Aspect Smart Weapon 486-66	- 0	1	72	54	61	\$2499	486DX2-66	16	340	ISA
Tagram Concerto HI-Note 486DX2-66	19	4	72	47	68	\$2359	486DX2-66	8	250	ISA
Ambra D466BL	26	4	72	49	56	\$2152	IBM 486BL-66	8	240	ISA
Axik AceCache 486DX2-66VG	21	4	72	56	65	\$2398	486DX2-66	8	250	ISA

Months Overall Performance Service

¹ Call 900/903-2972 and use the fax reprint numbers to order fax copies of system reviews. You may order an instant fax of up to 3 individual systems' capsule reviews or 1 capsule plus features tables (\$4.95); a complete month's review (\$9.95 each; December 3012, January 3001, February 3002, March 3003, April 3004, May 3005); and a list of all systems tested by

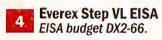






Acma PCMCIA
Solid economy minitower.







Micro Express PCI/66
Nice PCI design.

Monitor size/ dot pitch	Vendor contact number	Issue reviewed	Fax reprint number ¹	Comments
15"/.28	800/627-1961	current	3082	Great performance in budget DX2-66. No. 6 on Power chart.
14"/.28	800/547-5444	Feb 94	3056	IBM-made PC needs larger hard drive. Good support from direct office supply specialist.
15"/.28	800/786-6888	current	3086	Minitower comes with a built-in PCMCIA Type II slot, enabling it to share peripherals with notebooks.
15"/.28	800/821-0806	Dec 93	3073	EISA PC with twice usual number of SIMM sockets; \$150 price drop makes it a Budget Best Buy. No. 16 Power system.
14"/.28	800/989-9900	Apr 94	3087	PCI slots. \$500 price drop makes it a Budget Best Buy. No. 19 on Power list. Unresponsive presales service,
			6-7	
15"/.28	800/876-4278	Feb 94	3088	Price has dropped \$500 since February review; now makes Budget list. Great service. Hard drive a little small.
15"/.28	800/998-8011	Dec 93	3037	Price dropped about \$250 on cleanly designed, expandable desktop. Still numerous service complaints.
14"/.28	800/531-7447	Jan 94	3023	Slots aplenty on three-time Best Buy.
14"/.28	800/234-2945 2	Mar 94	3063	Good, basic, expandable PCI DX2-66 loses ground as competitors' prices drop.
14"/.28	800/999-1278	Dec 93	3050	Hot, expandable performer in a tower configuration.
14"/.28	800/627-1961	Dec 93	3031	Relatively quick for a 486SX-33. Responsive around-the-clock support rates very high with readers.
14"/.28	800/577-7526	Dec 93	3021	Expandable with good performance. Strong price competition pushes it downward.
14"/.28	800/577-7526	Feb 94	3022	Basic DX2-66 with good price but just 4MB of RAM. Price competition pushes it lower this month.
14"/.28	800/424-2983	Dec 93	3027	Nimble performance for DX-33 helps keep this PC's position stable.
14"/.28	800/426-3377	Feb 94	3025	Energy Star compliant, PS/1 user-friendly features, great service. Loses ground to price competitors.
14"/.28	800/234-2945 2	Dec 93	3029	Quick, expandable. Good price helps it hold its ground.
15"/.28	800/995-4584	Feb 94	3089	Solidly configured with lots of RAM; \$800 drop in price since February review gets it on our list.
14"/.28	800/824-7267	Jan 94	3090	Nice multimedia PC with good service. Relatively slow for a DX2-66.
14"/.28	800/239-5409	Dec 93	3024	Good machine, but readers are still complaining of confused presales service.
14"/.28	800/234-2945 ²	Feb 94	3035	Energy Star compliant, requires discarding SIMMs to increase RAM above 8MB. Has 1MB caching disk controller.

the PC World Test Center for the Top 20s (\$4.95). Touch-tone phone required. Charges will appear on your telephone bill.

² In California call 408/735-1234.

If you're switching f your moving cr

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The Desktop Application Director (DAD) makes it easy to switch between applications and commonly-used tasks.

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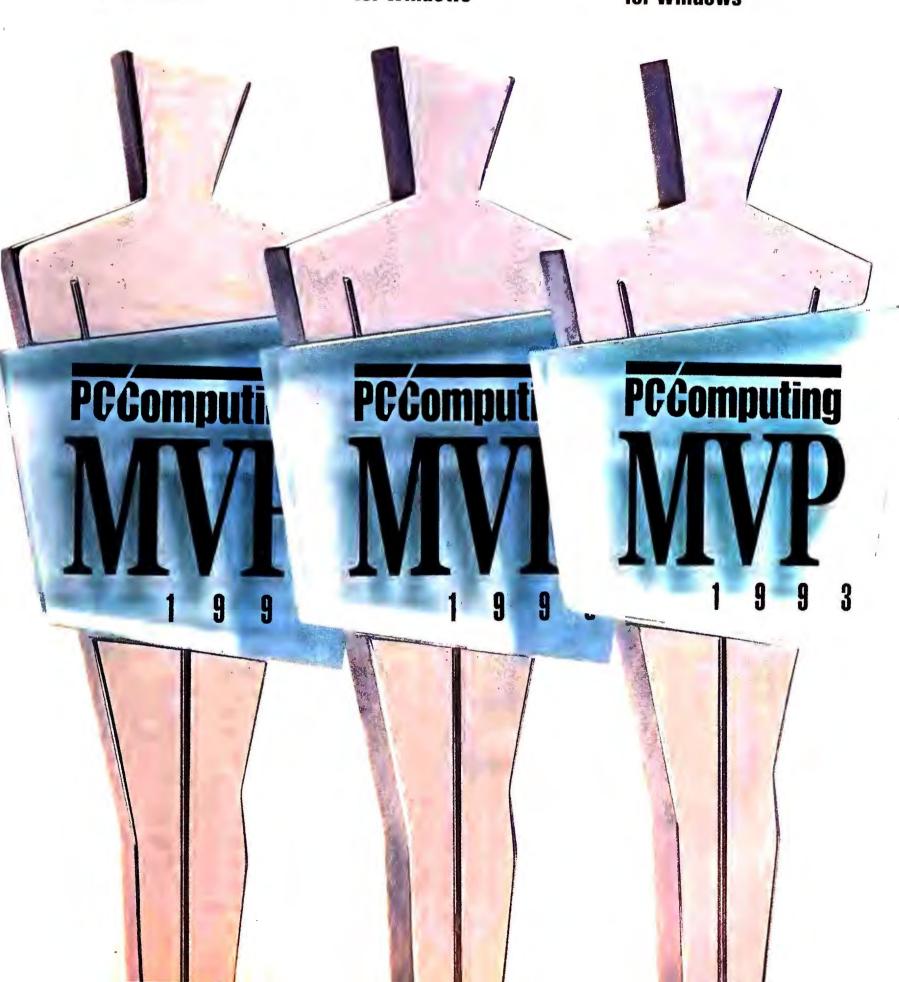
Borland WordPerfect®

m DOS to Windows, v has just arrived.

WordPerfect 6.0 for Windows

Borland Quattro Pro 5.0 for Windows

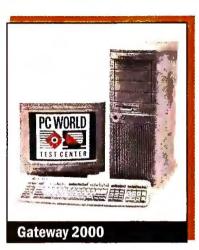
Borland Paradox 4.5 for Windows



SYSTEMS TOP 20

tor, and a 15-inch monitor. The Gateway's performance, while not outstanding, compares well with a typical Pentium-60's. That's quite good considering the PC's CD ROM drive, which typically has a negative effect on performance. If you beef up RAM to the 16MB more typical of a power system, you'll go even faster.

This system seems a logical choice for desktop use, although the towering, steel-reinforced case and 300-watt power supply work just as well on a server. You can install five expansion cards, two of which can be PCI boards, and RAM is upgradable to 128MB. If three free drive bays aren't enough, you can purchase an additional



internal drive cage to hold a hard drive that mounts under the power supply. Gateway rounds out its bundle with a utilities collection, and a choice of an application from stalwarts such as Microsoft's Excel and Word for Windows and Borland's Paradox and Quattro Pro for Windows.

Gateway's support is no longer top-rated, but it's still solid, with one year of free on-site service

and toll-free tech support 18 hours a day on weekdays and 5 hours on Saturdays. Gateway customers by the thousands have responded to our Reliability and Service Monitor; on average, they wait on hold a long 8 minutes for tech support. But a strong percentage are satisfied with the way the company resolved their problems.

While we can't echo Gateway's "Best Buy" designation on this unit, it is affordable, fast, and flexible. As a result, it shoulders in at number 9 on the Power Desktops Top 20. Gateway 2000, 800/846-2065, 605/232-2000 Reader service no. 651

IBM ThinkPad 750P

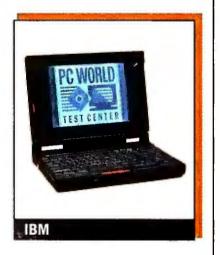


PC WORLD TOP 20 PROS: Outstanding battery life, good performance, innovative design CONS: High price, sticky PCMCIA slot cover MOBILE PC At first glance, the \$4654 IBM ThinkPad 750P

pen system may seem overpriced. After all, why should you pay that kind of dough for a monochrome 486SL-33 notebook? Well,

the multitude of innovative design and usability touches puts this Best Buy at the top of our Power Mobile PCs heap.

At 8.6 pounds, the ThinkPad 750P is no lightweight. But its 12MB of RAM helped it outperform a typical 486SL-33 by an impressive 25 percent. And battery life is a long 5½ hours. You also get a 170MB hard drive. The ThinkPad comes with pen-



enabled versions of Windows and DOS, some pen-based utilities, 16-bit sound capability, and a built-in speaker.

The ThinkPad's design is unique, with a hinged screen that lies flat for comfortable pen use. You simply snap open the keyboard to replace the removable hard disk, to hot swap the battery, or to upgrade RAM. The port covers are sturdy to a fault—we had to use a paper clip to pry open the cover for the PCMCIA Type III slot (which also accepts two Type II peripherals). The keyboard's fullsize, nicely sculptured keys are a pleasure to use, and the large 9½inch monochrome display has great contrast.

You can't go wrong with IBM's three-year warranty and 24-hour toll-free tech support. On-site service costs a reasonable \$40 for the first year. Hold times for tech support were just 2½ minutes, and IBM is among the elite—with the likes of Compaq, DEC, Dell, NCR, and Unisys—when it comes to low incidence of component failures. Only Gateway had more customers respond to our Reliability and Service Monitor, and like Gateway's, IBM's customers were very satisfied with resolution of problems.

Great service, fine performance, long battery life, and superb design—that's all it takes to rank as the top overall power mobile PCs Best Buy. IBM Personal Computer Company, 800/426-7735

Insight PCI P60 CD

PC WORLD TOP 20 POWER DESKTOP

PROS: Speedy performance, large hard drive, lots of free drive bays CONS: No on-site service option

Insight's PCI P60 CD zipped right through our

performance benchmarks, running 30 percent faster than a typical 486DX2-66 and noticeably quicker than most other 60-MHz Pentiums. Keep in mind that this Pentium box has a CD ROM drive whose drivers would ordinarily hinder performance. The unit's 16MB of RAM, 256K secondary cache, and 1MB PCI local bus graphics accelerator certainly help it perform well. And in a world of storage-hungry applications, the roomy 516MB Quantum hard drive adds even more value. To use the system for multimedia applications, however, you'll have to buy a sound card and speakers. But just as it sits, the Insight's fine performance, generous configuration,

and reasonable \$3599 price lift it to a strong Best Buy at number 4 on our Power Top 20.

You have a total of ten free drive bays at your disposal (three of which are externally accessible). This unit uses 72-pin SIMMs and accepts as much as 128MB of RAM. The four SIMM sockets in our unit were already filled with 4MB SIMMs; to leave upgrade room for the



future, you should ask for two 8MB SIMMs or a single 16MB module instead. Three free ISA slots and two free PCI slots round out the system's expandability.

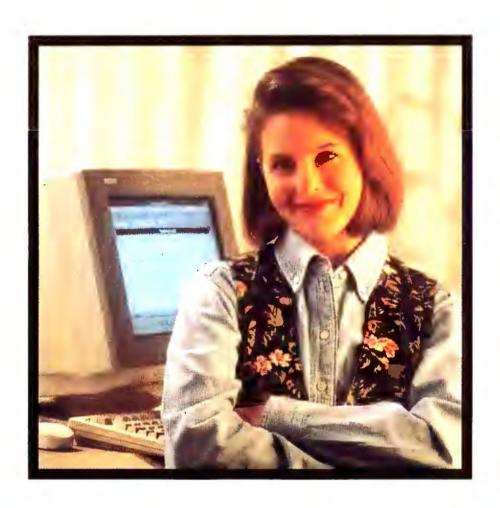
A sizable segment of Insight customers responding to our Reliability and Service Monitor surveys report having had some trouble with their products. Although most customers report satisfaction with the way the company resolved their problems, there's still room for improvement. The company also loses some points for its lack of an on-site service option. Although Insight gets a relatively low service rating, this system is a tremendous deal. It provides outstanding performance and great expandability at a price so reasonable that its overall value ranks high. So despite the mediocre support score, this system is a hands-down Best Buy. Insight, 800/998-8011, 602/902-1176 Reader service no. 618 continued on page 179



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Micron P60 PCI PowerStation

PC WORLD TOP 20

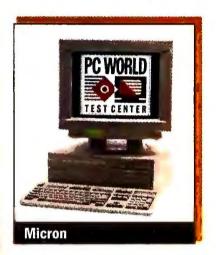
POWER
DESKTOP

PROS: Hot performance **CONS:** SIMM sockets full

Micron's compact \$4557 Pentium system offers

big power in a small package. Micron has loaded this box with 16MB of RAM, a 256K secondary cache, a 540MB hard disk, and a big 4MB disk cache on a fast 32-bit PCI controller board. In addition, you get a high-performance Diamond Viper PCI board with 2MB of VRAM and a gorgeous 17-inch Mag MX17F monitor. Add a double-speed CD ROM drive, and you have a beautifully enhanced Pentium system. Despite the presence of the CD ROM player's driver, this machine was one of the fastest we've reviewed, doing particularly well on our Excel test; unlike some vendors, Micron moves the CD ROM driver to high memory, significantly lessening the hit you take on performance.

The motherboard provides three 32-bit PCI slots (one free) and



four free 16-bit ISA slots. You can expand memory all the way to 128MB—but all four SIMM sockets are already filled, so you'd be wise to request two 8MB SIMMs or a single 16MB module when you order rather than the 4MB units that were installed in our system. The sturdy desktop case also houses three free drive bays. The company even provides a handy combo floppy drive and a

free copy of WordPerfect 6.0 for Windows.

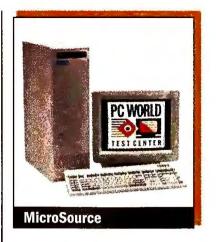
Micron offers toll-free technical support 11 hours a day (including Saturdays) and fax and BBS support. The one-year warranty, 30-day money-back guarantee, and two-day service turnaround are all typical. What's outstanding is the number of Micron customers who reported satisfaction with the company's resolution of problems: 96 percent! That's the highest on our survey. Combine that level of satisfaction with the solid configuration of this system, and it's no wonder it's a Best Buy at number 3 on our Power Top 20. *Micron Computer*, 800/438-3343 Reader service no. 619

MicroSource Tempest 486 PCI

PROS: 1GB hard drive, 17-inch monitor **CONS:** Poor documentation, high price

Some Pentium systems are actually dropping below the \$2500 mark these days, so this \$3550 DX2-66 system doesn't make much of an impression as a bargain. But a big 17-inch monitor and a humongous 1GB SCSI hard drive should be worth some extra dollars. The RAM and secondary cache configurations are more typical: 8MB and 256K, respectively. This full tower has great expandability—six free drive bays, five free slots (one PCI and four 16-bit ISA), and two free 72-pin SIMM sockets. The PCI graphics accelerator supports 1280 by 1024 resolution at a flicker-free 72 Hz, useful on the large monitor.

Performance on this system was far from impressive, however, running about 15 percent behind a typical 486DX2-66's. The documentation is also poor—mostly because it isn't well written and



lacks the illustrations it takes to clarify matters for users unfamiliar with doing upgrades. Micro-Source's support policies, however, are solid. The system comes with a better-than-average two-year warranty, on-site service for \$75 the first year, and a reasonable three-day turnaround on systems sent in for repair. You can reach tech support toll-free 9 hours daily

except Sundays, and reps picked up our calls immediately and answered all but one question correctly. Despite its large hard disk and monitor, the Tempest 486 PCI doesn't have the performance it takes to gain a foothold in our Power Desktops Top 20. *MicroSource*, 800/848-5161, 818/858-5161 Reader service no. 620

Packard Bell Diplomat 170M SubNotebook

PC WORLD TOP 20

BUDGET
MOBILE PC

PROS: Solidly built, nice design CONS: Flat keyboard Packard Bell's close alliance with ZDS has borne fruit in a number of nice notebooks.

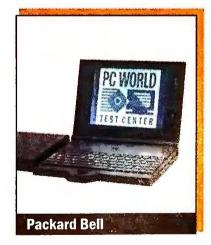
This Packard Bell is a twin of the ZDS Z-Lite subnote reviewed last month, which is still the number 2 budget mobile Best Buy. A lower support rating puts the Packard Bell at number 3 on our Budget Mobile PCs Top 10, but it's still a fine value. This unit has modest performance—as you would expect of a 486SL-25. But its battery life is excellent at 4½ hours. And the unit comes with two PCMCIA Type II slots and is street priced at a reasonable \$2000.

The Diplomat is clearly designed for the road, and the system sports a trim 6.2-pound traveling weight. In its standard configuration, the Diplomat comes with 4MB of RAM, a 170MB hard drive, and a 3½-inch sidecar floppy drive that conveniently attaches to the AC adapter (you can use both drive and adapter separately).

The 82-key keyboard is quite flat, although each key has a raised center to add some dimension. The keyboard may be too tight for touch-typists: Because the keys are packed in so closely, it's hard

not to bump them accidentally. The 8½-inch monochrome screen has a good display, although it could use more contrast. If you do demos, you'll appreciate being able to hook up an external monitor; the unit allows you to follow the action on the LCD while simultaneously giving your audience the bigger picture.

Packard Bell's support policies look good: You get a year warranty



and 24-hour toll-free tech support. But hold times for readers averaged about 9 minutes, and we got a lot more busy signals than we'd like. The ZDS Z-Lite still takes the edge in the standings. But the quality of the Diplomat gives it a high ranking, and Packard Bell's wide distribution should make it easy to find. *Packard Bell Electronics*, 800/733-5858 Reader service no. 653

PC WORLD



IBM ThinkPad 750P

Mono winner with power of the pen.

















New this month

No change from last month

▲ Up from last month

Down from last month

ER SYSTEMS		Last month	Months on list	Overall rating	Performance rating	Reliability and service rating	Price	CPU	RAM (MB)	Hard drive (MB)
IBM Think	Pad 750P	-	1	87	31	80	\$4654	486SL-33	12	170
IBM Think	Pad 750C	1	2	85	33	80	\$5604	486SL-33	12	170
₩ Compaq C	oncerto 4/33 Model 250	2	2	85	24	78	\$3025	486SL-33	4	250
▼ Toshiba T4	700CT 486 Notebook	3	2	84	35	80	\$4699	486DX2-50	8	203
W Austin 466	ST .	4	2	83	30	67	\$4299	486DX2-66	8	340
Toshiba Po	rtégé T3400CT	6	2	82	23	80	\$3549	486SX-33 ³	4	120
TI TravelMa	ate 4000E	5	2	80	33	74	\$4499	486DX2-50	4	209
₩ Sharp PC-8	3150	7	2	78	23	65	\$2699	486DX-33 ³	4	200
Toshiba T4	600	- 1	1	77	20	80	\$1995	486SL-33	4	120
▼ NEC Versa	E Series	8	2	77	27	71	\$5000	486DX2-50 ³	4	340
GET SYSTEMS						4 400		2 341.00		~ 10
Toshiba T4	600	-	1	83	20	80	\$1995	486SL-33	4	120
ZDS Z-Lite	486-25	2	2	82	17	62	\$1999	486SL-25	4 «	170
Packard B	ell Diplomat 170M	-1	1	82	18	56	\$2000	486SL-25	4	170
Sharp PC-8	3150	6	2	78	23	65	\$2699	486SX-33 ³	4	200
AST Bravo	NB	1	2	78	16	70	\$2350	486SL-33	4	120
Packard B	ell Statesman 200M	3	2	78	14	56	\$1500	Cx486SLC-33	4	200
WinBook 4	86SX/25 Color	-	1	77	23	52	\$2299	486SX-25	8	200
CAF Aqual	ite-4SX2/120	4 '	2	77 .	22	45	\$1425	486SX-25	4	125
₩ Ergo SubB	rick 486	7	2	75	11	68	\$1695	Cx486SLCV-25	4	163
Twinhead	Slimnote 486E 4SX/33S	14	1	75	27	58	\$2710	486SX-33 ³	4	207

Best Buy

¹ CA = color active, CD = color dual-scan, CP = color passive, MP = mono passive.

² Call 900/903-2972 and use the fax reprint numbers to order fax copies of system reviews. You may order an instant fax of up to 3 individual systems' capsule reviews or 1 capsule plus features tables (\$4.95); a complete month's review (\$9.95)



IBM ThinkPad 750C Great screen, lots of muscle.



Toshiba T4600
All-rounder: good price, battery.



ZDS Z-Lite 486-25 Well-designed subnote.

Weight (pounds)	Battery life (hours)	Screen type/size ¹	Vendor contact number	Issue reviewed	Fax reprint number ²	Comments
8.6	5:29	MP/9.5"	800/426-7735	current	3620	Good battery life, price help mono, pen-capable ThinkPad edge out its color sibling.
8.2	3:52	CA/10.5"	800/426-7735	Apr 94	3601	Ultimate color power notebook with great screen and built-in sound, but pricey.
8.2	6:31	MP/9.5"	800/345-1518	Apr 94	3602	Versatile notebook handles pen and regular apps. Fine battery life, but not fast.
8.8	4:02	CA/9.5"	800/334-3445	Apr 94	3603	Fast multimedia all-rounder with excellent battery life.
7.8	3:30	CA/9.5"	800/443-7914	Apr 94	3604	Lowest-priced active-matrix color notebook, fast.
6	5:30	CA/7.4"	800/334-3445	Apr 94	3606	Best subnote for power users: vivid screen, great battery life. Mediocre performance.
8.2	2:55	CA/8.6"	800/527-3500	Apr 94	3605	All-around excellence with good Windows performance; will have larger screen soon.
8.2	4:09	CD/9.5"	800/237-4277	Apr 94	3607	Surprisingly versatile for a budget-price subnote—also on Budget Top 10.
8.2	5:02	MP/9.4"	800/334-3445	current	3621	Also Budget no. 1. Solid all-around mono notebook with outstanding battery life.
8.2	2:59	CA/9.5"	800/388-8888	Apr 94	3608	Flexible unit can be upgraded many ways; screen orients out for presentations.
	-			N 777 - 449	,	
8.2	5:02	MP/9.4"	800/334-3445	current	3621	Also sneaks into Power Top 10. All-around mono notebook with top-notch battery life:
6.2	4:16	MP/8.5"	800/553-0331	Apr 94	3612	Subnote twin of no. 3 Packard Bell. Good resolution of occasional support problems
6.2	4:40	MP/8.5"	800/733-5858	current	3622	Identical to the Z-Lite, but readers have had more service problems.
8.2	4:09	CD/9.5"	800/237-4277	Apr 94	3607	Also placed eighth on Power Top 10. Moved up due to positive reliability data.
6.8	3:48	CP/9.5"	800/876-4278	Apr 94	3611	Good price, good battery life, good design, and color, too.
7.4	3:50	MP/9.5"	800/733-5858	Apr 94	3613	Low price, good-size hard drive, but screen resolution could be much sharper.
7.8	3:01	CD/10.5"	800/468-2162	current	3623	Nice PowerBook-like pointing device, good color screen.
		nt a d	state of the state	p. Single	3614	
6.8	2:18	MP/8.5"	818/369-3690	Apr 94	£%	Cheap, cheap subnote, but watch the low-power signal. Poor support policies.
6.6	4:27	MP/8.7"	800/633-1925	Apr 94	3616	Light, cheap subnote, but performs at a crawl.
8.2	2:54	CP/9.5"	800/995-8946	Apr 94	3624	Not quick, but this well-designed notebook would be faster with more RAM.

each; December 3012, January 3001, February 3002, March 3003, April 3004, May 3005); and a list of all systems tested by the PC World Test Center for the Top 20s (\$4.95). Touch-tone phone required. Charges will appear on your telephone bill.

³ SL Enhanced.

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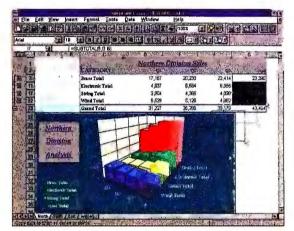


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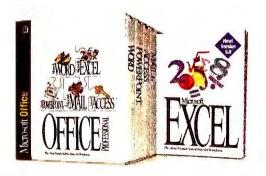
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Polywell Poly 586VLB

DESKTOP

PC WORLD TOP 20 PROS: Blazing speed, long warranty **CONS:** Slightly cluttered interior

Polywell's Poly 586VLB sped through our tests

like a jaguar chasing down its prey. That's not surprising, considering that this is the first 66-MHz Pentium we've ever reviewed. This

well-tuned system outpaced a typical 60-MHz Pentium by more than 15 percent. But the \$3371 price buys you more than a powerful processor: You also get 16MB of RAM expandable to 128MB, a 512K secondary cache, a 425MB Western Digital hard drive, and a 4MB Promise VL bus caching hard drive controller. The video subsystem includes a 2MB Orchid Fahrenheit 1280 Plus VLB graph-



ics accelerator and a nice 15-inch monitor. Polywell provides a VL bus rather than a PCI bus, which is more common on Pentiums.

Typical of Polywell's generous configurations, this tower model features numerous free drive bays and slots. It has three free externally accessible bays and two free internal bays. In addition, four ISA slots and one VLB slot are free. The RAM is installed in two 8MB SIMMs, leaving two 72-pin SIMM sockets free for cost-efficient memory upgrades. The unit's interior has a little more cable clutter than we usually see with Polywell systems, however.

The Polywell support package includes a healthy five-year labor and one-year parts warranty; on-site service costs \$75 for the first year. Technicians answered all questions accurately and promptly in our tests. The Poly 586VLB is a force to contend with, rating a strong number 12 on our Power Desktops Top 20. If your application requires none but the very highest performance, this system really delivers the goods. Polywell Computers, 800/999-1278, 415/583-7222 Reader service no. 621

Samsung PowerMaster SD966L

PROS: Sturdy construction CONS: Poor performance, small hard drive

This system is marketed as a desktop PC for the value minded. But it doesn't fully deliver. Like many other budget PCs, the Power-

Master features a basic graphics accelerator and a 14-inch monitor—just adequate for Windows use. You get 8MB of RAM expandable to 32MB and a 128K secondary cache. With one free VL slot, five free ISA slots, and three free drive bays, there's room for expansion.

Samsung

On the downside, buyers planning future memory upgrades should beware: All the 30-pin

SIMM sockets are occupied, and that means that RAM must be discarded to make room for the higher-capacity SIMMs you'll have to install to upgrade memory. The PowerMaster's \$2333 direct price is only so-so compared with similar systems'. And the relatively small 125MB hard disk is bound to pinch most Windows users sooner rather than later. Worst of all, the PC posted poor performance scores, lagging 25 percent behind a typical DX2-66 system.

Samsung's service and support is average in most respects; it includes a one-year warranty and toll-free technical support that we found to be both accessible and accurate. But the company offers no on-site service option or weekend support. We were impressed to see that Samsung customers responding to our Reliability and Service Monitor surveys report only a tiny incidence of defective products delivered. But among users who reported problems, a sizable number were dissatisfied with the resolution of those problems. This Samsung isn't a bad value overall—it just doesn't provide the balance of price, performance, and service it takes to make our Budget Desktops Top 20. Samsung Electronics, 800/724-6638, 201/229-4000 Reader service no. 622

Toshiba T4600

PC WORLD TOP 20 BUDGET MOBILE PC

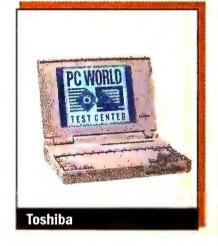
CONS: Slow performance, nonstandard keyboard layout Budget buyers can't expect the very best in performance, and the 486SL-33 Toshiba T4600 doesn't come close to matching the speed of

PROS: Great price, long battery life, durable construction

our number 1 Best Buy in power mobile PCs, the IBM ThinkPad 750P. But then again, the \$1995 Toshiba has just 4MB of RAM to

the IBM's 12MB. And we're talking budget equipment here, so the Toshiba T4600—buoyed by its super price—earns a rating as number 1 budget mobile PCs Best Buy and number 9 on the Power Mobile PCs Top 10.

The T4600's configuration is solid: In addition to the 4MB of RAM expandable to 20MB, you get a 120MB hard drive, a bright monochrome display, and two

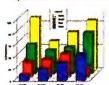


PCMCIA slots (one Type II and one Type III). The 5-hour battery life is great and will have you computing from coast to coast on a single charge. You can even monitor how much juice you have left with the handy LCD meter located above the keyboard. If frequent interruptions are a problem, activating the auto-resume mode will let you close the notebook in the middle of your work and come back to it later exactly where you left off.

The 8.2-pound T4600 is sturdy. We liked the springy feel and travel of the keyboard, but hot keying through applications with the oddly located <Alt> key may take practice to avoid activating the <Fn> key by mistake.

Toshiba's support is excellent and highly respected; it includes a three-year warranty. Among respondents to our Reliability and Service Monitor, only owners of Compaq notebooks had fewer problems. And Toshiba owners were highly satisfied with problem resolutions. Granted, this isn't the fastest 486SL-33 reviewed this month. But it has so much to offer, it's a can't-miss Best Buy for budget notebooks. Toshiba America Information Systems, 800/334-3445, 714/583-3000 Reader service no. 655 continued on page 188 We locked four ordinary computer users in a room for 30 minutes with one extraordinary program to see what they could come up with.

Thompson & Associates



Mike, Eaton Town, NJ





Concessivity	Dimit	Pleat
Teachers	1	
Parcets		1
Students	1	
Administration		1
Volunteers		1
Spormore c		1

Introducing the document WordPerfect

Memo

December 21 - 28

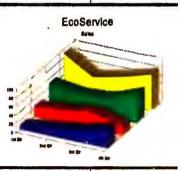
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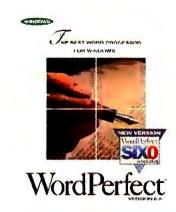
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FEATURES COMPARISON: THIS MONTH'S CONTENDERS-DESKTOPS

The New Order: Power = Pentium, Budget = DX2-66

BEST B	EUY				BEST	BUY	4 - 1	\	
	Acma - 66 A860X2-66	Ambra pcl	AST A/66d AST Minedia	Compad XE 270/W Deskprodel 270/W	Compad MT 4/66 Compad MT 4/66 Province MT 4/66	Computed CA860	Comtrade Bus VESA Local Bus VESA Voress	Eltech Splendor III	Gateway 2000 Gateway Buy P5-60 Best Buy
tandard features	11177	\				1	\	20070	\
Selling price as of 2/4/94 ¹ CPU	\$2187 486DX2-66	\$3658 Pentium-60	\$4196 486DX2-66	\$2446 486SX-33	\$2868 486DX2-66	\$2295 486DX2-66	\$1750 486DX2-66	\$2873 IBM Blue	\$2795 Pentium-60
CDII /ungrada aaakat	238-pin ZIF	273-pin ZIF	238-pin ZIF	238-pin ZIF	238-pin ZIF	238-pin ZIF	238-pin ZIF	Lightning 25/75 273-pin ZIF	273-pin ZIF
CPU/upgrade socket BIOS	AMI 8/8/93	AMI 1.00.03 AFIP	AST 11/30/93	Compaq 10/11/93	Compaq 9/29/93	Phoenix 1/15/88	AMI 11/11/92	Microid 10/24/93	AMI 11/11/92
Installed/maximum RAM (MB)	8/32	16/128	8/128	8/32	8/64	8/64	4/32	8/64	8/128
30-pin or 72-pin SIMMs	30-pin	72-pin	72-pin	72-pin	72-pin	72-pin	30-pin	72-pin	72-pin
SIMM sockets/number free	8/0	4/0	4/2	4/3	4/3	4/2	8/4	4/2	4/2
Secondary RAM cache installed/maximum (K)	256/256	256/256	0/512	64/256	0/128	128/256	256/256	256/512	256/256
Case style	minitower	desktop	desktop	compact	tower	compact	compact	minitower	tower
Free externally accessible 3½- inch/5¼-inch drive bays	2/1	0/2	0/1	0/1	0/3	1/3	1/2	1/0	0/3
Free internal 3½-inch/5¼-inch drive bays	0/0	1/0	1/0	0/0	0/0	2/0	0/0	0/0	3/1
Free 32-bit EISA/16-bit ISA/ B-bit ISA slots ²	0/4/1	0/4/0	4/0/0	0/3/0	0/5/0	0/5/0	0/3/0	0/3/0	0/4/0
PCI or VL slots/number free ²	2 VLB/0	3 PCI/2	0/0	0/0	. 0/0	2 VLB/1	2 VLB/1	2 VLB/1	3 PCI/2
Hard disk	Conner CFA340R	WD Caviar 2420	WD Caviar 2340	Quantum ProDrive LPS	Compaq	WD Caviar 2420	WD Caviar 2420	WD Caviar 2420	WD Caviar 2420
Size (MB)	340	425	340	270	525	425	420	420	425
Adapter	Promise 4030VLB	integrated	integrated	integrated local bus	integrated	integrated	integrated	integrated	integrated
Floppy drives (MB)	combo	1.44	1.44	1.44	1.44	1.44	1.44	1.2, 1.44	1.44
Graphics adapter	VLB Genoa 8500VL	Diamond Viper PCI	integrated VLB	integrated local bus	integrated local bus	VLB Western Digital 90C33	Actix ProStar VLB	Alaris/ Tomahawk	PCI ATI Ultra XLR 2MB
Installed VRAM/DRAM (MB)	0/1	2/0	0/1	1/0	1/0	0/1	0/1	0/1	0/2
Monitor	Impression 5 DCM-1588	Ambra MPR-II	AST P766D	Compaq 1024 461-P	Compaq 1024 461-P	CompuAdd TE 1564M	CTX 1451	Proton FM-1561A	Gateway 1572FS
Screen diagonal (inches)/ dot pitch (mm)	15/.28	15/.28	15/.28	14/.28	14/.28	15/.28	14/.28	15/.28	15/.28
Modem fax/data speed (kbps)	n/a	n/a	n/a	n/a	n/a	n/a	9.6/2.4	14.4/9.6	n/a
Sound board	0	Media Vision 16	Media Vision 16	Compaq Business Audio	Ö	0	·O.	Creative Labs SoundBlaster 16	0
CD ROM drive	0	Philips LMS CM206	Toshiba XM-3401B	0	O.	0	0	NEC CDR-510	Mitsumi CRMC-FX001D
Data transfer rate (K/sec)	n/a	307	330	n/a	n/a	n/a	n/a	450	300
Parallel/serial/mouse ports ervice and support	1/2/0	1/2/1	1/2/1	1/1/1	1/1/1	1/2/0	1/2/0	1/2/0	1/2/1
Warranty (years)	1	1	3	3	3	1	3	1/3 3	1
30-day money-back guarantee	● ⁵	•	0	0	0	•	•	•	•
On-site service first-year price	free	\$29	free	free	free	free	\$30	\$69	free
Service center tumaround (days)	2	7	2	2	2	3	2	- 2	0
Dally toll-free support (hours)	11	24	24	24	24	15	12	8.5	18
Weekend support	● 6	•	•	•	•	0	● 6	0	6,7
BBS	•	0	•	•	•	•	•	0	•
Fax	•	0	•	•	•	•	•	•	•

¹All systems priced as configured with DOS 6.0 or later, Windows 3.1, VGA and color monitor, keyboard, and mouse or other pointing

device. Selling price is direct or based on vendor estimate.
²VL slots also accept 16-bit ISA peripherals.

³ One year parts and labor, three years system board parts.

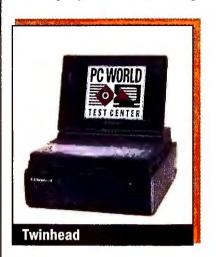
\$3599 \$4557 \$3550 \$3371 \$2333 Pentium-60 Pentium-60 486DX2-66 486DX2-66 Pentium-66 273-pin ZIF 273-pin ZIF 238-pin ZIF 273-pin 169-pin ZIF **Phoenix** AMI 8/8/93 **AMI** Phoenix A486 V 1.00.05.AFI 9/16/93 11/11/92 1.03 03B 16/128 16/128 8/64 16/128 8/32 30-pin 72-pin 72-pin 72-pin 72-pin 4/0 4/0 4/2 8/0 4/2 256/256 256/256 128/256 256/256 512/512 tower compact tower tower compact 0/3 0/1 1/4 1/2 0/2 7/0 2/0 0/1 1/1 1/0 0/3/0 0/4/0 0/4/0 0/4/0 0/5/0 3 PCI/2 3 PCI/1 2 PCI/1 3 VLB/1 2 VLB/1 Maxtor Toshiba **WD** Caviar **Ouantum** Samsung **ProDrive LPS** MXT-540A MK 537 FB SHD 3121A 2420 516 540 1024 425 125 Intel/PCI/IDE 4MB PCI 4MB Promise integrated integrated Promise DC-690 SCSI DC-680 1.44 1.2, 1.44 1.2, 1.44 combo 1.44 ATI PCI Diamond **ALVGA** Orchid Samsung 2201 PCI VLB SVB-6126VI Mach32 Viper PCI **Fahrenheit** 1/0 2/0 0/1 0/2 0/1 CTX CMS-1561 Mag MX17F Tystar TY MicroScan Samsung MultiScan 4G/ADI SyncMaster 15/.28 17/.26 17/.26 15/.28 14/.28 n/a n/a n/a n/a 0 0 Mitsumi 0 0 0 Mitsumi CRMC-FX001D CRMC-FX001D 300 300 n/a n/a n/a 1/2/0 1/2/0 1/2/0 1/2/0 1/2/1 1/54 0 0 \$75 \$75 0 free 2 0 2 3 3 24 9 9 8 11 . **●**⁶ •6 **●**6 0 • • 0

Twinhead Slimnote 486E 4DX2/66T

PROS: Good performance and expandability, vivid active-matrix color screen

CONS: Short battery life, flimsy display bezel

Torn between the mobility of a notebook and the expandability of a desktop system? One compromise is to buy a notebook with a



matching docking station. Twinhead markets its Slimnote 486E 4DX2/66T for \$4598. You can add an optional \$519 desktop docking station that has three full-length 16-bit expansion slots and a 200-pin I/O connector.

The 8.4-pound Slimnote comes with 8MB of RAM expandable to 20MB, a 200MB hard drive, a vivid active-matrix color display, and a PCMCIA Type II slot. Per-

formance is just about what you would expect from a 486DX2-66 notebook. But battery life is a short 1½ hours.

The Slimnote's exterior looks rugged, so we were surprised to find a loose bezel exposing delicate electronic components for the display. This makes us wonder how well it would stand life on the road. We liked the nonrestrictive keyboard layout, but not so much the marble-size trackball. Our research shows that Twinhead's policies are typical, with medium responsiveness and good accuracy. Although the Slimnote has some nice qualities, its low battery life, flimsy construction, and design flaws keep it from a Top 10 place. Twinhead, 800/995-8946, 408/945-0808 ext. 103 Reader service no. 654

WinBook 486SX/25 Color



PROS: Low price, good performance, well-placed trackball

CONS: Mediocre technical support

With its 8MB of RAM, this 25-MHz 486SX

notebook performs more like a 33-MHz machine. And the rest of the configuration is respectable for a \$2299 budget color system, with a 200MB hard drive, an internal fax-modem, and a PCMCIA Type II slot. The front-and-center trackball is right where it should

be, and the dual-scan color screen offers impressive brightness and contrast. Battery life is okay at just over 3 hours. The system's back port covers are solidly built and have convenient thumb flares for easier opening. Behind the back doors you'll find a docking station interface, a combined keyboard/mouse port, and the standard parallel, serial, and VGA connections.

PCWORLD

Service and support could be

better. Calls to WinBook's tech support required about 4 minutes on hold. Once we got through, one of our three questions was answered incorrectly. Despite the caveats, the WinBook ranks 7th on our Budget Mobile Top 10. It's worth a look if you want an inexpensive notebook with a decent dual-scan color screen. WinBook Computer, 800/468-2162 Reader service no. 652

⁴One year parts, five years labor.

⁶Saturdays only.

⁷ Only 5 hours on Saturdays.

⁵45-day money-back guarantee.



FEATURES COMPARISON: THIS MONTH'S CONTENDERS-MOBILE PCS

Mono Screen Budget and Power Notes Join Best Buy Ranks

	BEST	виу	BEST	BUY	,	
● Yes ○ No n/a = not applicable Standard features	Blackship Blk 486/33 ANB	18M ThinkPad T50P	Packard Bell Packard 170M Diplomat 170M SubNotebook	Toshiba TA600	Twinnead 486E Slimnote 486E ADX2/66T	WinBook Color 4865X/25 Color
Selling price as of 2/4/94 ¹	\$3475	\$4654	\$2000	\$1995	\$4598	\$2299
CPU	486DX-33	486SL-33	486SL-25	486SL-33	486DX2-66	486SX-25
Traveling weight (pounds)	8.4	8.6	6.2	8.2	8.4	7.8
Width x depth x height (inches)	11.4 x 8.5 x 2.1	11.8 x 8.4 x 2.2	9.9 x 8.4 x 1.6	11.8 x 8.4 x 1.8	11.4 x 8.9 x 1.9	11.4 x 9 x 1.9
Installed/maximum RAM (MB)	8/20	12/20	4/20	4/20	8/20	8/32
Secondary RAM cache installed/ maximum (K)	0/0	0/0	0/0	0/0	0/0	0/0
Installed/maximum hard disk (MB)	120/340	170/340	170/170	120/200	200/340	200/340
Removable hard disk	Ò	•	0	0	0	0
Display type	color active	mono passive	mono passive	mono passive	color active	color dual-scan
Screen diagonal (inches)	9.5	9.5	8.5	9.4	9.4	10.5
Maximum colors or gray shades of LCD	256 colors	256 gray	64 gray	64 gray	256 colors	256 colors
Simultaneous LCD and CRT	•	•	•		•	0
Highest resolution of external CRT	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768
Mouse/keyboard ports	0/1	1/02	1/1	1/1	1/02	1/02
Cursor keys in inverted T	•	•		•	•	•
Dedicated page control keys	•	•	•	•	•	•
All 12 function keys dedicated	•	•	•	•	•	0
Standard <ctrl> and <alt> layout</alt></ctrl>	•	•	•	0	0	•
Built-in pointing device	•	•	•	0	•	•
Modem fax/data speed (kilobits per second)	n/a	n/a	n/a	9.6/2.4	14.4/14.4	9.6/2.4
Docking station available	•		0	•	•	•
PCMCIA slot Type I/II/III	0/1/0	0/0/13	0/2/0	0/1/13	0/1/0	0/1/0
Power management						
Supports APM	O.	•	•	•	•	•
Type of battery	NiCd	NiMH	NIMH	NiCd	NIMH	NiMH
Suspend button	•	•4	0	0	•4	•
Suspends when case closed Service and support	•	•	•		•	0, ,
Warranty (years)	1	3	1	3	1	1
30-day money-back guarantee	•	•	0	0	5	
On-site/replacement service price for first year	0	\$40	\$129	\$50	0	0
Turnaround policy (days at service center)	2	3	2	2	3	3
Daily toll-free phone support (hours)	9	24	24	10	12	13
Weekend support	0	•	•	0	0	●6
BBS	•	•	•	•	•	•
Fax	•	•	•	0	•	•

¹ All notebooks priced as configured with DOS 6.0 or later, Windows 3.1, VGA monochrome or better display, mouse or other pointing device. Selling price is direct or based on vendor estimate.

² Mouse port doubles as keyboard port.

³ Accepts two Type II devices.

⁴ Suspends with key combination.

⁵ Only if bought direct.

⁶ Saturdays only.



When we set out to design the ideal office printer, we began by asking thousands of users what they wanted most. And then, instead of making those features

optional, as some others do, we made them standard.

Take print quality. We give you true 600 dpi resolu-

tion, plus 6MB of memory for improved graphics. Compatibility? We're DOS, Windows™ and Mac® compatible, with all the right languages and interfaces, and the intelligence to

TI REDEFINES
WHAT YOU SHOULD
EXPECT FROM AN
OFFICE PRINTER.

switch automatically. Connectivity?
All popular protocols are supported with a single network option board.
Maintenance? Our new toner cartridge gives you 15,000 pages

between changes. Paper handling? Two 250-sheet trays come standard. And value? Check the chart for a value comparison.

The new TI microLaser Pro 600. We're so confident you'll like it, we'll even give you a 30-day satisfaction guarantee. For more information, call 1-800-848-3927 or easy to remember 1-800-TI-TEXAS.

	TI microLaser™ Pro 600	HP LaserJet® 4	HP LaserJet 4M
Speed/Processor	8ppm/RISC	8ppm/RISC	8ppm/RISC
Memory	6MB	2MB	6MB
Emulations	PCL5/Adobe® PostScript® 2	PCL5E	PCL5E/ Adobe PostScript 2
Compatibility	DOS/Mac	DOS	DOS/Mac
Toner Cart. Life	15K pagest	6K pages	6K pages
Paper Trays	250 sheet/250 sheet	250 sheet/100 sheet	t 250 sheet/100 sheet
List Price*	\$1599	\$1839	\$2479

EXTENDING YOUR REACH WITH INNOVATION™



Ask About Our \$60 End User Rebate.††



* Dealer prices may vary, † @ 4% coverage. It Rebate applies to PS 23 and PS 65 models purchased April 1, 1994 through June 30, 1994. Software products illustrated above are not included with printer, and are intended only to indicate compatibility. microLaser and "Extending Your Reach With Innovation" are trademarks of Texas Instruments. Adobe, PostScript and the PostScript logo are registered trademarks of Adobe Systems, Inc. WordPerfect is a registered trademark of WordPerfect Corporation. PageMaker is a registered trademark of Adobe Systems, Inc. WordPerfect is a registered trademark of WordPerfect Corporation. PageMaker is a registered trademark of Adobe Systems, Inc. WordPerfect is a registered trademark of Apple Computer, Inc. LaserJet and PCL are registered trademarks of Hewlett-Packard, Inc. © 1994 TI.

System Snapshots

These systems, while very capable, don't match the preceding group for overall value in a business environment. However, many of them present unique and valuable solutions to end-user needs.

Arche NP-602

PROS: Good price

CONS: Low-contrast display, poor support

The \$1399 Arche NP-602 notebook comes with a Cyrix 486SLC-33 CPU, 4MB of RAM, and a 131MB hard drive—all wrapped in a 7.4-pound package. As configured, the unit wasn't very speedy, running slower than a typical Intel 486SX-25 notebook in our tests. On the other hand, the 3%-hour battery life is solid, and we found the keyboard and trackball comfortable. But the monochrome LCD's contrast level is low, providing a less-than-optimal display.

Arche stumbles on support: The company did okay handling anonymous calls for technical advice, but it has no toll-free support line. Unfortunately, we don't have sufficient Reliability and Service Monitor feedback from readers to expand on our research. This system didn't rate badly overall, but its weaknesses are strong enough to keep it off our Budget Mobile PCs Top 10. Arche Technologies, 800/437-1688, 510/623-8100 Reader service no. 647

Aspen 486 Color SubNote

PROS: Good price

CONS: Heavy for a subnote, short battery life

Aspen's 486 Color SubNote costs just \$2295, but don't get too excited: Its relatively small 7.9-inch color screen is an economy passive display. Aspen does provide a healthy 8MB of RAM to help beef up the performance of the pedestrian 486SX-25 CPU, and the 120MB of removable hard drive storage is adequate. But at a 7.4-pound traveling weight, this subnote is not at all a featherweight model. And its 1½-hour battery life is badly below par.

The keyboard is laid out quite well, and the marble-size trackball is relatively usable, although we did find the buttons rather awkward. This notebook comes with a one-year parts and two-year labor warranty, along with a two-day turnaround on repairs—and those policies are all solid

enough. Unfortunately, we don't have enough data in from Aspen customers via our reader surveys to give you the last word on the company's support. This subnotebook has its good points, but none are strong

enough to win a place on our Budget Mobile Top 10. Aspen Computer, 800/472-3273, 716/626-0315 Reader service no. 648

Compaq ProLinea Net1/25s

PROS: LAN-ready, low price, Energy Star compliant **CONS:** Slow performance, lack of expandability

This LAN-ready 486SX-25 integrates a 14-inch monitor and a tiny system unit into a \$1409 package that closely resembles a Macintosh. The choice of integrated ethernet or token ring network interface is convenient, but performance is slow, running about 25 percent behind a typical 486SX-25. There's no secondary cache option, but Compaq does provide a 486 OverDrive upgrade socket. The system comes with 4MB of RAM expandable to 20MB, a 214MB hard drive, just two free 16-bit slots, and no free drive bays.

Compaq's service and support is a mixed bag. And small size, low price, and LAN-readiness aren't enough to outweigh poor performance and low expandability in our book. *Compaq Computer*, 800/345-1518, 713/378-8820 Reader service no. 613

Dolch A-Pac 586-60C

PROS: Luggable multimedia system

CONS: High price, mouse costs extra

If you need a powerful, luggable multimedia PC—and can afford \$10,314—check out this PC. You get a Pentium-60 CPU, a 512K secondary cache, a 525MB hard drive, a CD ROM drive, a sound card, and speakers, all in a carry-on case weighing 28 pounds.

The A-Pac should appeal to those who need to give multimedia presentations on the road. The built-in active-matrix color screen supports resolutions up to 640 by 480—just like a notebook's. But the A-Pac has four free slots (two VL bus). It can't match desktop Pentiums, but performance compares well with multimedia DX2-66s. Too bad the price drastically limits its appeal. Dolch Computer Systems, 800/538-7506, 408/957-6575 Reader service no. 650

Hertz 486/D66X2e

PROS: 17-inch monitor, one-day service turnaround CONS: Slow for a DX2-66, no free SIMM sockets Hertz's \$2645 DX2-66 multimedia system

Hertz's \$2645 DX2-66 multimedia system comes with 8MB of RAM, a 256K secondary cache, and an impressive 17-inch monitor. A CD ROM drive and a sound card are included, but you have to pay \$20 or \$50, respectively, for a set of external or internal speakers. Surprisingly, this bulky desktop unit has four free 16-bit slots but just one free drive bay. Usually in a box this big, you'd get two to three free drive bays. And in contrast to the generous display, the 131MB hard drive is skimpy at best—and will be inadequate for most users.

Our main problem with this system is its performance, which was no better than mediocre in our tests—about 35 percent slower than a typical DX2-66. That's slow even for a multimedia model. Hertz's support policies have one standout feature: There's a one-day turnaround on factory repairs. Without more feedback from Hertz customers, we can't provide a service rating based on reader response. This system has pluses, but its drawbacks knock it out of the top ranks. Hertz Computer, 800/232-8737, 212/684-4141 Reader service no. 617

BATTERY LIFE TEST REPORT

IBM and Toshiba Run Coast to Coast

IBM ThinkPad 750P	5:29
Toshiba T4600	5:02
Packard Bell Diplomat 170M	4:40
WinBook 486SX/25 Color	3:01
Blackship BLK 486/33 ANB	1:56
Twinhead Slimnote 486E 4DX2/66T	1:29

Best Buy

Time in hours:minutes.

Methodolog

We drain and fully recharge the battery and set power-saving options to match a consistent profile where possible. Office workers type at regular intervals in Word for Windows, saving periodically. Notebooks are rotated among workers to even the work loads. We report the time elapsed until the notebook shuts itself off.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

TEST REPORT: THIS MONTH'S CONTENDERS

Pentium-66 Beats All; Eltech 75-MHz Tripler Hits the Midrange



Machines ordered by overall performance from best to worst.

Methodology

We tested each system as supplied by the manufacturer. We configured Windows with an HP LaserJet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. We set video resolution to 800 by 600 pixels in 256 colors, using the supplied video driver where possible. We loaded the test applications and files and test automation software and scripts.

Word for Windows 2.0

We worked with 1-, 9-, and 28-page business documents. Operations included creating, saving, opening, scrolling, editing, checking spelling, formatting, previewing, and printing.

Excel 4.0

We opened a file and performed several data extracts, entered new data, altered calculations, formatted, scrolled, moved blocks, previewed and printed, and saved.

Paradox for Windows 1.0

We used a custom form to add a number of records to an existing table, performed several queries, and generated a report.

Freelance for Windows 1.0

We built a six-page presentation using a standard template, clip art, text, and charts; applied several views to the presentation; previewed and saved it.

WordPerfect 6.0 for DOS

We performed a variety of editing, formatting, preview, and printing tasks on documents ranging from a single-page memo to a long report. Due to memory

requirements, the amount of free memory for DOS in the first 640K dramatically affects this test.

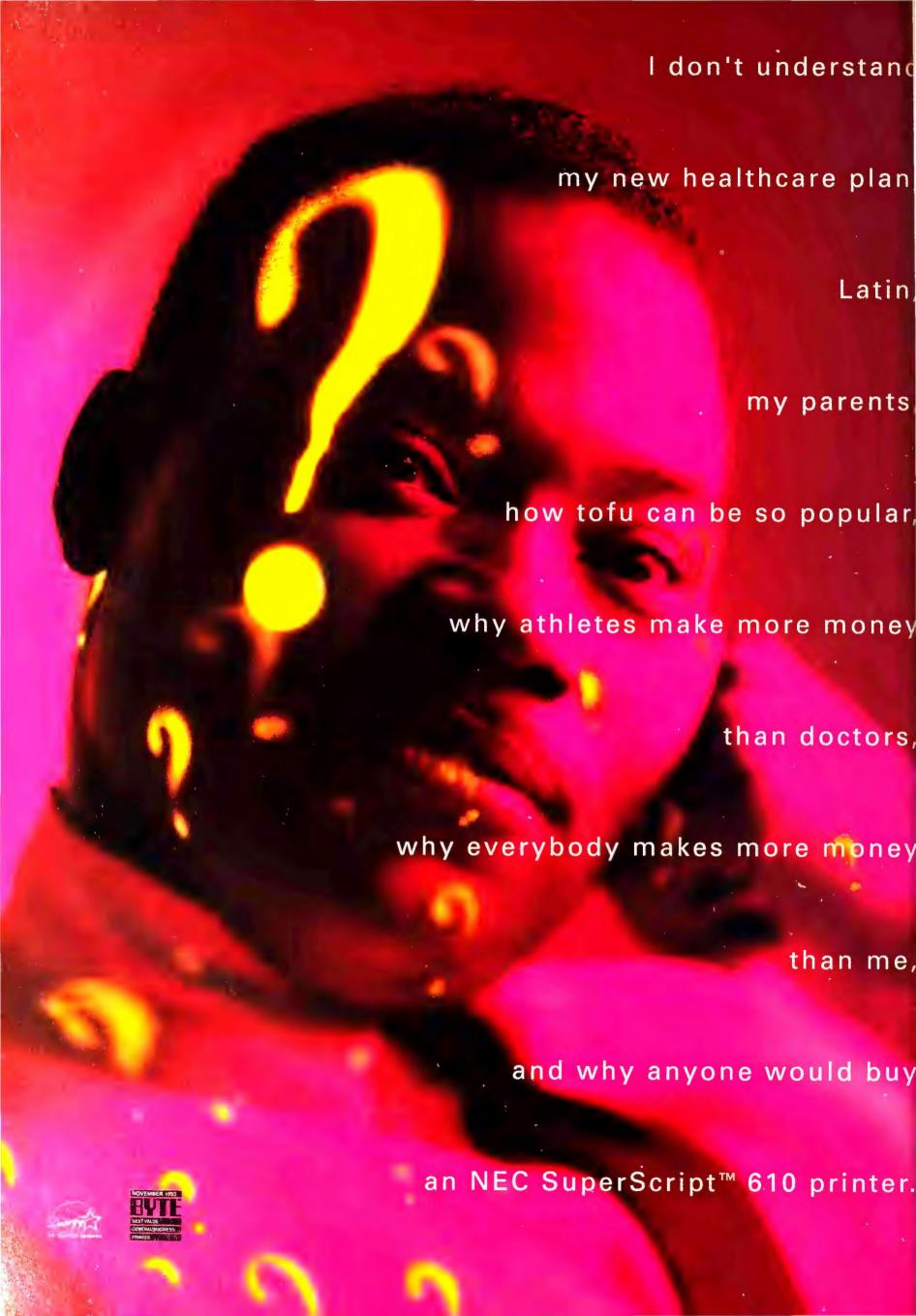
1-2-3 release 3.4 for DOS

Using the graphical Wysiwyg add-in and working in three different files, we created and altered formulas, built graphs, saved, and printed.

Paradox 3.5

We tested Paradox 3.5 running under Windows in a DOS box. We entered data, searched records, updated, and generated reports from a simple customer list.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



Why? Because it's the fastest and easiest personal laser printer you will ever use.

Besides you're smart enough to recognize a good idea when you see one. You're not afraid of new technology. And you're definitely tired of waiting every time you print from Windows.

But still you have your doubts. What exactly is this new technology? And what's in it for you?

Well, it's called GDI printing and it works like this. GDI (Graphical Device Interface) is the native language of Microsoft Windows.™ Because the SuperScript 610 thinks and speaks the same language it doesn't have to translate or reformat your documents before it can print. Which means it's 30% to 300% faster than ordinary printers. And what you see on the screen is truly what you get.

Okay, this is obviously a great Windows printer. But can it print PCL and DOS? Of course. As long as you open the application from within Windows. There's even a \$99 PostScriptTM option if you need it.

With all this sophisticated technology, you'd expect the 610 printer to be complicated and hard to use. But it's actually much easier to use than ordinary printers. And it only takes minutes to install.

To achieve this kind of ease we did have to eliminate a few things, however. Like the controller. Why have one when the PC can do the file processing? It's faster and more efficient. It also allows you to print fonts and graphics without any limitations. And every time you upgrade your PC, you automatically upgrade your printer.

We also moved the operator panel to the PC screen — where it belongs. That way graphical displays and animated icons can show you exactly what's going on at all times.

By the way, the SuperScript 610 is extremely compact, 300 dpi, prints 6 pages per minute and it comes with a 2-year overnight replacement warranty.

And it only costs about \$600. What's so hard to understand about that? For more information, call 1-800-NEC-INFO or for details via fax, call NEC FastFacts™ at 1-800-366-0476, and request document #SW610.





Win an Inmac 466P

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win an Inmac 466P, a Best Buy 486DX2-66 featured in this month's PC World Top 20.

HOW TO ENTER: Fax your completed questionnaire to *PC World* at 415/974-7367. If you have trouble connecting to this number, fax your survey to 415/974-7404 or 415/442-1891. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Fax Survey, Box 5-SS, *PC World*, 501 Second St. #600, San Francisco, CA 94107. Send your survey in no later than May 31.

HOW TO FILL OUT THE FORM: Clearly print your name (use block capital letters) and your fax number at right; fill the appropriate circle for each digit of your daytime phone number. Then fill out the rest of the questionnaire. WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES! One entry per person per month. Void where prohibited by law.

Void where prohibit	ed by law.										
ABOUT YOUR	PC										
	irer of the PC you use	most frequently?									
Acer	O DEC	Leading Edge	Sharp								
Acma	O Dell	Micro Express	Shasta								
ALR	Diamond	Micron	Swan								
Ambra	O DTK	MIS	○ Tagram								
Apple	O Dual	Mitac	○ Tandy								
Ares	O Eltech	O NEC	Tangent								
AST	O Epson	National Micro	Texas Instruments								
AT&T (NCR)	○ Ergo	O Netis	O Toshiba								
Austin	O Everex	Northgate	○ Tri-Star								
○ Axik	Gateway 2000	Packard Bell	Twinhead								
Blackship	O Hertz	O Panasonic	USA Flex								
○ CAF	Hewlett-Packard	O PC Brand	VTech (Expotech, Laser)								
Canon	O Hyundai	Pionex	Zenith								
Compaq	O IBM	Polywell	Zeos								
○ CompuAdd) Image	Samsung	No-name clone								
Compudyne	Inmac	Other (Specify firs	_								
Comtrade	Insight	Other (opecity ins	T letters)								
Cornell	O International										
CSP	Instrumentation										
Is this PC a?		huu thia DO2	When did how this DOO								
	Where did you Local deale		When did you buy this PC? This month								
O Desktop	-										
○ Notebook/laptop○ Hand-held			1–3 months ago								
Is the CPU a?		field sales force	○ 4-6 months ago								
_		p discount store	7-12 months ago								
Pentium/586	O Computer s		More than 12 months ago								
0 80486		tronics store	O Not sure								
0 80386	O Retail store		Would you buy this brand								
0 80286	O VAR	te A.	of PC again?								
Other (specify):	Other (spec	erry):	O Yes								
			O No								
Marin harrest areas DO	. h.,		1.14.41.4.14								
Less than 1 week	or phone, now	v long after you ordered 3–4 weeks	More than 4 weeks								
CESS HIGH I WEEK	O 1-2 WEEKS	O 3-4 MEGKS	Wore than 4 weeks								
WHAT ARE YO	U REPORTING	? (Check only one.)								
O No problems ever		A problem since last									
O No problems since			previously reported in survey								
to survey	, lust responded	All older problem not	previously reported in survey								
•	orting a problem n	lanca fill out the Un	time Depart /helew)								
 If you're NOT reporting a problem, please fill out the Uptime Report (below). 											
To REPORT a prob	lem, fill out the Pr	oblem Report (right	t column). ————								
			,								
+ UPTIME REPORT											
How many consecutive months has your PC been trouble-free?											
3 months	9 months 15 r	months O More	than 18 months								

○ 12 months ○ 18 months

STOP HERE if you're not reporting a problem.

	_	_								
LAST, FIRST NAME										
FAX NUMBER		-			-					
				ZIP						
Please	e fill in your day	time phone	number							
1 () 2 () 3 () 4 () 5 () 6 ()		0000000000	0000000000	0000000000		0000000000	0000000000	0000000000	0000000000	
7	0 0	0000	00000	00000		0000	00000	0000	00000	
PROBLEM F When you first red		PC. was an	v compo	nent "de	ead on a	rrival	"?			
Yes O No If so, which one w	O Don't kr	IOW		ione u	Juli 071 u		•			
Battery CD ROM CPU Floppy drive	Graphics/vio Hard drive Keyboard Memory		O Mo O Mo	dem/fax nitor/sc therboar use	reen	000		supply d board		
■ For the following questions, describe your most recent HARDWARE-related problem with this PC										
CPU (echnical suppor led, which one Graphics/vic Hard drive Keyboard Memory	t? was it? (Che deo board	Fau Inc Wro Fau ck all th Mo Mo Mo Mo	dem/fax nitor/sc therboar use	ponent installed iguration oheral .) t board reen	softw	rare C	Device OS proposed	e conflicts oblem know	
How many times h with this PC?			proble	cently d n occur	?	did	this p	roblem	PURCHAS occur?	
This was first to Two Three Did the problem of Yes No Not sure	O More	e than four	0 1- 0 4- 0 7- 0 Mo	s month 3 month 6 month 12 mont re than nths ago	s ago s ago ths ago 12	00000	1-3 r 4-6 r 7-12		s	
■ For the following										
On-site	Express syst	em swap iponent swap	000	Not at a Less tha 1-2 mi 2-5 mi	all an 1 mir n.	0	5-10 10-2			
How long did it tal to the person who Less than 1 ho 1-24 hours 1-2 days	finally helped your () 3–5 day () 1 week () More that	ou? 's an 1 week	Con	v long di npletely? Less tha 1–2 we 3–4 we	eks eks	ek ()	More Never	than 1 resolve	month ed	
Was the problem r satisfaction? Yes No	esolved to your		WOL	ild you b					received,	
On the whole, how service and support	rt you received? 3 \(\text{ 4 } \(\text{ 5} \)	5	Hov		s it that to a fri	end o	r colle	ague?	nend this	



HOW MUCH CAN ONE MAIL SYSTEM DO?

Can a mail system let you and everyone else in your office do more? Can it save you time, money and headaches? Can it keep you

ing in. And send faxes right from your word processor. Whether you're in Microsoft Word, Microsoft Excel, Lotus 1-2-3 or WordPerfect. learning to send and receive mail easy. And if you're going to be away, Mail's Out of Office feature will automatically forward a message to everyone who tries to get in con-

tact with you while you're out.
You can save even more time by adding other features that are just as easy to use as Mail. Like Schedule+, the best-selling scheduler for Windows. It helps you manage your calendar and reminds you of meetings and deadlines.



With Schedule+ you'll spend less time rounding people up for meetings, because Schedule+ lets you see when the people you need are free. So you can pick a time that's convenient for everyone.

YOU DECIDE.

connected whether you're down the hall, or down under on an important business trip?

Microsoft[®] Mail can.

No wonder it's the bestselling LAN- based mail
product in the world.

But first things first. How will Microsoft Mail work with what you already have? Perfectly. Whether you're in MS-DOS*, the Windows™ operating system, on a Mac* or OS/2*. And you can send mail without exiting the application you're work-

With Mail Remote, you don't need to be in your office to keep in touch. And with wireless, you don't even need to be near a phone. You can log in anywhere, anytime.

How can Microsoft Mail save you time? Mail has smart, sensible symbols and on-line help that make else is free. So you can schedule meetings without a lot of legwork.

Want to cut down on paperwork? Use Microsoft electronic forms to speed expense reports, vacation requests and any other routine forms through your office at the speed of light. And you can track them easily. So you won't have to worry that an important request has disappeared into a black hole.

It even shows you when everyone

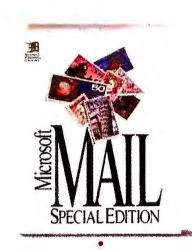


Electronic forms coordinate the flow of important forms through your office. Making sure everything gets where it's going. Without getting lost. Right on schedule.

Finally, with Mail Remote you can avoid disasters by staying connected while you're on the road, because Mail Remote lets you work just like you do in your office. It can even save you money. Just read the important messages, then let Mail Remote respond automatically when rates are lowest.

No other mail system is easier to use. Or gives you so many different ways to stay in control of your work. To prove it, we'll send you a free demo disk. Once you've seen everything you can do, we think deciding on a mail system will be easy. Just call (800) 871-3271.

Microsoft Mail is the best-selling LAN-based mail product in the world. Add Schedule+ for a personal timemanagement and group scheduling system. And electronic forms to speed paperwork through your office. Take then all on the road with Mail Remote. Together they'll make your whole organization more productive than you ever could have imagined.

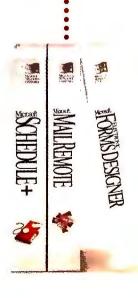




Microsoft Mail gives you an infinite number of ways to be more persuasive. Send words, graphs, pictures and sound as mail messages. There's almost no limit to what you can send.

Schedule+'s alarm clock reminds you of meetings, deadlines, anything. So you'll stay organized and save time. Without it, we might have forgotten this caption entirely.





Microso

Have Notebook,

A guide to hotels with the best amenities

for notebook-toting travelers.

he most important business trip of your life is playing out like a scene from *Planes, Trains & Automobiles*.

Thanks to a blizzard worthy of the *Guinness Book*, your flight from LA to Chicago is delayed three hours.

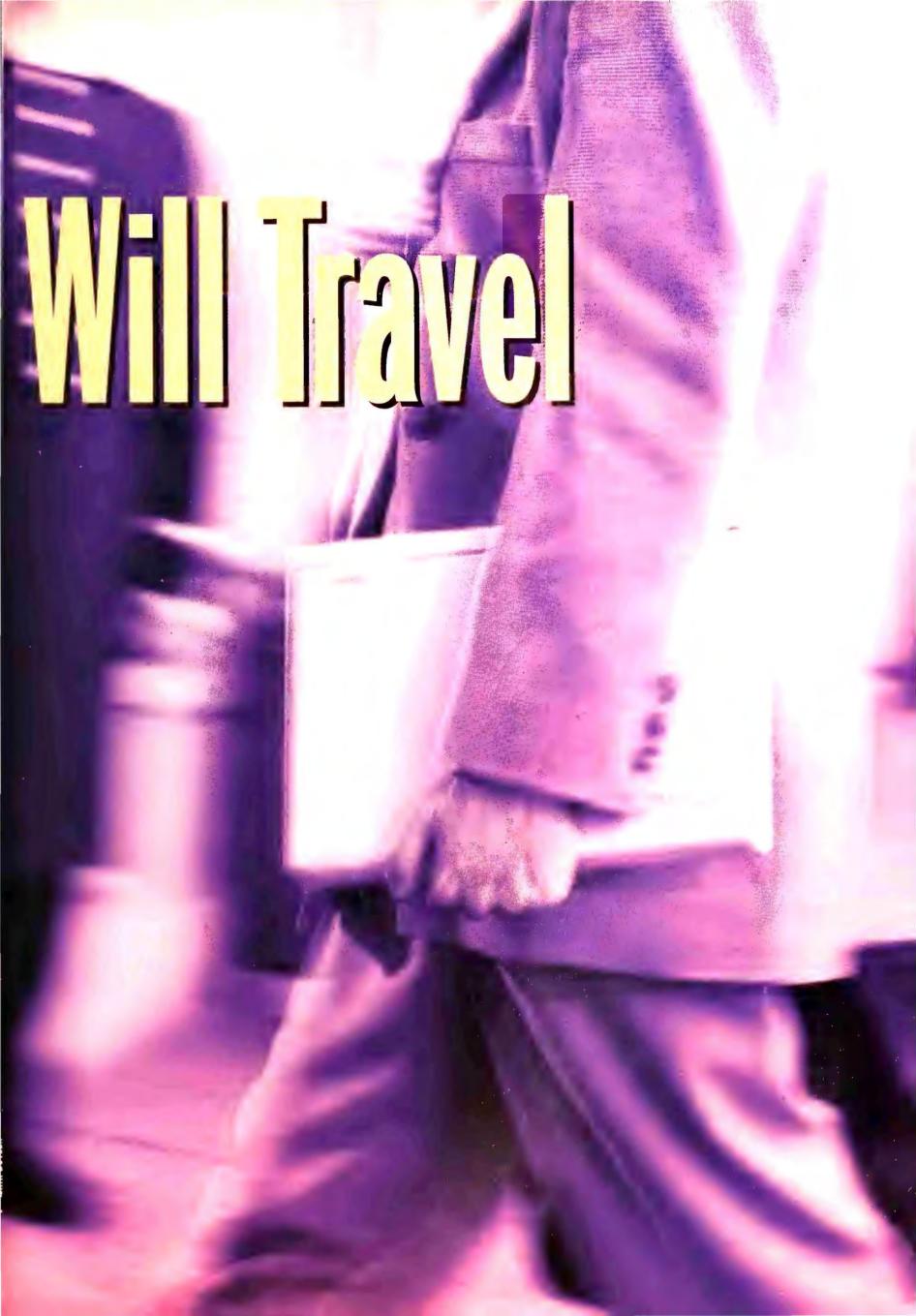
Finally en route, you plan to finish tomorrow's big sales presentation, but somewhere over the Rockies your note-

BY LESLIE CRAWFORD

book's battery runs out. At last, you arrive at your hotel room...only to find the electrical

outlet is a half mile from the phone jack, and there's no desk to be found. You call the front desk for help, but the staff doesn't know a laptop from a lapdog.

Chances are, none of your business trips will ever get *this* hairy. But when you have an important presentation to make or a critical sales call to prepare for, the last thing you need is an ill-equipped hotel room. The complimentary shampoo and the mint on the pillow are sweet touches, but the notebook-toting traveler needs more sophisticated amenities.



MOBILE COMPUTING HOTELS

An Executive's Wish List

Sue Sacks, an account manager at Steelcase, an international office furniture sales company based in Grand Rapids, Michigan, knows what it's like to try to work out of hotel rooms—even many of those claiming to be designed for the business traveler. Three weeks out of four she's on the road, setting up a virtual office in rooms throughout the country.

"Most hotels are set up for the tourist, not the technically minded traveler," says Sacks. "An efficient and practical work environment is a luxury." Beyond cable TV and a well-stocked bar, her executive wish list includes personalized voice mail, an onsite business center, a phone by the desk, and a personal coffeepot with good coffee. "You can never find ergonomic seating or an ergonomic desk. I'd also like good lighting," Sacks adds.

These comments are echoed by most frequent business travelers. Fortunately, their pleas have not gone unheard. A growing number of large hotel chains, as well as several smaller hotels in major cities, are now installing proper PC connections and other technical accourrements to ensure that busifacilities that include computers, fax and copy machines, printers, and even leading software packages. For example, this year most Hyatt Hotels in North America have adopted an innovative program for their business guests. For \$15 more a day, the Hyatt Business Plan offers guest rooms equipped with a workstation that includes a fax machine, a large desk with a telephone, and a computer hookup. In addition, their in-hotel business centers provide 24-hour access to printers, photocopiers, and

office supplies. (See the chart for a detailed list of major hotel chains and their business offerings.)

Most major chains even offer a "business guest suite." The price is usually higher, but the suite may have everything from an in-room computer and fax machine to multiple phone lines and ample work space.

Such services are still fairly new, however, and are not offered by all hotels in a chain. Don't assume, therefore, that just because the branch in Dallas has PC-friendly rooms,

ness travelers have a hassle-free stay. In the one in Seattle will as well. Always call addition to providing in-room amenities, ahead and ask about the range of services some hotels are establishing so-called execand equipment available, as well as inforutive business centers, centrally located mation about the room setup. San Francisco's Nob Hill Lambourne caters to the computer-savvy traveler by offering a PC and fax machine in every room.

Before You Make a Reservation

- Is there a PC-equipped business center on site? What are the hours? Charges?
- . If there's no business center, what are the charges for services such as faxing, copying, and printing?
- Are in-room PCs and fax machines available?
- . How are the rooms laid out? Is there a desk suitable for working? Are phone and electrical outlets near it?
- Is there safe storage for your notebook? In the room or at the front desk?

Savvy travelers also recommend verifying all charges in advance. If you're traveling on a tight budget, find out the charges before using a hotel's fax machines, printers, computers, copiers, or secretarial services. Some hotels charge as much as \$5 per page (for the first five pages, and 50 cents thereafter) for domestic outgoing faxes. That means a ten-page fax sent across town will cost \$27.50. If you have the time, you might consider looking for an independent business center nearby.

Small Wonders

Don't limit your options to the larger hotel chains. From Seattle to Washington, D.C., several independent luxury hotels are stepping up to meet the computing needs of today's business travelers. One advantage they offer over large chain hotels is an educated staff that is attentive to a guest's technical demands—whether that means digging up a needed software package or printing a document at midnight.

Here's a sampling of the services available in some of the larger U.S. cities.

Boston THE ELIOT: 370 Commonwealth Ave., 800/443-5468. Each of The Eliot's 93 suites has dual-line phones equipped with a modem jack. Printer, fax, copier, safe storage, and secretarial services are available. Price range: \$145 to \$195.

Houston THE LANCASTER; 701 Texas Ave., 800/231-0336. All 93 rooms have three to four telephones, each with a data port. Computers are available for rent during your stay, as are cellular telephones and in-room fax machines. Printing, copying, secretarial services, and safe storage facilities are also avail-

Lowest Prices on the SX & New DX2-50:

Rave Reviews! Read what the experts say:



Scoring high in overall value and design, the Micro Electronics WinBook gives you a lot for your MAGAZINE money, including an outstanding inte-

gral trackball.

PC MAGAZINE, Guide to Portable Computing, 8/93

"<u>If you're a Windows user on</u> a budget, or just have a bad

case of Mac envy...you should take a look at the WinBook. It's a machine that can hold its own with more expensive, less thoughtfully designed systems from other direct vendors."

COMPUTER SHOPPER, This Powerbook Twin Acts Like a PC, 9/93

WINDOWS MAGAZINE

'The WinBook is <u>a great example</u> of what a Windows notebook should be....fast, easy-to-use and a miser on battery life....lt's also inex-

pensive: nearly 50% less than some comparable notebooks.

WINDOWS MAGAZINE, Transcontinental Portable, 9/93

The WinBook Intel486 SX-25 & DX2-50 SL **Enhanced Features**



Ergonomically engineered & designed by award-winning Palo Alto Design

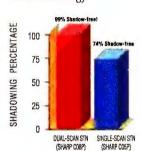
The WinBook's unique ergonomic features include a sloping wrist rest and keyboard with full-size keys, plus a centered, dual-button trackball—allowing you to work in total comfort away from your desk.

Clear, sharp color display gives you near-active matrix quality at a passive matrix price!

Images are sharper and clearer with less cursor loss. And the WinBook's advanced dualscan color display gives you 99% shadow-free performance compared to other single-scan passive matrix displays. You get a brighter, crisper, wider angle of view with an 18:1 contrast ratio-compared to

Longer battery life

The WinBook features NiMH 2200 MA batteries with goldplated contacts, allowing it 13:1 with previous passive matrix technology.



to run much longer than units with traditional NiCAD batteries-and there's no memory effect!

The WinBook offers you more features for less!

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Docking station gives you desktop power!

Two expansion slots and drive bays let you add peripherals such as monitors, hard drives, CD ROMs, I/O cards or an extended keyboard. Includes parallel, serial, PS/2 mouse, external keyboard and VGA ports. **And it's just \$399!**



Mouse/keyboard, parallel, serial and VGA ports plus PCMCIA expansion





WinBook



68 units reviewed! Portable Computing Issue, August '93

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Color Dual-Scan

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SX & DX Specifications

- SX and DX dual-scan cotor: 5.9 ibs with battery
 Pointing Device
 16mm Algs dual-action, Microsoft-compatible trackball

- SX-25: up to 3 hours with power management, over 5 hours with auxiliary power system (less 30 minutes for color).

- rives 1, built-in 1.44MB 3.5° lloppy drive Iniernal 200MB (16ms) hard drive Optional 340 MB (14ms) hard

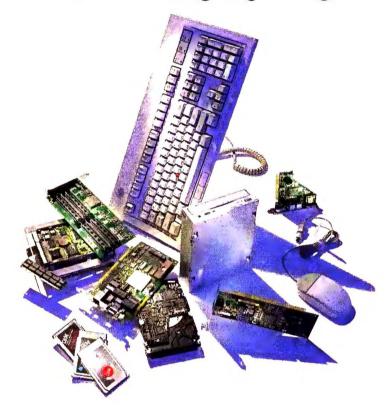
- Isplay
 SX monochrome: super-twisted
 64 gray-scale 10° LCD
 SX and DX color: dual-scan STN
 256-color 9.5° LCD
 640x480 resolution
 512k video RAM, up to 1024x768
- or external monitor contrast and brightness

- Keyboard

 Full-function keyboard with 85 keys and 4 inverted-T cursor control keys, 3.0mm keyboard spacing
- lodem Fax-9600 baud send/4800 baud receive/2400 baudHayes-compat
- PCMCIA type il slot Serial: 9-pin connector Parallel port Video: 15-pin connector for
- use anterface/AT keyboard
- external monitor 160-pin docking stalion Auxiliary baltery port
- Options
 Docking station
 Car adapter
 BMB, 16MB and 32MB RAM

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MOBILE COMPUTING HOTELS

able. In addition, the large suites can accommodate small business meetings. *Price range:* \$175 to \$500.

New York THE LOWELL; 28 E. 63rd St., 800/221-4444. The Lowell's 44 suites and 21 rooms have multiline telephones for computer and fax hookup, with in-room fax machines available on request. Notebooks and portable phones are available for rent, and there's safe storage in the lobby. Conference room facilities are also available in the hotel. *Price range: \$280 to \$840 (\$1500 for the penthouse)*.

THE TUTOR; 304 E. 42nd St., 800/879-8836. Each of the 300 guest rooms has two dual-line speakerphones with voice mail and a data port for fax and PC hookup; every room also has a safe. The hotel business center has PCs with a library of several leading business software applications, fax and copy machines, and both a color and a black-and-white laser printer. Secretarial services are also available through the concierge. *Price range:* \$195 to \$265.

San Francisco THE NOB HILL LAMBOURNE; 725 Pine St., 800/274-8466. Each of the 20 guest rooms is equipped with its own computer, fax machine, and two-line phone with personalized voice mail, conference call capabilities, and a separate data line. Safe storage is available in the room. The hotel business center provides a variety of business software, along with laser printers. Copying and secretarial services are also available, as are conference room facilities. *Price range:* \$125 to \$199.

Seattle INN AT THE MARKET; 86 Pine St., 800/446-4484. All 65 rooms have dual-line phones with a built-in data port. In-room fax machines are available for rent; PC, printer, copier, and fax services are available through guest services, as are conference room facilities and safe storage for notebooks. *Price range:* \$115 to \$245.

Washington, D.C. THE JEFFERSON; 16th and M Streets, 800/368-5966. All 100 rooms have dual-line speakerphones with confer-

ence call capabilities and data ports. In-room fax machines and computers are available for rent. All suites and one-third of the regular rooms are equipped with safe storage. Secretarial services, copiers, computers, and laser printers are available through the concierge. *Price range:* \$160 to \$950.

Whether you prefer a small, elite hotel or one of the larger chains, remember to use a business travel agent when planning your trips. Agents who specialize in business rather than recreational travel can quickly identify a hotel that best meets your needs and fits your budget. For example, Vesta Hotels (310/657-1478) in Los Angeles runs a nationwide center that can steer you to computer-friendly hotels in a number of major cities.

A final word of advice: Remember to ask your travel agent about corporate rates, which can be significantly lower than standard room rates.

Leslie Crawford is a San Francisco-based freelance writer.

Chain Hotels for Business Travelers

A survey of high-tech hookups for notebook users.

● = Yes ○ = No	Number of hotels/location	Business centers	Conference rooms	Special business amenitles
COURTYARD 800/321-2211	221/U.S., Int'l	0	•	Fax, copy services available at front desk; in-room voice mail at 63 hotels.
FAIRFIELD INN 800/228-2800	136/U.S.	0	0	Fax and copy services at front desk.
GUEST QUARTERS SUITE HOTELS 800/424-2900	29/U.S.	Not all hotels	•	Corporate suites available with PCs, fax machines, dual-line speakerphones. Equipment rentals, secretarial services available through front desk.
HILTON HOTELS 800/445-8667	236/U.S., Int'l	Not all hotels	Not all hotels	"BusinessSaver Program" offers ten free calls and ten free faxes. Work space, PCs for rent.
HYATT HOTELS 800/233-1234	103/U.S., Canada, Caribbean	•	•	"Regency Club" offers VIP service, with concierge to arrange secretarial services and all other business needs; 24-hour telex, fax.
HYATT INT'L 800/233-1234	62/Int'l	•	•	Many hotels have in-room fax machines. PC, fax, and cellular phone rentals as well as courier and secretarial services available through concierge.
INTER-CONTINENTAL HOTELS 800/327-0200	121/Int'l 17/U.S., Canada	•	•	Most hotels have in-room voice mail and dual-line phones with data ports.
ITT SHERATON 800/325-3535	404/U.S., Int'l	Not all hotels	•	Club floors have extra amenities: work area with business equipment or use of hotel's business center. Some hotels have in-room fax machines.
MARRIOTT HOTELS 800/228-9290	254/U.S., Int'l	Not all hotels	•	Copy and fax services available at front desk.
RENAISSANCE HOTELS AND RESORTS 800/228-9898	46/U.S., Canada	Not all hotels	Not all hotels	Rooms have two to three phones with multiline capabilities, data ports, and voice mail.
RESIDENCE INN 800/331-3131	183/U.S.	0	Not all hotels	Designed for extended stay (5-plus nights). PC, fax, cellular phone, and teleconferencing equipment available for rent.
RITZ CARLTON HOTELS 800/241-3333	30/U.S., Int'l	Not all hotels	•	Rooms equipped with work desks; no modems in rooms, but concierge can arrange hookup. Fax machines, PCs, and cellular phones available for rent.
STOUFFER HOTELS AND RESORTS 800/468-3571	29/U.S.	Not all hotels	•	Some guest rooms include two phone lines with data ports.

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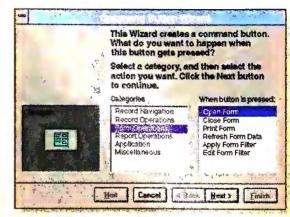
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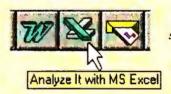


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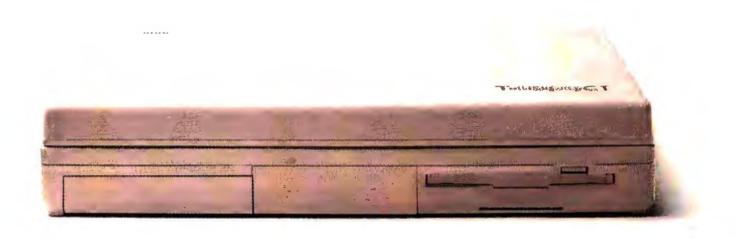
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Speed and Style

Laser Printers

Selecting the best of today's models that offer faster performance,

revolutionizes offices around the world. The coffee machine, certainly. The fax machine, without a doubt. But what about the laser printer? Ten years ago, it didn't exist; today, it's hard to imagine life without it. And while the technology driving coffee

makers may have improved in recent years, it hardly matches the torrid pace of the laser printer's advancement. In fact, there now seems to be a laser printer for every use, from powerful network printers that churn out 20 pages per minute (ppm) and cost more than \$10,000, to svelte personal lasers

that create professional-looking documents right on the desktop for as little as \$600 on the street.

Between the extremes is an array of affordable, full-function printers that pack enough muscle to carry the load of departments, work groups, and small offices with-



trom

better quality, and more options—all at yesterday's prices.

out overloading modest budgets. Not only can they crank out 8 ppm to 10 ppm and juggle fonts and graphics, they can handle a tough work load—day after day—without breaking down. Many include features such as PostScript capability, 600-dot-per-inch (dpi) resolution, and optional network connections. And they all provide more power than previous models, at a much lower cost.

To find the standouts in this group, we tested 16 laser printers with engine speeds between 8 ppm and 10 ppm and street prices of \$2000 or below. Most of these printers easily met our price cutoff—the

> average price was about \$1370 despite the fact that most came loaded with PostScript capability, 600-dpi resolution, and plenty of RAM. The lowest-priced entrant, the \$995 Panasonic KXP-4440, will surely open some eyes. But don't ignore pricier units, such as the \$1499 Apple LaserWriter Select 360 and the \$1349 Texas Instruments microLaser Pro 600 PS23.

> As always, consider your needs before shopping. Some printers may lack flexibility, while others may be overqualified for the job. Fortunately, we tested a variety of printers suitable for every use—from accounting firms cranking out numbers to design houses proofing PostScript output. No doubt about it: Somewhere in this group is a printer that can meet your needs.

Brewing the Perfect Page

One thing you won't have to worry about is finding a printer that offers professional-quality output for standard business fare such as correspondence, spreadsheets, and graphs. All the printers we tested print crisp lines and sharp characters when operating at 300 dpi; most documents don't need higher resolution for precise renderings of fonts and other blackand-white objects. With the printer positioning 90,000 dots in each square inch of the page—300 dots horizontally multiplied by 300 dots vertically—this resolution is sufficient to create attractive, legible text at sizes as low as 8-point.

But laser printers can run into trouble on the curves. Rounded characters—the letters e and a, for example—pose a sticky challenge at small sizes because the printer can apply only a limited number of dots to create the curve.

To overcome this problem (commonly called the jaggies), printer vendors have followed two tacks: enhancing the perceived resolution and increasing the number of dots per square inch. The first solution, introduced by Hewlett-Packard with its LaserJet III line, enhances resolution by manipulating the size, shape, and placement of the toner dots. While the page still holds the same number of dots per square inch, the printer can vary the shape of the dots or shift their position to create smoother curves and straighter diagonal lines. Most of the printers in this roundup offer some form of resolution enhancement.

A bigger advance came with 600-dpi output, which arrived in the mainstream with HP's LaserJet 4. This technology lets printers manipulate smaller dots and control them more precisely—quadrupling the dots per square inch. 600-dpi output has the greatest effect on gray-scale images and extremely small fonts—though it comes at a cost. Quadrupling the resolution means quadrupling the amount of memory needed to render the printed page—usually to the

BY MICHAEL DESMOND



PRINTERS LASERS

tune of 4MB or more of installed RAM. 600-dpi print jobs can also take significantly longer to print than 300-dpi jobs.

It's All in the Beans

So what makes one printer better or faster than another? At the heart of any printer is the engine, which defines the resolution and the rated speed of the product. The engine also determines the size and shape of the printer, where paper goes in and out, and how toner cartridges are designed and installed. In addition, each printer uses a controller similar to a system's CPU that processes jobs sent from a PC.

But the most important components are those you interact with every day. A zippy controller and print engine might yield a 10 or 20 percent performance advantage, according to our tests, but you'll lose more time if you have to deal with a difficult front-panel interface, complex toner and drum assemblies, and manual port and emulation switching. So consider features that spare you extra trips to the printer.

Finally, a busy office can consume prodigious amounts of paper, so make sure your printer holds enough sheets to keep things moving without dumping documents on the floor. While a printer's stated paper capacity is important, also consider its maximum capacity with optional bins. Most of the printers we tested handle at least 250 sheets in their standard input trays. If you need to print envelopes, transparencies, and other nonstandard media, you need a printer with a manual-feed tray that can feed paper from a stack-several here can handle only one item at a time. And while the ability to handle labels and thicker paper without jamming is important, no printer we tested had problems passing nonstandard media through its primary paper path.

On the Front Burner

You may have problems setting the automatic timer on your coffee machine, but you'll have little trouble working with most of these printers. While recent printer advancements have focused on improving resolution and graphics handling, this crop boasts improvements in convenience. The biggest news is that printers have finally learned to talk back. Remote printing used to be a one-way trip, with the user sending a print job off to whatever fate awaited it at the other end. If a printer happened to be

stalled or jammed, users didn't know about it until someone went to the printer and found the job in limbo. Many new printers provide software that lets the printer talk back to the PC. So if a paper jam is holding things up, the user will find out about it *before* the job goes out, not half an hour later. The printer can also alert connected PCs if it is low on toner, out of paper, or malfunctioning. Six of the printers in this review offer some form of bidirectional capability through the parallel port, the pri-

mary connection between printers and PCs.

At the same time, some vendors are increasing the speed limit on the parallel port. While four of the printers in this roundup offer accelerated-transfer capabilities, the prospects for universal high-speed printing are bound to the next release of Windows—when both bidirectional communications and high-speed transfers will be built into the operating system. So expect to hear more from your laser printer.

A related feature is automatic port and

300-dpi Printers: The House Blend

Did we ever promise a fair fight? Several 300-dpi printers, including the Toshiba and the Okidata OL810 and OL850, impressed our judges with their clear graphics. While most 300-dpi printers use resolution enhancement to create fine text, very small fonts pose a problem—check the Fujitsu and Kyocera printers.



Fujitsu PrintPartner 10W



Okidata OL810



Panasonic KXP-4440



Sharp JX-9660PS



Kyocera Ecosys FS-1500A



Okidata OL850



Samsung Finale F8000/12



Toshiba PageLaser GX200

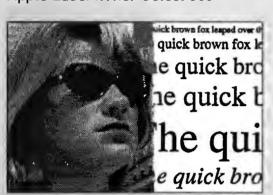
600-dpi Printers: Gourmet Output

Silky-smooth output from the Apple LaserWriter Select 360 and Texas Instruments microLaser Pro 600 PS23 catapulted these printers to a Best Buy. But there's more to it than dots: The Lexmark 4039

10R suffers from dark output, while banding holds back the Alps LSX1000 and Brother HL-10h. For text output, the contest is much closer, with all 600-dpi models offering excellent quality at all sizes.



Apple LaserWriter Select 360



Dataproducts LZR-965



NEC SilentWriter 1097



Alps LSX1000



Hewlett-Packard LaserJet 4



Sharp JX-9660PS



Brother Int'l HL-10h



Lexmark 4039 10R



Texas Instruments microLaser Pro

emulation switching. In the past, a printer connected to one PC through its serial port and to another through its parallel port had to be set manually to accept data from one port or the other. But most of the printers we reviewed can sense incoming data and automatically switch over to the active port. Emulation switching, likewise, lets a printer switch among printer languages without intervention—so a PostScript job originating from a Mac can be immediately followed by a PCL job originating from a PC.

But not all printers are created equal: Some are limited in the number and types of ports and languages they can switch between. Certain switching tasks, such as between a parallel port and a network connection, are tricky enough that some printers may not handle them smoothly. Check whether a printer supports the switching capabilities you need before buying.

Hardware is only part of the story. One of the most important things to consider when choosing a laser printer is the software it uses to render pages. This software, often called a page description language (PDL), defines how a printer handles fonts and graphics, and determines what the printer can and cannot do. When it comes to PDLs, the discussion begins and ends with PostScript. Developed by Adobe, Post-Script has long been the universal language among printing devices on both the PC and the Mac; virtually all professional publishing houses and service bureaus rely on the language for the bulk of their work. This

makes PostScript capability a must-have feature for offices sharing printers with both Macs and PCs. And while it is by no means necessary for day-to-day printing, anyone proofing output bound for a service bureau will surely require a PostScript printer.

Today there are two versions of Post-Script—Level 1 and Level 2. PostScript Level 2 has added features such as advanced color management, file compression, and faster printing speed. The performance boost comes in part from optimized code, which lets print jobs execute faster, as well as from compression that speeds up data transfers from PCs and eases RAM requirements. Best of all, the cost of Post-Script has finally come down, thanks in large part to third-party PostScript vendors

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PRINTERS LASERS

such as Phoenix Technologies. Several printers reviewed, including the Sharp JX-9660PS, Lexmark 4039 10R, and Fujitsu PrintPartner 10W, use third-party Postscript in their printers. The average price for the 11 PostScript printers in this review is about \$50 higher than non-PostScript models.

But the lingua franca among PC-compatible printers is still Hewlett-Packard's Printer Control Language, or PCL. While PCL has long trailed PostScript in its ability to scale type and handle complex graphics, advances over the last two years have closed the gap between the languages. With font utilities such as Adobe Type Manager and Microsoft's True Type, any Windows-based PC can scale type and send it to a printer, regardless of the limitations of the printer's software. HP's LaserJet III line introduced PCL5, which offers nearly all the functionality of PostScript Level 1 while boasting swifter performance. PCL5 is now the standard language among PC laser printers, with all but two printers in this review—the Okidata OL850 and the DataProducts LZR-965—offering PCL5 compatibility.

PCL took another step with PCL5e, introduced with HP's LaserJet 4 printers. An enhanced version of PCL5, it delivers features such as bidirectional communication, high-speed data transfers, and data compression. The Alps and Brother printers are currently the only non-HP printers to offer PCL5e. But as with PostScript, PCL clone makers are debuting lower-cost alternatives.

Of course, creating professional documents requires access to a variety of fonts. In the past, users often relied on fonts that printer makers bundled with their products. But now ATM and TrueType let you scale fonts from your PC's hard disk and download them to the printer on the fly.

Best Buys



For outstanding print quality, the Apple LaserWriter and TI microLaser were a tier above the

rest, with the best overall output quality in the review. The LaserWriter's low \$1499 street price buys you 7MB of RAM, Post-Script Level 2, and plug-and-play networking. The \$1349 microLaser boasts 6MB of RAM, PostScript Level 2, and some of the best performance scores in the review.

Memory

Additional graphics and font handling functions demand more resources. When a laser printer produces a page using PCL or Post-Script, it usually renders the entire page in memory before printing it out. In contrast to dot matrix or ink jet printers, which produce output one line at a time and need only a small amount of memory, laser printers need at least 1MB of RAM to compose and store pages—though users printing simple

text-only files at 300 dpi could squeak by on 512K of RAM. High resolutions demand even more storage, with PostScript print jobs requiring somewhat more RAM than PCL jobs. Fortunately, memory prices have dropped enough to make loaded printers affordable. While the printer with the most RAM—the 8MB Dataproducts LZR-965—costs a hefty \$1795, both the Apple LaserWriter Select 360 and the NEC SilentWriter 1097 deliver 7MB of memory

for a more reasonable \$1499.

Anyone doing graphics

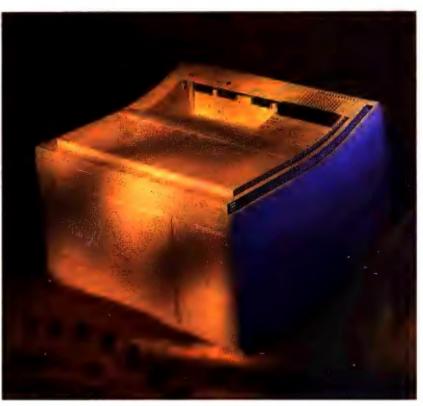
Anyone doing graphics jobs in PCL5 should go with at least 2MB to 4MB of RAM—more for full-page graphics at 600 dpi. With 600-dpi PostScript printers, 4MB is a good minimum; 6MB or 7MB will ensure that jobs complete successfully. Six of the printers in this review came with 2MB of RAM, while four—all 300-dpi printers—came with just 1MB. None of the 600-dpi printers had less than 2MB of RAM, and most had significantly more.

Of course, there are exceptions to the rule. The Sharp JX-9660PS offers 600-dpi resolution on just 2MB of RAM by using a memory handling technique in its Post-Script language. Called SoftBand, this system basically recycles memory by loading new data into memory as old data is sent to the engine. While this technique lets the Sharp handle most 600-dpi jobs, it is no substitute for more RAM: The Sharp could not print our full-page graphic at 600 dpi.

One more thing about memory: All these

models are upgradable, so you can add RAM to your printer down the road. Among the most upgradable are the HP LaserJet 4, the Alps LSX1000, and the Brother HL-10h, accepting up to 34MB of RAM. Several others have memory ceilings of 16MB to 22MB. The least upgradable are 300-dpi models—the Okidata OL850 has a 4MB ceiling, while the Kyocera, Okidata OL810, Panasonic, and Toshiba top out at 5MB.

Finally, consider the vendor's warranty. A



THE HEWLETT-PACKARD LASERJET 4 didn't break any land speed records, but its features, output, and price make it a contender.

laser printer is the kind of day-in, day-out machine that can bring an office to its knees when it goes down. So look for toll-free phone support for quick advice when things go bad and on-site service when you need to call in the cavalry. Also consider the availability of components and parts—in general, popular models will be easiest to maintain, upgrade, and repair.

To help you shop for a printer that meets your specific needs, we considered a variety of factors in our evaluation. While we paid particular attention to price, performance, and output quality in choosing overall Best Buys, we factored in service and support packages, availability of upgrades, and ease of use. To help you find the printer with the right mix of features, we've divided the review into three categories: output quality, performance, and features and flexibility. If you need high-quality graphics first and foremost, pay close attention to our review of these printers' output quality. But if you need a printer that can keep up with the

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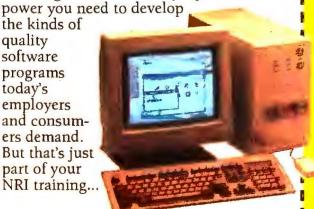
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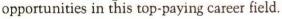
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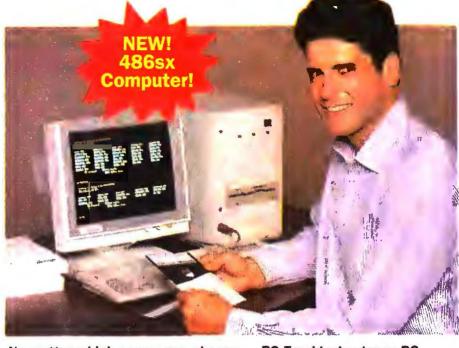
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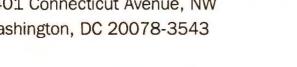
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Is PostScript Worth It?

ive years ago, Adobe's PostScript was the only page description language that let desk-top laser printers scale type, rotate text and images, and perform other complex graphics operations. Without it, a printer was limited to the fonts stored in the printer or downloaded from a hard disk. But software-based type managers such as Adobe Type Manager and Microsoft TrueType enabled PCs to scale type from stored outlines and download fonts to the printer. Meanwhile, HP's Printer Control Language (PCL) gained features such as support for white-on-black text, rotated type, and 600-dpi output.

So why do all but one of the printers reviewed here offer PostScript either standard or as an option? Compatibility. PostScript is the universal standard for handling electronic output on platforms ranging from the PC and the Macintosh to high-end Sun and DEC workstations. Prepress houses and service bureaus around the world recognize PostScript for handling output; so if you want to move your designs, images, and layouts farther than the nearest laser printer, you'll want PostScript capability.

caffeine-induced urgency of an overworked office, be sure to check the results of our application-speed tests. Finally, the features-and-flexibility reviews will help determine which printer can meet your installation needs without requiring a degree in printer science.

The PC World Taste Test

Best Output Quality

- 1 Apple LaserWriter Select 360
- 2 Texas Instruments microLaser Pro 600 PS23
- 3 Toshiba PageLaser GX200
- 4 NEC SilentWriter 1097
- 5 Hewlett-Packard LaserJet 4

For all the talk of performance, features, and warranties, professional-quality output remains the raison d'être of laser printers. While all these models are competent with plain text, they vary significantly when working with fine lines and gradated shades. To determine which printers are up to the task of handling everything from text to full-page graphics, we called upon PC World's staff to examine sample output from each printer. Our judges checked out text printed in a variety of point sizes and fonts, including reversed, white-on-black text that really challenged some of these printers. In addition, we compared each printer's rendering of a three-quarter-page gray-scale photograph, examining the clarity, contrast, and smoothness of the gray shades. We evaluated each printer on output produced under its preferred language—PostScript or PCL—and at its highest available resolution. One 600-dpi printer—the Sharp JX-9660PS—was judged at 300-dpi resolution in this category, because it lacked enough RAM to produce the full-page graphic. However, we included both 300- and 600-dpi samples from the Sharp printer in our output sidebar. Check these output samples to see the dramatic improvement in graphics quality.

The winner of *PC World*'s beauty contest? The Apple LaserWriter Select 360, hands down—it won every category of our

print test. The Apple grabbed our attention with its accurate rendering of the sample photo and held our interest by producing text that looked great even under magnification. Despite the complexity of the scanned photo, the Apple unit produced silky-smooth scale transitions and fine detail without sacrificing image con-

trast. Close behind the Apple was the Texas Instruments microLaser Pro 600 PS23, which also managed a seamless reproduction of our image. The real surprise was the Toshiba PageLaser GX200—the second runner-up in the beauty contest—which has the distinction of being the only 300-dpi printer among the winners. The Toshiba excelled on the strength of its grays, pro-

ducing even images and realistic shadows without the ugly banding that hampered some other printers. Rounding out our top five were the NEC SilentWriter 1097, which gave a strong graphics performance, and the HP LaserJet 4, which excelled in producing text. One interesting note: Post-Script printers did not enjoy a monopoly on print quality; the PCL-based HP and Toshiba units both placed well.

Other graphics standouts include the Sharp JX-9660PS (which shares the same engine as the TI microLaser), which fell a hair behind the fifth-place HP LaserJet 4 in our judging, even though we ran it at 300 dpi due to insufficient RAM. Its graphics output tied the Toshiba and bested the HP, though average text performance kept it out of the top five overall. Also strong was the Dataproducts LZR 965, which produced excellent contrast and clarity despite minor banding. Meanwhile, the Okidata OL810 and OL850 produced nearly identical output, with good grays and contrast.

Those that suffered in graphics judging include the Lexmark 4039 10R, which produced the darkest image in the review, effectively knocking it out of contention for a spot among the overall top five. Dark output also plagued the 600-dpi Brother HL-10h and the 300-dpi Fujitsu PrintPartner 10W. The twin Brother and Alps printers



OVERACHIEVER: The Toshiba PageLaser GX200 placed third in our output judging—the only 300-dpi printer to break into the top five.

placed last and next to last, respectively, in graphics judging due to the way they banded gray shades. Finally, the 300-dpi Panasonic KXP-4440 suffered from the most severe banding of any printer, producing a heat-shimmer effect on the graphic.

Text quality proved to be a tighter contest, with all printers creating good black-on-white text at sizes down to 8-point. But

PRINTERS LASERS

printing small white letters on a black background produced noticeable differences among the units; problems such as uneven toner distribution and poor focus showed up in the fine lines of serif type. And while resolution enhancement allowed the 300-dpi printers to produce smooth curves and straight lines, only the 600-dpi printers were able to maintain the quality of the characters at the smallest point sizes. Indeed, 600-dpi printers dominated the field in our text-output judging.

Once again, the Apple impressed the judges. It produced precise and accurately spaced characters at sizes as low as 4-point, though its handling of reversed text was only average. Behind the Apple was the HP, which rendered precise characters and perhaps the best white-on-black performance in the review. The Lexmark and the TI trailed in a third-place tie in text quality, with the Lexmark producing stronger blacks—the very characteristic that plagued it in the graphics test. The top 300-dpi entrant was the Toshiba, which once again outshone several 600-dpi models.

Among the disappointments in text output were the NEC and Dataproducts printers, which finished at the back of the 600-dpi crowd and even fell behind several 300-dpi models. Despite a strong graphics showing, the NEC struggled with reversed text, and both it and the Dataproducts failed to reproduce fonts accurately at the smallest point sizes. But the poorest performances came from the Kyocera Ecosys FS-

THE LEXMARK 4039 10R was dog slow in our tests, but its duplex paper feeder and excellent options make it an office workhorse.

1500A and the Fujitsu PrintPartner 10W. The Fujitsu printed small type with uneven spacing and inconsistent darkness, so characters looked washed out and jumbled; its reversed type was the worst in the review. The Kyocera had even greater trouble getting consistent toner coverage, with small type breaking up on the page.

Burning Toner

Best Performance

PCL

- 1 Samsung Finale F8000/12
- 2 Sharp JX-9660PS
- 3 Fujitsu PrintPartner 10W
- 4 Panasonic KXP-4440
- 5 Texas Instruments microLaser Pro 600 PS23

PostScript

- 1 Fujitsu PrintPartner 10W
- 2 Texas Instruments microLaser Pro 600 PS23
- 3 Sharp JX-9660PS
- 4 Samsung Finale F8000/12
- 5 NEC SilentWriter 1097

Not everyone needs or even wants to produce gourmet documents. For many users, the definition of a good laser printer is one that cuts through print jobs fast. While all these printers have engines rated from 8 ppm to 10 ppm, running them through applications showed significant differences in speed. To find out how fast these printers

are, we timed them as they printed files in WordPerfect for DOS and Microsoft Word for Windows, a spreadsheet table in Microsoft Excel, and a page layout in Aldus PageMaker. For testing, we used a Compaq Deskpro 386DX-25 with 8MB of RAM running DOS 6.0 and Windows 3.1. We disabled Windows' Print Manager to get the most accurate results.

We tested the printers with the most advanced drivers supplied by the vendors; if a printer came with PCL5 as its main driver, that's what we used. We also wanted to compare the performance of PostScript against PCL5, to see if there was a speed difference. We ran all PostScript printers through our test suite twice—once with the supplied PostScript driver and once with the supplied PCL driver—except for the Okidata OL850 and the Dataproducts LZR-965, which lack PCL5, and the Lexmark, which we could not get to run under PCL5 in time for review.

When the toner settled, we found that PCL printers enjoyed a sizable performance advantage over PostScript competitors—on average, PCL was about 16 percent faster than PostScript. The best showing in the PostScript derby—by the Fujitsu PrintPartner 10W—falls behind the performance of the three best times in our PCL-based testing. And the slowest performance in the roundup was from the PostScript-based Lexmark.

In general, we found that Excel experienced the greatest difference between PCL and PostScript—about 30 percent slower—with Word for Windows print jobs paying a 24 percent penalty. Our advice: If you want to print fast, keep it simple. Use Windows' TrueType or Adobe Type Manager to create fonts, and avoid high-resolution Post-Script print jobs. But if you need the best possible quality, expect to pay the price in longer print queues.

Among printers running PCL, the quickest feet belonged to the Samsung Finale F8000/12 running under PCL5. The Samsung dispelled all doubts by winning every component of the performance test. Behind were the PCL5-based Sharp, Fujitsu, and Panasonic. The Sharp powered near the top with a strong WordPerfect score, while the Fujitsu placed in the top five in Excel WordPerfect, and WinWord. The Panasonic excelled in the same apps. And don't overlook the TI microLaser. Not only did it finish fifth among PCL printers, but TI plans to offer a processor upgrade that will double the speed of the existing controller. So the TI may get faster still.

Nipping at the heels of the top five was the Okidata OL810, which took a second place in our Word for Windows component. Just behind were the Brother and Alps printers, followed by the NEC.

Bringing up the rear were the Apple LaserWriter, the Toshiba PageLaser, the Kyocera EcoSys, and the Hewlett-Packard



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PRINTERS LASERS

LaserJet 4. The HP was by far the slowest PCL printer, placing dead last among PCL printers in Excel—more than 6 seconds slower per page than the top finishers. The Kyocera unit did well in both WinWord and Excel—placing in the top five—but stumbled badly in PageMaker and fell to the back. The Apple was mediocre in Excel and WinWord and slow in WordPerfect, though a stronger PageMaker finish helped balance things out.

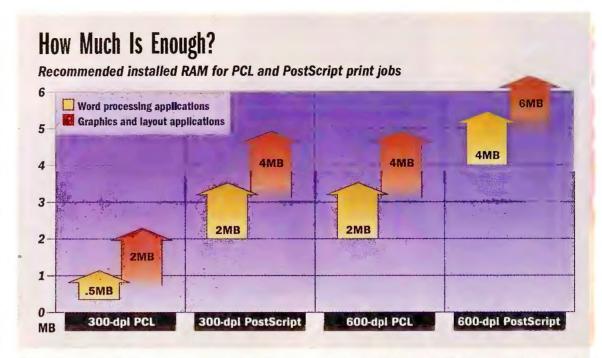
On the PostScript side, the Fujitsu Print-Partner 10W broke away from the pack. The Fujitsu won every part of our performance test and built impressive leads in Excel and WordPerfect. The TI microLaser Pro 600, meanwhile, was strong in every category except for Excel, while its Sharp twin—the JX-9660PS—boasted an excellent combination of PostScript and PCL performance, with top-three finishes on both sides. The Samsung Finale F8000/12 placed fourth overall against its PostScript competition, falling just behind the Sharp. And while the NEC SilentWriter 1097 failed to distinguish itself running PCL5, it finished fifth in our PostScript testing.

Four printers placed firmly in the middle of the pack. The Apple LaserWriter excelled in WordPerfect, while the Dataproducts LZR-965 scored a seventh-place finish overall with average performances across the board. Not surprisingly, the twin Alps and Brother printers crossed the finish line one after the other.

Finally, the Okidata OL850 and the Lexmark 4039 lagged behind the rest—significantly behind the Fujitsu PrintPartner 10W.



IN A HURRY? The Samsung Finale F8000/12 was the fastest PCL-based performer and placed a solid fourth in PostScript testing.



Printers vary in their use of memory, but there are some guidelines. 600-dpi resolution requires up to four times the memory of 300 dpi. PostScript jobs require more memory than equivalent PCL jobs, and pages with lots of graphics and fonts will always need more.

Overall, the Lexmark was the slowest printer in the review, placing last in every test component. One reason: The Lexmark's long and circuitous paper path adds extra time to each print job.

All That and Brains, Too

Best Features and Flexibility

- 1 Hewlett-Packard LaserJet 4
- 2 Lexmark 4039 10R
- 3 Apple LaserWriter Select 360
- 4 Alps LSX1000
- 5 Brother Int'l HL-10h

Laser printers became an office fixture because they are inexpensive, reliable, and fast. After all, when was the last time you

saw a cappuccino machine in the office? You want your printer to handle incoming jobs without intervention and to be simple enough to use that you never need to consult the manual.

To find out which printers let you settle right down to work, we looked at capabilities such as port and emulation switching, bidirectional communication, and interface design. In addition, we considered toner cartridge installation, manual-feed printing, and documentation quality. We also considered available upgrades, since a growing business may need to add network connections or PostScript capability to a base-level printer down the line.

No surprises here. The HP LaserJet 4 leads the pack with its outstanding design, impressive automation, and simple and attractive interface. We had no trouble getting the HP up and running—its simple toner cartridge design and excellent documentation made setup a breeze-and the front panel controls were among the easiest to use. Add automatic emulation and port switching, easy PostScript and networkinterface upgrades, and great paper handling, and the HP proves to be one of the most versatile printers around. Another standout is the Lexmark 4039 10R. We struggled through some initial problems but soon found its controls to be the best we've seen—its context-sensitive, four-row LCD display puts all the other printers to shame. The Lexmark's duplex option lets it print on both sides of the page—a good papersaving option. And though the Lexmark's documentation is a bit clumsy, the printer's impressive list of features and upgrades make it a powerful contender.

Behind the HP and Lexmark are the Apple, Alps, and Brother printers. The Apple didn't get extra points for its attractive, minimalist design, but it scored big with its easy-to-use interface. The Apple has no front panel controls, relying instead on software running on the PC to handle



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DIMENSION: $319(L) \times 247(W) \times 30(H)$ mm.

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• HDD

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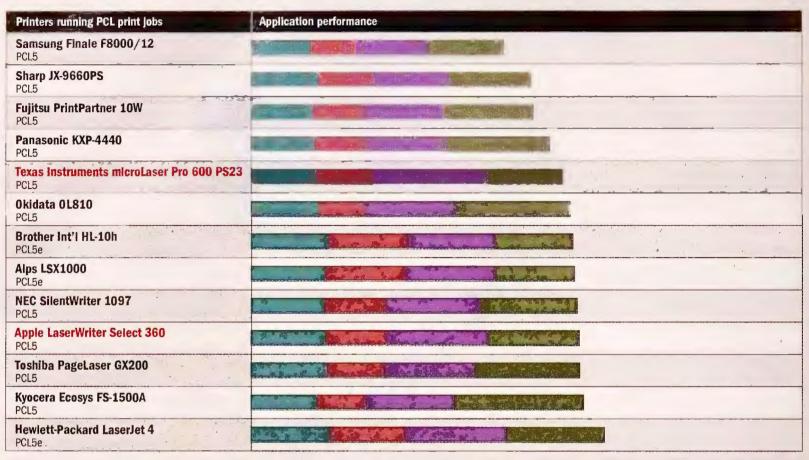
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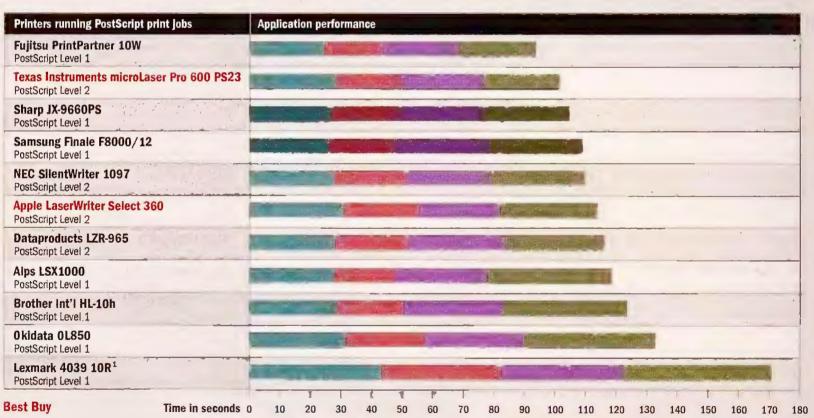
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PC WORLD TEST CENTER REPORT

High-Resolution Output Means Slower Performance





¹ Unable to complete PCL testing by press time.

Printers are divided by language and ordered from fastest to slowest in each section. Times are in seconds, measured from the time we issued the print command to the time the page ejected from the printer.

Methodology

We tested all printers as configured by the vendor. We used the vendor's PCL or PostScript drivers, and all PostScript printers were also tested under PCL; we did not test PCL4 emulation.

Each test was run twice on each printer. The first was immediately after the printer was turned on; the test was repeated so font or other caching could come into play. Scores are the average of both tests.

Excel 4.0

We printed a simple one-page spreadsheet

Word for Windows 2.0

We printed a one-page business letter.

WordPerfect 5.1

We printed a three-page text document. The score given is the total for all three pages.

PageMaker 4.0

We printed a text page in landscape orientation, with three columns of text, a black bar with white-onblack text, and a halftone image.

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as Excel, without the steep learning curve, SPSS for Windows is a great buy."-Michael Burgard, PC/Computing Widely used analytical tools such as crosstabs, correlations, curve-fitting and regression are in the Base module. Optional modules with unrivaled

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operations such as manual paper feeds, resolution changes, and emulation switching. And unlike some of the printers, the Apple had no problem performing all the tasks required of it. The toner cartridge, meanwhile, is the most compact and simple we've seen. The Apple is a strong allaround machine, with standard PostScript Level 2, a built-in AppleTalk network interface, and bidirectional communicationthough the lack of ethernet or token-ring options is a problem for network users. The Alps and Brother printers, meanwhile, surprised us with strong network capabilities, bidirectional communication, and excellent documentation. Only the Alps's noisy operation disappointed us, and even that couldn't keep it out of top contention.

Other strong contenders include the NEC, Dataproducts, and TI printers. All three run under PostScript—great for mixed Mac-PC environments—and offer automatic port and emulation switching. The NEC has a large footprint, but it's quiet and boasts excellent manuals. The TI and Dataproducts printers offer good connectivity and compatibility in smaller boxes, making them candidates for desktop duty.

At the back of the feature pack were the Panasonic KXP-4440 and the Kyocera Ecosys. The Kyocera's environmentally sensitive print engine is compelling, but the printer lacks port switching, network options, and an intuitive front panel interface. Still, the Kyocera's unique toner and drum assembly eliminate expensive cartridge swaps since users just add toner as needed. Unfortunately, installing the drum assembly is a messy operation. Likewise, the Panasonic suffers from a clumsy toner cartridge design, and it lacks the ability to switch automatically among emulations. We also had problems with the Fujitsu printer, which frequently jammed. Other older designs, including the Okidata OL810 and OL850, fell in the middle of the pack.

The Best of the Best

Overall Best Buys

- 1 Apple LaserWriter Select 360
- 2 Texas Instruments microLaser Pro 600 PS23

When all is said and done, the Apple Laser-Writer and TI microLaser come out a step ahead of the rest. While a strong second tier of products kept things close, there is simply no arguing the Apple LaserWriter's selection as a Best Buy. It lagged a bit in our performance tests, but the Apple's unrivaled print quality and affordable \$1499 street price, with a whopping 7MB of RAM, more than compensate for the slower speed. Throw in an outstanding design, PostScript

Level 2 capability, and ready-to-run networking, and the Apple is simply the best all-around printer you can buy in this price range. Anyone proofing PostScript layouts or needing high-quality graphics output should put this printer high on their list.

But the TI microLaser ran a close second. Its output quality was just a shade behind

RES COMPARISON				
What's Brewing? Las	ers Off	er Mo	ore fo	r Le
● Yes ○ No n/a = not applicable		Apple Heet 360	Brother Int'l	Dataproducts LZR-965
Standard features	1	\	_\	.0
Estimated street price	\$1395	\$1499	\$1199	\$1795
Resolution (dots per inch)	600	600	600	600
Engine speed (pages per minute)	10	10	10	9
Installed RAM	2	7	2	8
Maximum RAM	34	16	34	16
Resolution enhancement	•	•	•	. Q
Internal scalable fonts	71	n/a	13	35
Font cartridge slots	2	0	2	0
Emulations and connectivity	1 = 3 = 9			
PostScript	Level 1	Level 2	Level 1	Level 2
PCL	5e	5	5e	4
Bidirectional/enhanced throughput	•/0	•/0	0/0	0/0
Serial port	•	•	•	
Network connection	•	•	optional	•
Supported networks ³	A/E/T	Α	E/T	Α
Automatic port/emulation switching	•/•	•/•	0/0	0/0
Operational items		A		
Power-down mode	•	•	•	(O)
Lowest power draw (watts)	30	20	21	n/a
Operational power draw (watts)	900	450	900	700
Toner life (in pages)	4000	4000	4000	3000
Paper handling		The state of the s	- 6-	
Standard/maximum paper capacity	250/500	250/800	250/500	250/50
Maximum face-down/face-up output capacity	250/50	150/0	250/50	250/30
Straight paper path		0	-	•
Envelope feeder		•	•	optiona
Service and support			1	
Warranty (years)	3	1	2	2
Toll-free support		•	•	
Daily hours of phone support	8.5	12	9,25	9
On-site service	0	•	optional	•
	0/0	0/0	•/•	

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² PostScript Level 1.

³ AppleTalk, ethernet, and/or token ring.

⁴ Requires 3MB of RAM.

that of the Apple, but the TI boasts better performance and ethernet support. Add an attractive \$1349 street price, and the micro-Laser Pro 600 is an easy Best Buy. The TI entry will appeal to anyone looking for a powerful printer that won't eat up a lot of desk space—its towerlike design leaves a minimal footprint. And with 6MB of RAM

and Level 2 PostScript, this 600-dpi printer can handle almost any task.

And speaking of the TI, don't overlook the Sharp JX-9660PS. Built around the same engine as the TI printer, the Sharp offers comparable print quality and performance—at a low \$1299 street price. Finally, the HP LaserJet 4 earns mention with its

attractive \$1380 street price and outstanding print quality. Consider such issues as the availability of consumables, service and support, and the prospects for future upgrades, and the LaserJet 4 is hard to ignore.

Michael Desmond is an assistant editor for PC World.

TOW	Fujitsu printer	Hewlett-	Kyocera Ecosys ECA500A	Lexmark 4039 10R	NEC NECT WRITER	Okidata Okidata	Owidata OU850	Panasonic Panasonic	Samsung Finale Finale 12	Sharp 857-3	Texas ents pro licrolaser pro	Toshiba Toshiba PageLaser
	\$1200	\$1380	\$2000	\$1920	\$1499	\$1085	\$1487	\$995	\$1801	\$1299	\$1349	\$1799
	300	600	300	600	600	300	300	300	300	600	600	300
- 7	10	8	10	10	10	8	8	10	- 8	8	8	8
	2	2	1	4	7	1	2	1	6	2	6	1
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-	b/•	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	•/•	0/0
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	850	195	515	300	850	800	800	620	550	650	650	0
	8000	6000	7000	7000	8000	2500	2500	3000	3500	15,000	15,000	1500
									1			
	250/500	350/850	250/250	200/730	250/500	200/400	200/400	200/400	500/500	500/500	500/500	250/550
	150/50	250/ n/a	250/250	250/100	150/50	200/400	200/400	150/20	250/ n/a	250/ n/a	250/ n/a	250/20
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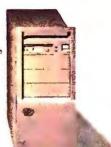
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HELP LINE Q & A



Tip of the Month

A DOS UPGRADER'S CAVEAT: A few cautions are in order if you want to upgrade from MS-DOS 6.0 to 6.2 using Microsoft's Step-Up upgrade package (available from the Microsoft Download Service at 206/936-6735). First, make sure you're not running a version of 6.0 modified by a hardware vendor. If you are, you'll need to upgrade with Microsoft's MS-DOS 6.2 Upgrade package.

Second, be sure you have not deleted any system files, such as DBLSPACE.BIN, from your DOS directory or the root directory of your system. If you have deleted a file that the upgrade program wants to replace, the upgrade will not complete; instead, you'll get an error message. In that case, the simplest solution is to reinstall all of MS-DOS 6.0, then upgrade to 6.2.

Also, be aware that the upgrade program merely preserves your old SmartDrive settings rather than enforcing safer operation. Should you want the SmartDrive disk cache to be conservative about delaying writes to the disk, you'll need to edit your AUTOEXEC.BAT and set the SmartDrive options—type HELP SMARTDRV for a list—after the upgrade has been completed.

Brett Glass, Contributing Editor

Cryptic Carrier

When I try to use my modem, nothing happens. I have tried using both Procomm and the electronic-mail program in Central Point Software's PC Tools, but all I get is a message saying 'No carrier'. What does this mean? I do have a carrier, don't I?

Also, can you recommend a good book on computers that explains the concepts other books assume you already understand?

Charlotte Moore, Philadelphia

To the computer novice, the 'No carrier' message might sound like a request to sign up with a long-distance phone company. But *carrier* means something different in the world of computer communications. In modem users' lingo, a carrier is the audible tone a modem sends across the telephone line when it communicates with another modem. Changes in the tone convey the data; thus, in a sense, the tone is "carrying" the information.

'No carrier' indicates that your modem is hooked up to your PC properly (if it weren't, you wouldn't get that message). But after the modem tried to place a call, it couldn't hear the carrier tone of the modem at the other end. This might be due to any number of causes: Your modem might not be plugged into the phone line (or might be plugged into the wrong jack); it might not have been given the right number to dial; or, worse, it might have been dialing the number of a human being. My advice: Have an experienced modem user show you the ropes.

As for books of basic computer knowledge, perhaps the best ever written is *The Secret Guide to Computers* by computer guru Russ Walter (\$15, 617/666-2666). This big, heavily illustrated book is written in a humorous, accessible style and assumes you know nothing whatsoever about computers at the outset. And if you don't understand something, you can call the author.

Directory Discipline, Part 1

How can I make DOS's DIR command list a directory's files alphabetically? An alphabetical listing would make it easier to find files.

Jay Masunaga, San Rafael, California

DIR will sort your files by name if A you enter the command DIR /0. You can make this the default sort order for DIR by putting the command SET DIRCMD=/O in AUTOEXEC.BAT. The /O stands for "order" and can be used with a colon followed by N, E, D, S, G, and/or C to sort the listing by name, by extension, by date, by size, with directories grouped, and by compression ratio, respectively. (You can use more than one sort order letter.) To reverse the sort order, place a minus sign before the sort letter. For example, to display a directory's files and subdirectories by extension, with subdirectories grouped at the end, and with like extensions sorted by file name, use DIR /O:-GEN. The technique is a little different if you're using DR DOS or Novell DOS (see the next item).

If you're looking for a particular file, use the file's name as a parameter to DIR, as in DIR MYFILE.DOC. If you're not sure of the exact file name, use wild-card characters—? for any one character and * for any remaining name or extension characters. For example, DIR ??FILE.* will list the files in the

Data Management 256 | Publishing & Presentations 262 | Communications 266 | Hardware 268 | Star-Dot-Star 272

current directory with six-character names that end in FILE, regardless of extension, and DIR MYF*.* will list files whose names begin with MYF.

Directory Discipline, Part 2

When I ran MS-DOS 5, I put SET DIRCMD=/O:N /P in my AUTO-EXEC.BAT file. That setting causes DIR commands to display directory listings in alphabetical order, pausing at each screenful until I press a key.

I recently switched to DR DOS 6, which I think is the best DOS around. However, setting DIRCMD has no effect on directory listings. How can I accomplish the same thing in DR DOS without typing DIR | SORT | MORE? Joe M. Wolff, Narrowsburg, New York

A DR DOS has a different command for fancy directory listings: XDIR (for "extended DIR"). It automatically sorts files by name, so the command XDIR /P will do the trick (the /P adds the pause between screenfuls).

If you really want to keep using DIR to get a sorted directory listing, upgrade to Novell DOS 7. Its macro processor, named DOSKEY after the MS-DOS equivalent, will let you redefine the DIR command so that it's automatically interpreted as XDIR /P.

Baffling Buffers

What's the best way to configure the buffer settings for my CD ROM drive? Both the low-level device driver and the Microsoft CD Extensions driver (MSCDEX) support variable numbers of buffers, and the new Smart-Drive has CD caching. Do these settings conflict? How do I get the best performance?

Dave Rogers, America Online

A Many CD ROM drivers, as well as MSCDEX, attempt to improve drive performance by allocating a small cache for the data they think your program will want next (usually the data immediately following what the program just read). This really helps, because even

multispeed CD ROMs spin quite slowly compared with hard disks; if the drive misses the data the first time, it must wait a relatively long time before that data comes around again.

As with disk caches, you'll get the best results if you have lots of cache RAM and you maximize the size of the cache that's closest logically to the CPU. In this case, it's best to turn on CD ROM caching in SmartDrive (or, even better, in an optimized third-party disk cache) and reduce the buffers in the drivers to their minimum sizes. But be sure that MSCDEX is loaded before the cache utility in your AUTOEX-EC.BAT file; otherwise, the cache may not recognize your CD ROM drive.

Give Your Ink Cartridge a Shot in the Arm

Do you know if the ink cartridge in the Canon BJ-200 can be reused? It seems a bit wasteful to shell out \$25 or so for a new one each time it runs out of ink. Can I refill the cartridge?

DickM92562, America Online

A Don't toss out that old cartridge yet. Refills for ink jets are a growth industry, and plenty of kits are available to let you refill the cartridges for Canon, HP, IBM, Kodak, Tandy, and other ink jet printers. Besides saving you money on cartridges and ink, refills also help protect the environment by reducing the number of cartridges you throw away. (For more on reducing printer costs and the pitfalls and rewards of refilling an ink jet cartridge, see April's "The Frugal Printer.")

If you have a color ink jet printer whose one-piece cartridge holds three or four colors, it's especially important to look into refills for both ecological and economic reasons. Normally, you must throw away the cartridge when any one of the colors is exhausted; with refills, you can continue to use the cartridge even after one color runs out.

The exact techniques used by refill kits vary, but the general idea is the same: You open the cartridge or pierce it with a needle, inject new ink, and re-

USER GROUP OF THE MONTH

PACS

May's user group tips come from the Philadelphia Area Computer Society. In addition to operating an electronic BBS, PACS publishes a 48-page monthly newsletter of software and hardware reviews, special interest reports, shareware library notes, and other features. The group's meetings are held from 8 a.m. to 4 p.m. on the third Saturday of each month in the Drexel University Matheson Building at 32nd and Market streets. There are more than 60 special interest groups, including ones for Windows, UNIX, Paradox, dBASE, spreadsheets, connectivity, investments, and consulting. The group has a shareware and public-domain software library of more than 2GB.

For more information, contact president Steve Longo at PACS, P.O. Box 312, La Salle University, Philadelphia, PA 19141. You can call PACS's voice line at 215/951-1255 or log on to its BBS at 215/842-9600. Yearly membership is \$27 and includes admission to the meetings and a subscription to the newsletter.

Reader service no. 623

DOS'S SCANDISK: DOS 6.2's ScanDisk detects and corrects disk drive errors. ScanDisk asks, by default, if you want to perform a surface scan after it's finished checking a drive's file system. To force ScanDisk to scan automatically, add /SURFACE after the SCANDISK command; to check all local drives, add /ALL. To save any lost clusters as files, add /AUTOFIX, and add /NOSUMMARY to bypass summary screens. To find out more about ScanDisk, type HELP SCANDISK or SCANDISK/? at the DOS prompt.

Steve Longo Philadelphia Area Computer Society



seal it. Some brands have special selling points (such as superior ink colors or a plastic needle that may be less likely than a metal one to cause injury). Here's a list of some vendors that can help you refill your cartridges. (Note: Golden Ribbon sells replacement cartridges but not refill kits.)

- American Ink Jet, 508/667-0600
- Aspen Imaging International, 800/955-5555
- Computer Friends, 503/626-2291
- Disks & Labels to Go, 800/426-3303
- Future Graphics, 818/341-6314
- Golden Ribbon, 800/443-6966
- Graphic Utilities, 617/890-1818
- · JetFill, 713/933-1900
- Kotler-Fuji Int'l, 852/418-2333
- Parana Supplies, 310/793-1325
- Pelikan, 615/794-9000
- Repeat-0-Type Manufacturing, 201/696-3330

Page Printer Puzzler

What is a page printer? Does it store data differently from a dot matrix printer? Why do low-end laser and ink jet printers frequently signal 'out of memory' errors when they're asked to print relatively simple graphics?

David A. King, Shelburne, Vermont

A page printer gets its name because it saves up the data for a full page, then prints the page. Thus it needs more memory than a dot matrix printer, which prints one line at a time. Ink jets fall between these two categories. Some are true page printers, while others act more like dot matrix units. Page printers usually report 'out of memory' errors because the manufacturer skimped on the RAM it provided with the printer.

Printer manufacturers often charge exorbitant prices for add-on memory, which means you should make sure there's a third-party memory vendor supporting the printer before you buy it. I also recommend that you start with plenty of memory: 2MB is a good starting point for a 300-dot-per-inch (dpi) printer, while 600-dpi printers may need up to 8MB to print a full page at high resolution. If you buy a PostScript model, add about 2MB for the overhead of that language.

Scanner Savior

I work in an office that has a perfectly good HP ScanJet, one of the original models. Many new software titles call for TWAIN-compatible scanners. Is there anyplace I can go to get a TWAIN driver to help this old warhorse talk with the new programs? MENovak, America Online

HP isn't providing TWAIN support for many of its older scanner models. However, if you have any HP ScanJet other than the early 4-bit model, you should be able to get TWAIN support with the drivers included in Corel's CorelSCSI Pro and CorelDraw 4.0. You'll need to load the original ScanJet driver, followed by the ZSoft Rev 6 scanner driver (created for ZSoft products such as Picture Publisher). With these two drivers loaded, Corel's TWAIN Data Source program will be able to access your scanner. For more details, call Corel Systems' technical support number.

 Corel Systems, 800/836-7274 (sales), 613/728-1010 (technical support)

MHz Muddle

In the January 1994 Help Line, in response to an inquiry about Cyrix upgrade chips, you stated that even if the upgrade is made, the CPU will have the same speed in MHz. Does this mean that if I upgrade a 386DX-40, I'll get a 486-40? Are the Cyrix chips fully compatible with Intel chips?

Cris Radaneata, CompuServe

The Cyrix upgrade chips are not A quite identical to any of the Intel chips, though they appear to be compatible with just about all software. Because the Cyrix upgrade chips have a different internal architecture than the Intel 486, and because they're used in systems with 386 memory buses, they won't perform quite as well as an Intel 486. Also, results will depend on the characteristics of your motherboard. (If it has a RAM cache, for example, you'll get better results.) Therefore, you can't . tell by the clock speed in MHz how much faster your system will perform. Cyrix claims a 100 percent performance

increase for its replacement chips, but users report a more modest 50 percent increase in real-life applications.

Unfortunately, if your system is a 386DX-40, you won't be able to use a Cyrix upgrade chip to speed it up. At this writing, Cyrix has not shipped a chip that could fit a 386DX-33 system, and it has not announced plans for a 40-MHz chip. My advice: If you want more speed, replace the motherboard with one equipped with a 486DX2-66.

Larger Laptop

I would like to upgrade my Toshiba T5200 luggable, which currently has a 100MB hard disk, to 300MB or more. I have contacted Toshiba, and the largest internal drive it offers for the T5200 is only 200MB—due, it says, to compatibility limitations. Can you help me locate a larger drive?

A. de Salabert, Rotterdam, Netherlands

You can get an upgrade for your A T5200 in one of three ways. First, because you have an AC-powered luggable with a full-length ISA slot, you can buy a hard card—a hard disk on a card—and fit it inside. This is a great way to go because you don't have to discard your existing hard drive. The second approach is to buy an external drive, complete with case and power supply. If you go this route, install a SCSI host adapter and run a cable to the drive. (You can also run a drive through the parallel port, but at greatly reduced performance.) The advantage of this solution is that you can attach up to seven SCSI devices. The disadvantage, of course, is that there will be more to carry. Finally, you can get an internal upgrade from Laptop Solutions of Houston, Texas (713/789-0878). This outfit is known for fitting large hard drives into laptops—especially Toshibas and Compaqs. However, its services don't come cheap. Prices range from \$749 for 250MB to \$1395 for 520MB.

By Brett Glass

Brett Glass is a contributing editor for PC World. Help Line welcomes your questions (see page 12 for contact information).

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SPREADSHEETS Q & A

1-2-3 4.0 Macros: Dealing With Relativity

I recently upgraded from 1-2-3 release 2, where I'd garnered a reputation as a macro wonk, to release 4.0 for Windows, which is making me feel like a macro weenie. Every time I use the recorder to create a release 4.0 macro, I get stuck in the same place. The macros I end up with are tied to specific ranges and cell addresses, but I need macros that can be used with any range or cell. For example, how can I record a macro to copy a formula for every item in a list when the column and the number of items might be different each time the macro runs?

Dixie Calvander, Lowe's Grove, North Carolina

A You've run smack up against the chief difficulty in writing macros for Windows spreadsheets, which are oriented toward complete actions rather than keystrokes, as in 1-2-3 for DOS. One solution is to use the *Transcript* • *Record Relative* command, which tells 1-2-3 to note relative, rather than exact, addresses when you record a macro. But even with this change, the recorder isn't as relative as it should be, so you should also know about the {ANCHOR} command, which can help you create something much more like DOS-style key-

stroke macros. I'll show you how to use both techniques.

To follow this tutorial, you can set up the worksheet shown in FIGURE 1 or use just about any worksheet of your own. Say you wanted to create a macro that selects cells D2..D13. With your DOS spreadsheet's techniques in mind, you'd be likely to select cell D2, then choose Tools • Macro • Record to turn on the macro recorder. Then you'd select range D2..D13 using the keyboard: Holding down the **<Shift>** key, you'd press <Left>, <End>, <Down>, and <Right>. Doing so would select the original formula plus all the cells that need copies of the formula. Finally, you'd execute Edit • Copy Down, then select Tools • Macro • Stop Recording to turn off the recorder.

If you were to select *Tools • Macro •* Show *Transcript* at this point, you'd display the transcript window where your actions are recorded as the macro statements {SELECT A:D2..A:D13;A:D2} and {EDIT-COPY-FILL "DOWN"}.

The problem is that despite your use of the cursor keys and other keys to select the range, the macro recorded a {SELECT} command that refers to the specific range A:D2..A:D13. If you were to use these two statements as your macro, that macro would work only with exactly the same cells.

Let's try again. Select Transcript • Record Relative, then select Tools • Macro • Record. Record the actions described above. In the transcript window you will see {SELECT-RANGE-RELATIVE 0;11;0} and also {EDIT-COPY-FILL "DOWN"}.

{SELECT-RANGE-RELATIVE}, as the name implies, selects a range relative to the cell pointer. The three arguments in the statement, 0;11;0, indicate

USER GROUP TIP

Start Excel Without a Sheet

To launch Excel 4.0 or 5.0 with no empty Sheet1 or Book1, respectively, add the /E switch after EXCEL.EXE in the command line of Excel's Properties dialog box. In Program Manager, click Excel's icon, select File • Properties, and in the dialog box add a space and the switch to the end of the command line.

John Kassay Philadelphia Area Computer Society

respectively that the range is one column wide, 12 rows high, and one sheet deep (this command, like all 1-2-3 commands and functions, starts counting with zero). The selected range starts at the active cell. This statement solves half the problem—it selects a range in the same column where the active cell is located, but the range is always just 12 rows high. Let's give it another try, but this time we'll forgo the transcript recorder in order to create a keystroke-by-keystroke version of the same macro. Select the worksheet window and enter {ANCHOR}{L}{END}{D}{R}{}^{\sim} into G3.

This statement, which you can't get with the macro recorder, mimics the exact keystrokes you performed to select the range to copy, and it's completely relative: The {END}{D} sequence extends the selection to match the items in column C. To complete the macro, select the {EDIT-COPY-FILL "DOWN"} command in the transcript window, choose Edit • Copy, and paste the command into cell G4 of the worksheet. Use Range Name to assign the name \H to cell F3, then select cell D2 and press <Ctrl>-H to execute the macro. Add or delete a row of data, and the macro still works like a charm, accommodating changes in your ranges.

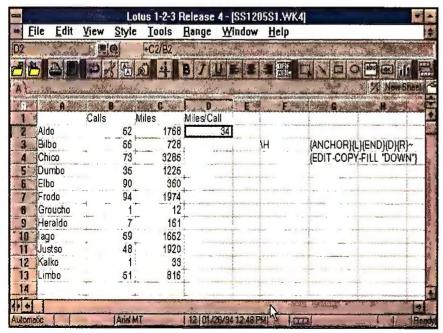
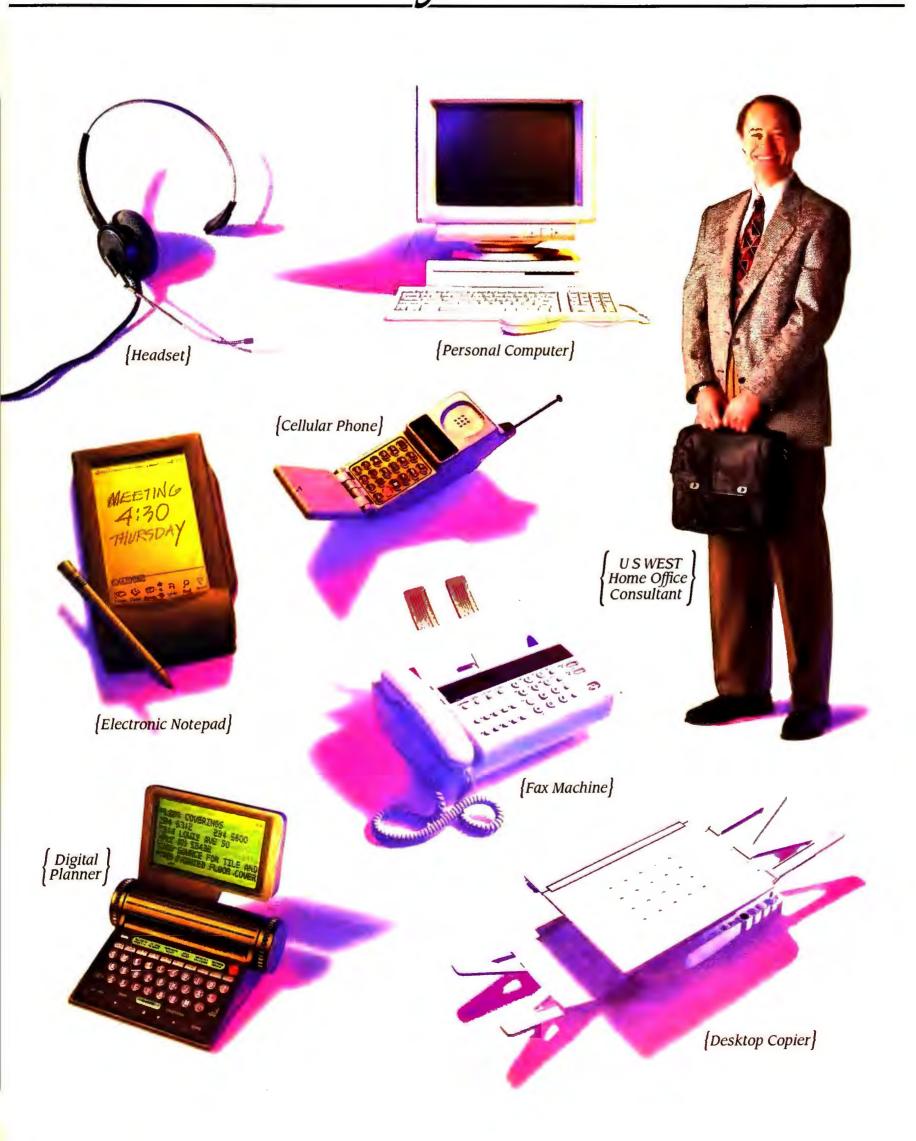


FIGURE 1: USE KEYSTROKE-ORIENTED MACROS when you need to deal with ranges that fluctuate in size.

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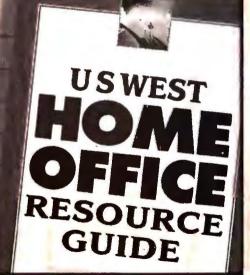
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Master Class: Curing the Printing Blues

After you've wrestled with creating a long and complicated worksheet, you still face a major hurdle: printing it. A few simple techniques can ensure that your printouts are perfect every time. In the second of two Master Classes on spreadsheet printing, we'll discuss strategies for big, complicated reports.

Multipage Reports

Shrinking the report, a trick I described last month, is fine for medium-size worksheets, but for really big ones you'll need more than one page. In some cases, the worksheet comprises a single table, with column headings across the top and row headings down the left edge. In such worksheets, an unprepared print job will quickly render the report indecipherable: It mindlessly slices a big print range into pages, leaving some with no headings at all.

The cure lies in print titles, which ensure that text in the title area is automatically reprinted at the edges of every page of the report, so all the pages display the necessary labels. To set print titles for rows and columns in most spreadsheets, you need to select the appropriate command and then designate ranges for the rows and columns containing headings. (In Excel, you'll need to select the range first and then the command.) Typically, you can designate just one cell in each row and each column. Use the commands shown below (top refers to row, left refers to columns):

1-2-3 for DOS : Print • Layout • Borders • Top and : Print • Layout • Borders • Left

Quattro Pro for DOS / Print • Headings • Left Heading and / Print • Headings • Top Heading

Quattro Pro for Windows File • Print • Options • Top heading and File • Print • Options • Left heading

1-2-3 for Windows 4.0 File • Page Setup • Columns and File • Page Setup • Rows

Excel 4.0 Options • Set Print Titles

Excel 5.0 File • Page Setup • Sheet • Rows to Repeat at Top and File • Page Setup • Sheet • Columns to Repeat at Left

In all the spreadsheets except Excel (which compensates for the titles on its own), you must be careful to select a print range that does not include the title rows or columns, or the titles will appear on your report twice. For example, if your row headings are in column A and your column headings are in row 1, select a print range beginning with cell B2.

Using page headers and footers can cut down on the confusion of

identifying multiple pages. Headers and footers include, in addition to text, special codes that print the name of the file, current date, page numbers, and so on. These codes make it easy to determine at a later date whether your report is current and which worksheet file corresponds to the piece of paper you're holding. In most Windows spreadsheets, select File • Page Setup, then click the Header or Footer button and follow the on-screen instructions to enter the codes you need. (In Excel 5.0, click on the Header/Footer tab, then choose Custom Header or Custom Footer.) In 1-2-3 2.x or 3.x, use :Print • Layout • Titles • Header or Footer. In Quattro Pro for DOS, the command is Print • Layout • Header text or Footer text.

Using Multiple Print Areas

Print titles won't help if your worksheet contains separate tables or work areas that need to appear in the same report. If you're using 1-2-3 release 2.x with Wysiwyg, or Quattro Pro for DOS, you're stuck printing each area on a separate page; to automate the process, you'll have to write a macro. But multiple print ranges are a routine task in 1-2-3 for Windows, 1-2-3 release 3.x, or Quattro Pro for Windows. For example, in 1-2-3 for Windows, select File • Print, choose Selected Range in the Print box, select the first range, type a comma, select another range, and so on, then click OK. The second range prints immediately below the first; if you want them on separate pages, follow the instructions described above, then go to the top row of the second range, select Style • Page Break • Row • OK, then choose File • Print. In these three programs, all of which are true 3-D spreadsheets, you can also select a 3-D print range, and the result is the same as if you had selected each page individually.

Excel 4.0 is the odd program out in this lineup: Even if you use the <Ctrl> key to select a collection of ranges, each range always prints on a separate page. But you can work around this problem. Begin by selecting the range you want to appear at the top of the page. Then click the camera tool (found on the Utility tool bar—right-click the standard tool bar and select Utility).

Drag a box around the first range you want to print, then go to an out-of-the-way area of your worksheet and click, and a "snapshot" of the range appears in a graphic box. Drag to position the image if necessary. Repeat the process to position the second range below the first, select *Options* • *Set Print Area* to set the print range so it includes both images, and print.

Happy printing!

Specialized Sorting in Any Spreadsheet

I have a parts list in Quattro Pro for Windows that includes a column of part numbers in the form XYZ123A, where XYZ represents the vendor and 123 represents the location in our plant. I need to arrange the part numbers according to their plant location, but I can't figure out how to make Quattro

Pro sort using 123 and ignore XYZ. Can you explain how to accomplish this? *Alice Frothingame, Caliphon, Wisconsin*

A If your part numbers are in column A starting at A2, select column B and insert a temporary column into your list. Select cell B2 and enter the formula @MID(A2,3,3) to isolate the 3-digit location

codes from the part numbers starting at position 3 (the first letter of the part number is position zero). Copy the formula for all items in the list, and use it as your sort key. This trick also works in 1-2-3. The formula is =MID(A1,4,3) in Excel. (Excel requires a 4 as the second argument, since it counts the first letter of the part number as position 1.)









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Scanning Throughput*			
300dpi/8.5 x 11"	2:00 Minutes	1:55 Minutes	4:05 Minutes
600dpi/8.5 x 11"	5:22 Minutes	9:27 Minutes	17:35 Minutes
800dp1/4 x 5"	2:20 Minutes	3:38 Minutes	6:36 Minutes
1200dpi/4 x 5"	5:28 Minutes	9:05 Minutes	13:00 Minutes
Single Lamp Design	Yes	Yes	No
Software Bundles	Complete PhotoShop	Photoshop LE	PhotoShop LE
Descreening	Yes	No	No
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*These tests were carried out on a Centris 650 with 40MB RAM; 300MB Hard Drive and Adobe PhotoShop 2.5. Results on Macintosh and PC were virtually identical.





SPREADSHEETS Q & A

Counting the Hours in Excel

Is there a way to calculate work hours in Excel? If an employee starts working at 7:45 a.m. and quits at 3:15 p.m., how do I calculate how many hours and minutes have been worked?

Brian Walker, Sterling, Illinois

This problem is easier than you may sus-A pect. Say an employee starts at 7:45. Enter 7:45 AM into A1. Let's say she knocks off at 3:15. Enter 3:15 PM into B1. In cell C1, enter the formula +B1-A1. You'll see the answer '7:30 AM' appear, meaning 7 hours and 30 minutes. To remove the spurious 'AM', select Format • Number (in Excel 5.0 select Format • Cells • Number), click Time in the Category list and h:mm in the Format codes list, then click OK.

Note that this value, despite its time format, is actually denominated in days (which you can see by formatting the cell according to General numeric format). To convert to decimal hours, use the formula +(B1-A1)*24 and the General numeric format. If a worker's shift crosses midnight, you can enter date as well as time. For instance, enter 5/1 10:00 PM into A1 and 5/2 4:15 AM into B1, and your formulas will do the right thing.

Scaling Graph Axes in 1-2-3

I've just started using 1-2-3 release 4.0, and I love the chart feature, but I can't seem to get my graph's y-axis to look right. If the numbers in my data vary between 0 and 5000, 1-2-3 labels the axis 0 through 5, with the word 'Thousands' beside it. How do I get rid of the word and make the axis say '1000', '2000', and so on?

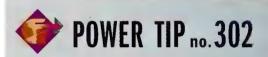
Ware Schieffer,

Charlotte, North Carolina

It's all in the *exponents*. Set up your chart as usual, then right-click on the y-axis and select Y-Axis from the pop-up menu. Click the Options button in the dialog box, and choose Manual in the Axis units box. Notice the zero in the cryptically named Axis units' Exponent field: When you created your graph with values in the thousands, 1-2-3 automatically set the exponent to 3, meaning 103 or 1000 so the values on the y-axis appeared as multiples of 1000. When you chose Manual, you set the exponent to zero, meaning 10° or 1. You can also select Manual in the Units title box and fill in a phrase in place of the 'Thousands' indicator, or leave the field blank to suppress it. Click *OK* twice to display the results.

By Richard Scoville

Richard Scoville is a contributing editor for PC World and a software training consultant based in Chapel Hill, North Carolina. Spreadsheets welcomes your questions (see page 12 for contact information).



Ouick-Change WinWord 2.0 Tool Bar To open Word 2.0 for Windows* Options dialog box quickly to change the tool bar, double-click an empty space on the tool bar.

> Karl Tetsuya Koessel **Senior Technical Editor**



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560i-W	17"	0.26mm	H:30-82kHz V:55-90Hz	1280×1024	
550i-W	17"	0.28mm	H:27-65kHz V:55-90Hz	1024×768	
340 <i>i-</i> W	15"	0.28mm	H:27-61.5kHz V:55-90Hz	1024×768	

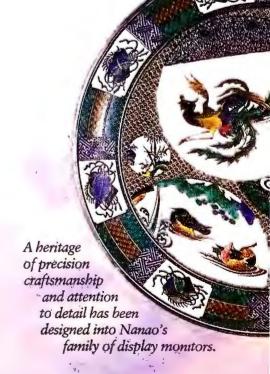
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WORD PROCESSING Q & A

Better Performance for WinWord 6.0 and WPWin 6.0

I just upgraded to version 6.0 of Word for Windows, and I have to say I'm disappointed with the program's performance. It seems quite sluggish on my 33-MHz 386DX computer even with 4MB of RAM, plenty of hard disk space, and a Diamond SpeedStar video adapter. Can you suggest any ways to improve performance short of buying an entirely new system?

Alan Johnson, New York

A Sure thing. While I can't guarantee you'll ever get blazing speed from WinWord on your 386, you can improve performance. (Incidentally, the speed-up advice here also applies to users of WordPerfect 6.0 for Windows.)

- 1. Add more memory. While these programs will run on 4MB of RAM, they really need at least 8MB to run smoothly. Also, make sure all of your memory is available to Windows by setting your memory management software to use extended memory only.
- 2. Today's word processors make heavy use of Windows graphics functions, so if you're still using an unaccelerated video card, now's the time to replace it with a graphics accelerator. Also, unless you really need high-resolution, high-color video modes, stick

with 640 by 480 resolution and 16 or 256 colors for the fastest performance. (See "Turbocharging Windows," October 1993.)

- 3. If you're not already using a permanent swap file for Windows on your hard disk, set one up. Launch the Control Panel, double-click the 386 Enhanced icon, click Virtual Memory Change, and set up your swap file. (With 8MB of RAM, I recommend an 8MB swap file.)
- 4. Make sure you have at least 4MB to 6MB of free space on the drive where Windows stores temporary files. Find the line in your AUTOEXEC.BAT file that reads SET TEMP= drive\path. Make sure TMP files aren't being sent to a drive compressed with DoubleSpace or any other disk compression utility.
- 5. Whenever possible, work in your program's fastest display mode. In Win-Word, that means selecting *View Normal*; WordPerfect users should select *View Draft*. Switch to page-layout views only for final formatting.
- 6. If your document includes graphics or charts, don't display them while editing text. In WinWord, select *Tools* Options View. Select the Picture Place holders check box and click OK. Word-Perfect users can accomplish the same thing by selecting File Preferences and

double-clicking the Display icon. In the Display Preferences dialog box, uncheck the Graphics check box in the Show frame, then click OK and Close.

- 7. If you work with documents longer than about 50 pages, break them down into smaller chunks, then use your program's Master Document feature to bring them together for final formatting and printing.
- 8. Finally, whenever possible, run your word

processor as the only active Windows application. Applications and utilities (including clock programs, screen savers, and schedulers) steal time, memory, and Windows resources away from your main task.

Customizing WinWord 2.0 Envelope Fonts

Word 2.0 for Windows' Create Envelope tool, but I don't like the default font that it uses for the addresses. I haven't figured out how to change these fonts to new defaults. What's the answer?

Alicia Bogard, Boston

A This question sent me deep into WinWord's help system, but I found the answer for you. The fonts used on envelopes are stored in styles, but it's not all that easy to display those styles so that you can change them. Here's how to do the job and make the new font choices the default:

Start with a blank document. Select Tools • Create Envelope, then click the Add to Document button. WinWord will attach an envelope to your blank document, positioning the cursor in the return address. Now select Format. Style, choose the envelope return style from the Style Name list, then select Define to drop down the rest of the Style dialog box. There, select the resulting button and make your font changes in the Character dialog box, clicking OK when you're done. Back in the Style dialog box, turn on the Add to Template check box, then select Apply. Answer Yes in the dialog box, which asks if you want to redefine the existing style.

To change the style for the envelope's main address, select Format • Style, choose envelope address in the Style Name list, and then define the new address font by repeating the remaining steps from the preceding paragraph. You don't have to save this blank document when you exit WinWord, but be sure to answer Yes when prompted to save global glossary changes.

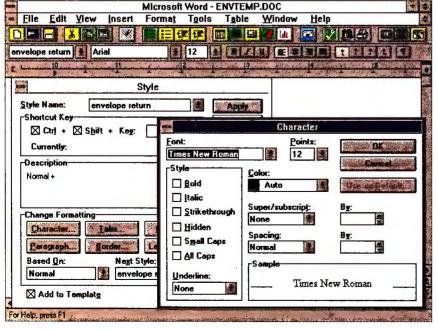
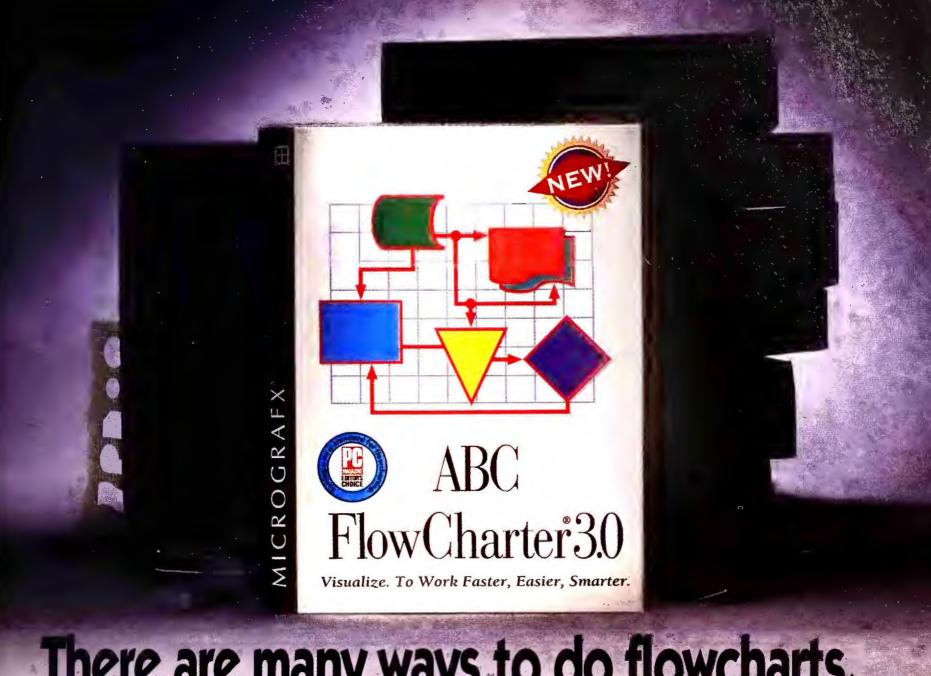


FIGURE 1: ALTER ENVELOPE FONTS and other formatting in Word 2.0 for Windows by changing the specifications for two styles.



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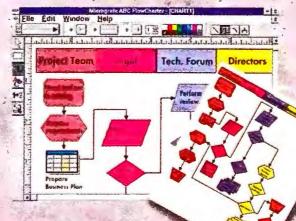
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Your new envelope fonts will become the defaults. By the way, you won't have to use the *Tooks • Create Envelope* command the next time you want to change these fonts, since the steps above added the two envelope styles to your *Normal* template. Instead, just start with the *Format • Style* step.

Canceling a Print Job in WinWord 2.0

In WordPerfect for DOS I could cancel a print job in midstream by pressing <Shift>-<F7>41. Now that I've switched to Word 2.0 for Windows, I miss that function. The Cancel button disappears shortly after I begin printing, so I don't have a chance to press it and stop the printer, even though the printer has not yet begun to print. Is there any way to cancel print jobs in Word? Sabrina Willis, Portland, Oregon

A If, as I assume, you're using the Windows Print Manager, you have two options.

First, if a print job has gone to Print Manager's print queue but hasn't started printing, just minimize WinWord and double-click the *Print Manager* icon. Select the *Delete* button, and answer *Yes* when asked to confirm the operation.

The second method is to turn off Print Manager altogether. To do this, open the Windows Control Panel and double-click the *Printers* icon. Uncheck the *Use Print Manager* check box, then select *Close*. Now when you print from WinWord, the Cancel button will remain visible until the entire document is printed, letting you cancel the job at any time.

Missing Characters in WordPerfect 6.0 for DOS

I recently upgraded from WordPerfect 5.1 for DOS to version 6.0. Unfortunately, ever since I upgraded, I've had problems printing on my Texas Instruments microLaser Plus printer. What happens is that some letters don't print when I'm using large fonts. I'm using the HP LaserJet IID driver supplied by WordPerfect. Do you have any suggestions?

Jack DeLap, Bonner Springs, Kansas

A What you have here is a failure to communicate. WordPerfect is sending large characters to your printer as soft fonts, but your printer doesn't completely understand what WordPerfect is trying to tell it.

The first thing you should try, therefore, is to lower the *threshold point size*—the point size above which Word-Perfect sends fonts as bit maps rather than soft fonts. To do so, press **<Shift>**-**<F7>**, then **<Shift>**-**<F1>** to get to the printer setup screen. Lower the threshold to whatever point size you're trying to print, and send the document through. If it still doesn't print correctly, try reducing the threshold point size by another 10 percent.

If that doesn't work, call WordPerfect's laser printer support line at 800/228-9027. Explain your problem, and ask for the 6.0a interim update. While the interim release isn't always helpful when dealing with emulations, it may be your only hope.

Easing the Switch From WordStar 7.0 to WordPerfect 5.1

I'm a 60-words-per-minute touch typist who uses WordStar 7.0 for DOS. I am happy with the program, but I'm concerned about its future. I'm thinking of switching to WordPerfect 5.1 for DOS, but when I tried it out, my typing speed slowed way down because I couldn't use those familiar WordStar shortcut keystroke commands. Is there any way to duplicate those WordStar commands in WordPerfect and keep my typing speed up?

John H. Menkes, Beverly Hills

A Sure. Moving to WordPerfect 5.1 makes a lot of sense, because of the company's outstanding customer service and the program's superior handling of fonts, graphics, and printing. Luckily for you, WordPerfect also has a customizable keyboard layout, which makes it possible to use most WordStar commands.

Customizing the keyboard yourself could take quite a bit of work, but fortunately, user Sid Kingdon has already done the job for you. He makes a keyboard file and associated macros, which

are available at no charge. Available as WSKEYS.ZIP on PC World Online, these files implement the 60 most common WordStar commands, including the famous <Ctrl>-key cursor controls. The system is easy to install, and a complete documentation file is included in the WSKEYS.ZIP archive. It should make you feel right at home in WordPerfect.

Moving From Column to Column in Ami Pro

I just bought Ami Pro 3.01 and am using it to create a three-column newsletter. Everything works fine, except that I can't figure out how to jump from the first column to the second, or from the second to the third, without repeatedly pressing <Enter>. Is there an easier way to move from column to column?

Jay Masunaga, San Rafael, California

A You need a break—a column break, to be specific. To insert one, start by selecting Page • Breaks. In the Breaks dialog box, select the Insert column break option and click OK. If there's no text beyond the cursor position when you insert the break, you'll have to press **Enter>** once before you can start entering text in the next column. To see where you've placed column breaks, select View • View Preferences, then select the Marks check box and click OK. Ami Pro will display an icon in the columns where you've placed a column break.

Another way to handle text in multiple columns is to use Ami Pro's balanced-column feature. With balanced columns turned on, the program automatically breaks the text as you type so that an equal amount appears in each column. To turn on balanced columns, select Page • Modify Page Layout, choose the number of columns and the gutterwidth measurements you need, then select the Column balance check box and click OK.

By George Campbell

George Campbell is a contributing editor for PC World. Word Processing welcomes your questions (see page 12 for contact information).



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WINDOWS Q & A

DOS Windows Your Way

I like how Windows remembers each DOS program's last window size and position. But other people are now using my PC and they keep rearranging things. How can I keep DOS windows where I want them?

Ross Beckett, Denver

A To chisel your DOS application windows in digital stone, first size and arrange them as desired, then exit the programs. Restart the DOS programs, and in each window, press -<Space">Alt>-<Space to open the control menu, select Fonts, make sure the Save Settings on Exit option is not checked, and click OK. Next, open SYSTEM.INI, find the [NonWindowsApp] section, and add

the line **DisablePositionSave=1**. Save the file and restart Windows.

Now, no matter how your DOS application windows are manipulated, they'll snap back into place the next time you load them. If you later decide to change the size or placement of a DOS window, load the program, make the changes, choose Fonts from the window's control menu, check the Save Settings on Exit option, and exit the program. Then restart the program and uncheck Save Settings on Exit so that the new configuration can't be altered.

Adding Menus to File Manager

I know that you can modify the Tools menu that DOS 6.0 adds to File Manager ("Custom File Manager

Menu," November 1993). But can you tell me how to add a custom menu? Bill Terry,

Bethesda, Maryland

You can create a A limited custom File Manager menu copying and modifying another menu's Dynamic Link Library (DLL) file. A simpler solution is to pick up a utility that includes a powerful macro language, such as File Commander (\$49.95 from Wilson Window-Ware, 800/762-8383). For another alternative, see this month's Windows Toolbox.

However, if you're willing to roll up your sleeves and modify a Dynamic Link Library file, then read on. Because you own DOS' 6.0, the obvious candidate is MSTOOLS.DLL; this file adds the

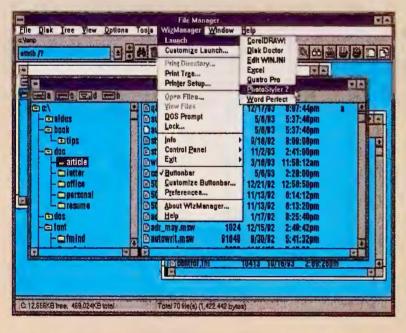
Tools menu to File Manager.

Before you dig in, though, ponder these rules, which are dictated by the fact that you can't change the size of your copy of MSTOOLS.DLL: 1) You can add only two programs to your custom menu. 2) The executable files (EXE) of the two programs must be in the same directory as the DLL (move them if necessary). 3) The executable file names must be exactly the same length (not counting the extensions) of the programs originally referenced in MSTOOLS.DLL. Since you're replacing references to MWBACKUP.EXE (the DOS 6.x backup program) and MWAV.EXE (the DOS 6.x antivirus program), the file names must be 8 and 4 characters, respectively. If the programs' EXE file names aren't the proper length, rename them now. 4) The custom menu's name must be exactly 5 characters (to match Tools), and the menu options must be exactly 9 and 12 characters, respectively. The names can be shorter if you fill them out with spaces or punctuation.

Now you're ready to act. Since you're keeping the Tools menu, first copy MSTOOLS.DLL to another directory and rename the copy. In File Manager, select MSTOOLS.DLL in your DOS directory, and choose File • Copy. In the To text box, type the path and new name of your custom DLL, such as C:\WINDOWS\CUSTOM.DLL. Remember, the DLL should reside in the same directory as the two programs your custom menu will reference.

Next, launch Windows Write and open your custom DLL file. When prompted, select No Conversion. When the DLL is loaded into the editor, select Find • Replace. To supplant the command that launches the DOS 6.0 antivirus program, type MWAV.EXE in the Find What text box and the four-letter name of your new executable file (such as CALC.EXE) in the Replace With text box. Then select Replace All. With the Replace dialog box still open, type MWBACKUP.EXE for Find What and the

Windows Toolbox



If you'd like to squeeze a little more oomph out of File Manager without investing a bundle, check out WizManager 1.5. This shareware program not only adds some handsome window dressing (such as a colorful, scrollable button bar), but also provides a customizable program launch menu, a DOS command line, the capability to print directory trees or listings, program launching from menus, password protection, detailed disk and system statistics, and even a rudimentary script language for automating tasks. It's available via PC World Online and other online services as WIZMGR.ZIP. Registration is \$39.95 from Mijenix Corp., 608/277-1971; for orders call 800/242-4775 or 713/524-6394.

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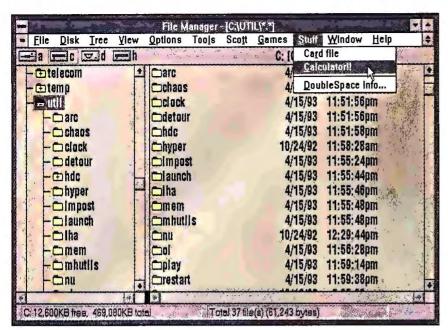
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ADD YOUR OWN CUSTOM MENUS to File Manager by modifying copies of MSTOOLS.DLL. To create more menus, just repeat the process.

eight-letter name of your other new program (such as **CARDFILE.EXE**) for Replace With, and select *Replace All*. Bear in mind that this technique is not limited to Windows programs—you can also reference DOS applications, batch files, and PIFs.

Next, you need to customize the options listed on the new menu. Type &Antivirus... in the Find What text box, enter its replacement menu name (12 characters plus an ampersand), such as &Calculator!!, in the Replace With text box, and click Replace All. The ampersand indicates the following character will be underlined in the menu for keyboard access. Make sure you don't assign the same letter to the two menu options. Now type &Backup... in the Find What text box and a 9-character (plus ampersand) replacement in the Replace With text box—for example, Ca&rd file (the space counts as a character). Click Replace All, and leave the Replace dialog box open.

To give the custom menu a name, type **Too&Is** in the Find What text box and a five-character (plus ampersand) name in the Replace With text box, such as **&Stuff**. Click *Replace All*, then select *Close* to exit the dialog box. Save the file and exit Write.

Finally, you must tell File Manager there's a new DLL in town. From File Manager or Program Manager, select File•Run, type WINFILE.INI, and press <Enter>. Locate the [AddOns] section and add a line that points to your

new DLL. For example, type My Brand New DLL=C:\WINDOWS\CUS-TOM.DLL (it doesn't matter what you type to the left of the equal sign). Save and exit.

You're done. Just start File Manager (or restart it if it's already running), and your new Stuff menu will appear. The only thing you can't change on this menu is the DoubleSpace Info option, since this choice doesn't launch a program. If launching only

two programs doesn't satisfy you, simply repeat the entire process to create still another custom menu. Just keep in mind that you're limited by File Manager, which recognizes only the first five lines in the [AddOns] section of the WINFILE.INI file.

If this technique doesn't work—for example, if File Manager stalls, Windows spits out an 'Application Error', or the new menu doesn't appear—that means you probably entered an extra space or character inadvertently when replacing references in the DLL. Step out to DOS and compare MSTOOLS. DLL and CUSTOM.DLL. If they're different sizes, start this tip from the beginning and be especially careful. Happy launchings.

Icons That Format

I hate running File Manager just to format a floppy disk. Can I create an icon in Program Manager that accomplishes the same thing?

Gregory A. McComsey, PC World Online

A It's easy as pie—if you don't mind using DOS commands and creating an icon for each floppy drive. The steps: Open the desired group window in Program Manager, choose File • New • Program Item, and click OK. Give the icon a title in the Description box, such as Format Floppy A:, and in the Command Line box, type COMMAND.COM /C FORMAT A:. You must specify a floppy drive on

this line; you can also add other parameters at the end, such as $/\mathbf{s}$ for creating bootable floppies and $/\mathbf{q}$ for quick formats if you use DOS 5.0 or later. You can also assign a shortcut key or select a different icon. Click OK, and the floppy formatting icon appears. When you double-click the icon, a DOS screen will pop up prompting you to insert a floppy disk to format. Just follow the instructions on screen. If you want to format floppies in another drive, use the steps described previously to create a second icon for the task.

Sharing Patterns

I've created a custom company logo pattern on my home computer (via the Desktop section of Control Panel), but I'm having a hard time reproducing it on my office PC. Is there some secret pattern file on my home PC that I must copy to the office PC?

Teresa Wu, Honolulu

A More or less. When you create a custom pattern and add it to the 'PatternName:' list box in the Desktop dialog box, a reference is added to the [Patterns] section of CONTROL.INI, which is found in the \WINDOWS subdirectory. For example, if you took the supplied Diamonds pattern, edited it, and added the new pattern to the list as 'Logo', you'd find a line like 'Logo=0 255 0 255 0 255 0 255' added to the bottom of the section.

To copy this custom pattern to any other system, simply copy the appropriate line from your home PC's CONTROL.INI to a text file, and, on the office PC, paste it into the [Patterns] section of CONTROL.INI. To make the pattern current, open Control Panel, select *Desktop*, click the *Pattern: Name* list, choose the custom pattern, and click *OK*. Your personalized logo will now be installed.

By Scott Dunn

Scott Dunn is a contributing editor for PC World and coauthor of 101 Windows Tips (Peachpit Press, Berkeley, California, 1992). Windows Q&A welcomes your questions (see page 12 for contact information).



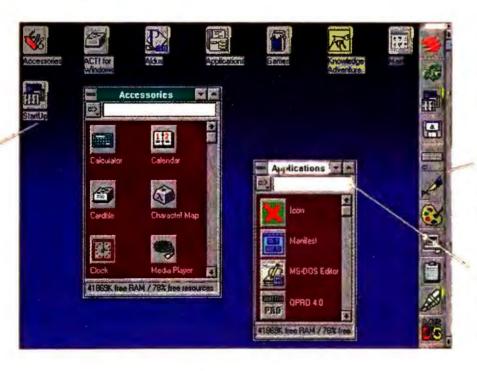
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0S/2 Q & A

Driving Me Crazy

I've been using the Drive objects on my desktop to keep my files organized, but I've run into a problem. How do I restrict the file listing to, say, word processing documents?

Tom Pelosi, New York

A In OS/2, you can set a folder to display only one kind of file, to display everything but one kind of file, or to display files that match a complicated set of criteria. For example, here's how you'd restrict a folder's listing to Ami Pro word processing files that have the SAM extension. Just right-click the folder to bring up its menu, then click the Open arrow and select Settings • Include. Click the right-facing arrow at the bottom right of the notebook, next to the 'Include – Page 1 of...' message. Continue clicking until you get to the 'File System Criteria' page.

This page displays three headings in a small table: Property, Comparison, and Value. The first one, Property, defines the file property you want to base your selection on—for example, name, size, or date. Comparison lets you find files that are equal to something, less than something, and so on. Value refers to the criteria you want to compare, which in our case is the extension SAM. One criterion, 'Flags less than – H –', is probably there already. It tells OS/2 to display all files that don't have the hidden ('H') attribute turned on.

To see only your SAM files, click the Add button since you want to add a criterion. In the resulting dialog box, for the 'Property to be Compared' option, select *Real name* (meaning the file name). Under Comparison, select *equal to*. For Value, type *.SAM.

The final step is to select AND or OR under 'Use of criteria'. What's the difference? If you select AND, OS/2 displays only files that meet *all* of the criteria you've defined. If you select OR, it displays all files that meet *any* of the criteria. Once you select all your options, click the *Add* button again to add your criteria to the table.

OS/2 immediately changes the fold-

er's contents to reflect your new criteria. If you don't get the results you expected, just click the *Change* button to modify your entry.

Let's get a little fancier. What if you want to display all files that are *not* from Ami Pro? Just click *Change*, then change the Comparison type to *not equal* and click *Change* again.

Sort It Out

We're having two problems with our C: drive folders. We can sort the file icons in a folder, but new files we add don't automatically get sorted. Also, there seems to be no way to sort by file extension. Can you help?

Jack and Mary Koch, Lucas, Texas

A There's an easy solution to the first problem and an explanation for the second. Open the folder of interest and bring up the Settings notebook by right-clicking and selecting Open • Settings. Go to the Sort page and you'll see options for the Sort menu. Near the bottom is the check box 'Always maintain sort order'. If it's checked, OS/2 automatically sorts the objects in the folder whenever they get out of order. If you want OS/2 to automatically sort the objects in all of your folders, do this with your hard disk's Drive object rather than an individual folder.

Sorting by extension is another matter. OS/2 assumes you'll be using its own High Performance File System, which allows 254-character file names but doesn't recognize a DOS file extension as anything other than the last three letters in a file name. If you use OS/2 applications, you can sort files by type—for example, OS/2 recognizes Ami Pro for OS/2 files and can sort them accordingly—but with DOS or Windows programs, you're out of luck.

By Lou Miranda

Lou Miranda is an OS/2 programmer and consultant based in Minneapolis—St. Paul. OS/2 welcomes your questions. See page 12 for contact information.

From Windows to OS/2

Colorful, Magical Icons From Useful, Productive Associations

Windows lets you associate an application with its data files through the File Manager's File • Associate command. Once they're associated, you can launch the application by double-clicking a data file's name or icon.

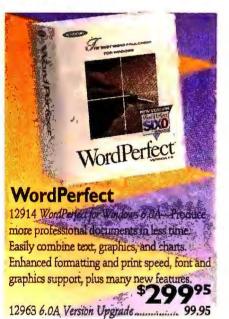
OS/2 offers similar, but more versatile, capabilities. Native OS/2 applications register their file format with the operating system, which associates them with their data files without relying on a three-letter extension. In addition to letting you launch applications, direct OS/2 associations allow you to print your files by dragging them to a Printer icon.

So how do you associate files with DOS and Windows apps? Easy. Right-click the icon for a DOS or Windows program, then click the Open arrow and select Settings • Association. In the New Name box, type *. and the program's default data extension (for instance, *.WPD for WordPerfect 6.0 for Windows), and click the Add» button to the box's right. Close the note-book by double-clicking the Title Bar icon in the upper left corner.

Now check out a directory where you store some of your app's data files. Notice something different? Your files have icons that match the application—you can double-click them to bring up your app. Unfortunately, associations won't allow you to print a DOS or Windows document by dragging it to a Printer icon.

You can associate more than one application with an extension. Double-clicking a file icon with that extension launches the first program assigned. To choose from a list of associated applications, right-click the data file and click the Open arrow.



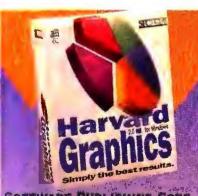


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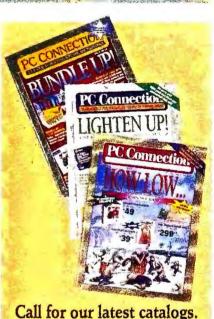
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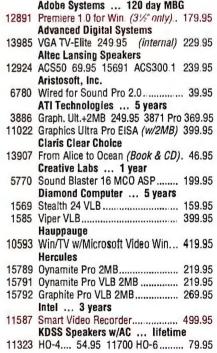


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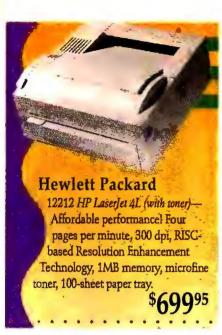
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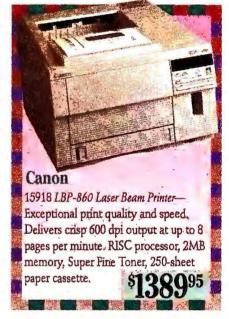
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DATA MANAGEMENT Q&A

Cross-tabulating dBASE Data

We have a dBASE IV employee data file that has character type fields for Location and Group, as well as for Name, Social Security Number, and so on. An employee can be assigned to one of five locations (1–5) and one of 25 groups (01–25). I'm trying to design a report that shows people per location per group. It must be organized into six columns: one for the group and one for each location, with each row listing the name of one user in that location's column. I can't figure out how to do this. Ronald Christian, Woodside, New York

```
close all
select 1
use employee order tag group
select 2
use exclusive emplrpt
zap
select 1
do while .not. eof()
 grp = group
 loc = location
 nm = name
 select 2
 if group <> grp
   append blank
 rec = recno()
 fld = "location" + loc
 do while &fld <> space(10)
   skip
   if eof()
     append blank
   endif
 enddo
 replace group with grp, &fld with nm
 if recno() <> rec
   goto rec
 endif
 select 1
 skip
select 2
report form emplrpt to printer
```

FIGURE 1: PRINT YOUR CROSS-TAB REPORTS after preparing them with this dBASE program.

What you've got is a cross-tab report, something dBASE's report writer doesn't support. Short of buying a separate report writer program, your best bet is to transfer the data to a temporary file that has a column for each location, then print your report from this file.

First, create a data file called EMPL-RPT that includes the fields **Group**, **Location1**, **Location2**, **Location3**, **Location4**, and **Location5**. Define Group just as it is in the original file, and make all the Location fields as long as the original file's Name field. Then design your report using this new—and still empty—data file. The report will be a simple, columnar report with one row of fields.

One more thing: The original data file needs to be indexed on the Group field. As long as the numbers in the Group field have leading zeros, as you indicated, this index will put them in the correct order.

Finally, copy the commands shown in FIGURE 1 to an ASCII text file called EMPLRPT.PRG. In writing this program, I've assumed that your original file is named EMPLOYEE; your group index is Group; the only fields you want to print are Group, Name, and Location; and both your temporary file and the report are named EMPLRPT. You may want to change these names when you re-create the program. Also, if you want to add other fields to your report, you'll have to alter the report design and the program to accommodate them. You'll find my version of EMPLRPT-.PRG in the Featured This Month folder on PC World Online.

Once you've set up your files and the program, simply enter **DO EMPLRPT** at the dot prompt to print your report.

Checking a dBASE Database Structure

I use dBASE III Plus to manage several projects, each of which includes multiple data files. I often find myself confused about which data is in which file. How can I print the structures of these files for quick reference? Pam Clark, New York

A It's easy. At the dot prompt, with a data file open, enter LIST STRUCTURE TO PRINTER. If you have a laser printer, you may want to follow this with EJECT.

Importing ASCII Files With dBASE IV

In "Getting ASCII Information Into dBASE" (November 1993), I told Perry Smith there's no way to import ASCII files using dBASE IV's menus. As it turns out, this is not completely true. While you can't import ASCII records into a new data file, reader Trevor Fernandez of Toronto pointed out that you can append them to an existing one.

First select the data file in question, then choose Modify structure|order• Append•Copy records from non-dBASE file. Depending on how the fields in your text files are separated, select Text fixed-length fields, Blank delimited, or Character delimited. Note that in all three cases dBASE expects your ASCII file to have a TXT extension.

Copying Paradox Pictures

I often use picture validity checks in Paradox for DOS. Can I copy a picture from one field to another, either in the same or a different table? It would save me a lot of time.

Chris Utter, CompuServe

While viewing the table with the picture you want to copy, press <f9> to go into edit mode and select ValCheck • Define. Choose the field you want to copy from, and select Picture to display the picture expression. Then press <Alt>-<F10> to bring up the PAL menu, select MiniScript, and enter x = menuchoice(). This command saves the picture to a variable called x. Press <Esc> a few times to back out of the menus.

To copy the picture to another field, follow the steps to add a new picture to a field. When Paradox prompts you to enter a picture, press Alt>-<F10>, choose MiniScript, and enter typein x at the prompt. When you press Enter>, you'll see the picture appear. Just press Enter> again to add it to the field.

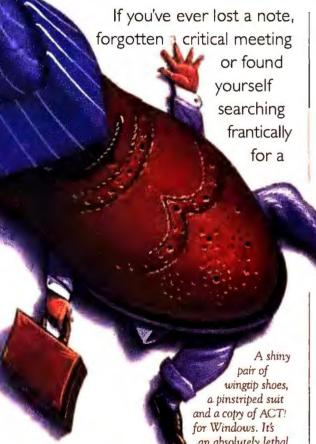
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DATA MANAGEMENT Q&A

Integers Only in Paradox for Windows

I can't change Paradox for Windows' default display to show numbers as integers in a table. Paradox always shows numbers with two decimal places, and I have to change the formatting for each field to get it to do otherwise. Can you help?

Rachel S. Nash, South Orange, New Jersey

A Paradox for Windows takes its default number format from your Windows settings. To make all new numbers show as integers, go to the Windows Program Manager's Main group and launch Control Panel. Next double-click *International*, and click the Number Format's *Change* button. Change the value in the Decimal Digits box to **0**.

Spell-Checking Access Data

I'm using Access to set up an inventory system for a market, and I'd like to spell-check a report before printing it. I tried to export the report to Word 2.0 for Windows, but I lost all the formatting. What can I do? Terry LeRoy Coleman, Inglewood, California

You can't spell-check in Access or import your report layout into WinWord, but you can export an Access table or query into WinWord, bring it back, and print your report from that. You'll have to do the exporting and importing on the Access side because WinWord can't read your Access data directly. (Word 6.0 for Windows can do a mail merge with Access data, but that wouldn't help in your situation.) It doesn't take long, so it might be worth the trouble if you really want your records spic and span.

First highlight the name of the table or query you want to check in Access's Database window. Select File • Export • Text (Delimited) and the name of your table or query. In the Export to File dialog box, you can change the name of the text file that Access creates, or just click OK. In the next dialog box, select Options, select the Text Delimiter (none) and the Field Separator (tab), then click OK to make the conversion.

Now go to WinWord, load the TXT file Access just created, and spell-check it. If you correct any errors, save and close the file with the *Text Only (.txt)* option.

Now you can go back into Access and import the revised file. Assuming you want to put the records back into your original table, make a copy of your database (just in case), then delete all the records in the table by opening the database and the table and selecting Edit • Select All Records • Edit • Delete. Back in the Database window, highlight the name of the newly emptied table and select File • Import • Text (Delimited) and the name of your newly corrected text file. Click Import to open the Import Text Options dialog box. Click Append to Existing Table, and select your newly emptied table. Again click Options, set the Text Delimiter to [none] and the Field Delimiter to {tab}. Click OK and Access will copy the information back into the inventory file.

By Celeste Robinson

Celeste Robinson is a contributing editor for PC World and the author of The Paradox 4.0 Handbook (Bantam Computer Books, New York, 1992). Data Management welcomes your questions (see page 12 for contact information).



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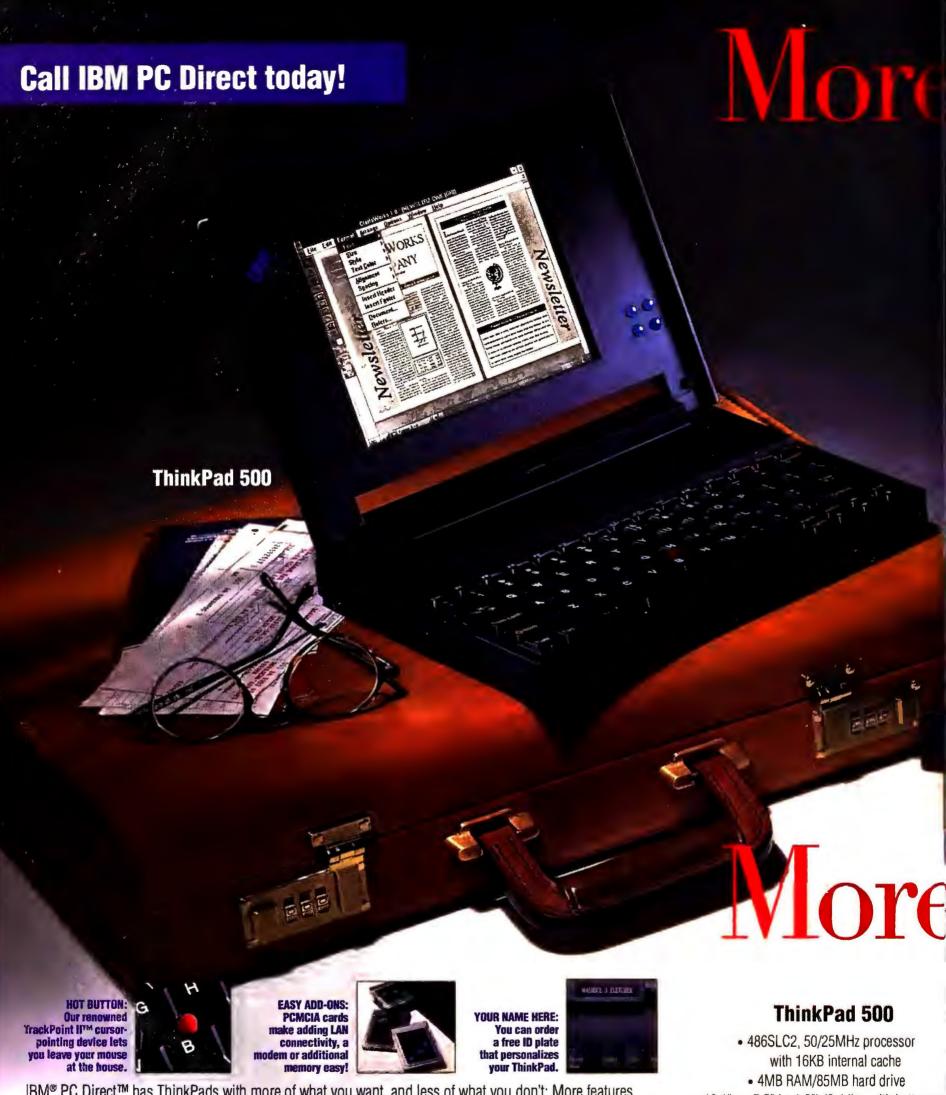
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PUBLISHING & PRESENTATIONS MAKEOVER

Puttin' On the Ritz

Designing a publication is like getting dressed: The way you lay out a page says as much about you as the suit you have on. When you put together a presentation or newsletter, ask yourself, What does this design say about me?

Take, for example, *The Streamwood Pen*, a four-page newsletter for the public employees of Streamwood, Illinois, that assistant village manager Carol Sorenson assembles each month in WordPerfect 5.1. Her current design has a nice, informal feel—it's the paper equivalent of an employee bulletin board. But what if she wanted to convey a more dignified image? How should she change the design? Here are some suggestions.

Mightier Than the Pen

Using the same tools as Sorenson (with a little additional help from CorelDraw),

we started our redesign at the masthead. That's the first place your readers look, and first impressions count.

In the original, the title of the newsletter and the hand holding the pen were created in WordPerfect's figure editor. We switched to a straightforward text treatment, using Garamond to establish a statelier tone. The masthead contained three separate pieces of art, none of which fits in with our new image. We got rid of all three.

Proceeding to the main text, we decided the typeface it used (14-point Univers) was too big. While large type has a folksy charm, it limits the amount of text on the page. We switched to a no-nonsense 11-point Times Roman. The smaller, denser type makes the newsletter seem less chatty.

After changing the typeface, we changed the column layout to match. We switched from two columns justified on both sides to three ragged-right columns. This gets rid of the unsightly gaps between words that often occur when you have large type and narrow columns. One rule of thumb: Whatever column width and type size you choose, you should be able to fit a minimum of 25 characters on each line.

These type-size and layout changes require more text, but that's okay: We're repositioning the newsletter as a serious conveyer of information. Another benefit of the increased density: We go from four pages to two, which means lower printing and paper costs.

Careful With That Clip Art

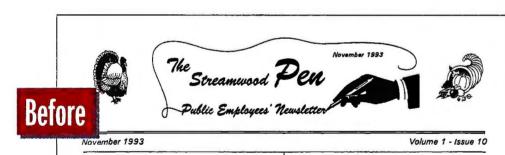
Having restyled the type and columns, we set about rearranging the page. We chose to lead with the announcement of the Employee of the Quarter program, expanding it in the process from a brief announcement to a full-blown story. We added a piece of clip art to lead the eye to the story and balance the graphic in the lower right, choosing a top-hatted dancer to suggest talent and class.

Beneath the lead story, we ran the "Kudos" section, expanding the original two items with more text and using full sentences instead of a telegraphic style. We also combined two holiday announcements from page two of the newsletter, replacing the original clip art with the image of an angel—again to establish that serious tone.

The final result is a far more professional-looking publication, one that announces, by design alone, We mean business. It just goes to show that, with a little redesign, you can change what your readers think about your publication and, by extension, you.

By David Brickley and Dan Miller

David Brickley, a designer based in Moss Beach, California, performed the redesign. Dan Miller is an assistant editor for PC World. Publishing & Presentations welcomes your questions and makeover candidates. See page 12 for contact information.



MANAGER'S MEMO

"Employee of the Quarter" Award Program!

This will be your opportunity to nominate any non-management employee for a special awardl committee of Department Heads and Assistant Department Heads (who will be ineligible for the awards) will review the nominations and select a deserving recipient quarterly. Each selected employee will receive a \$500 U.S. savings bond and other appropriate recognition. Start thinking now about a fellow employee that you feel has done a job "above and beyond" their regular work responsibilities and nominate them for the quarter ending December 1993I Nomination forms will be distributed soon.

VILLAGE BOARD NOTES



The Streamwood Board of Trustees recently:

- Approved the annexation and rezoning of an 8.65-acre parcel on Schaumburg Road, between Bartlett Road and Route 59, for use as a wholesale nursery
- Accepted an independent actuarial study recently commissioned for the Police Pension and Fire Pension Funds.
- Approved placement of a new ESDA warning siren on Schaumburg Road, west of Route 59.

KUDOS...

To George Garland, Matt Karibo and Dan Ring for admirably representing Streamwood at the 1st Annual MICA "Road-eo" held in Normal on October 22. The "Road-eo" consisted of a series of defensive driving events.

While the City of Quincy walked away with the first place award and traveling trophy, we promised a more competitive event next year -- when the Village of Streamwood will serve as "Road-eo" host.

After

The Streamwood Pen

c Employees' Newsletter

Volume 1- Issue 10

What does your masthead say about you? We switched from a script typeface to a roman style and ditched the clip art to establish a no-nonsense tone.

how important different

stories are, should balance other

visual elements, and should be

relevant to the text that they

accompany.

of the Quarter" Program

Streamwood Village is very pleased to announce a special awards program for its outstanding employees. This will be your opportunity to recognize your best non-management employees by nominating them for a special award!

A committee composed of Streamwood Administration and Operational Department Heads and

Assistant Department Heads (who are ineligible for the awards) will review all submitted nominations on a quarterly basis and choose a deserving recipient. Each selected employee will receive a \$500 U.S. savings bond and other appropriate recognition.

So start thinking now about which of your employees you feel

b "above and beyond" their regular work responsibili-

your department stands out? Who has gone that extra
your department meet its goals?

is, you can nominate him or her for the quarter endr 1993. Nominations (from Department Heads and ads only) will be accepted by the Administration Secg November 15, 1993. Nomination forms will be he main administration office. Pick yours up soon, fill n it in!

Christmas Items

Employee Luncheon In last month's newsletter, employees were polled on their preference for a Christmas event for the Village employees. With 39 responses, the preferred event was a luncheon. Therefore, please mark your calendars for Wednesday, De-

cember 22, between 11:30 am and 2:00 pm at the Stree Golf Course. Arran being made for a he

Justifled columns can produce unsightly gaps between words; ragged-right columns aren't as neat along the edges, but they get rid of the gaps.

Employees' Childr mas party A new

buffet and, of cours

Christmas cheer.

about to unfold—the Village will host a Children's Christmas Party for children of all (Continued)

Kudos

George Garland, Matt Karibo and Dan Ring admirably represented Streamwood at the first annual

MICA "Road-eo" held in Normal on October 22. The "Road-eo" consisted of a series of defensive driving events. A number of local and state law enforcement officials were on

Large type suggests a breezy attitude, while small type announces, "I have a lot to say."

tants. ing skills the police

place award and traveling trophy, our guys promise a more competitive event next year—when the Village of Streamwood will serve as "Road-eo" hosts.



During a recent meeting of the Streamwood Boar the following items were acted upon.

- ☐ The annexation and rezoning of an 8.65 acre p a wholesale nursery was approved. It's located or Road between Bartlett Road and Route 59.
- ☐ An independent actuarial study recently commissioned for the Police Pension and Fire Pension Funds was accepted.
- ☐ Placement of a new ESDA warning siren on Schaumberg Road west of Route 59 was approved.

To create the image of the crowd, we took a plece of clip art, applied a mirror effect to it, and added reverse type.

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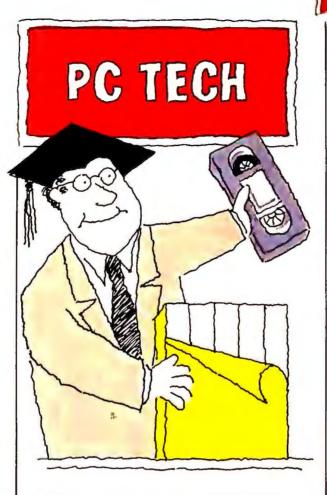
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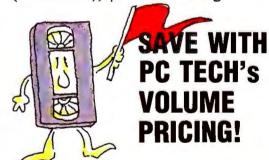
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FV54

COMMUNICATIONS Q & A

Rural Phones Jinx High-Speed Links

I've been using high-speed modems for almost two years, but recently my 14.4-kbps modem stopped working at high speed. I suspect the problem is that I live in a rural area, and the local phone company just installed a multiplexer. The modem works fine at my office, but now it won't work above 4800 bps at home. I sent the modem back to the manufacturer, who said it worked. The phone company checked the lines, declared them clean, and told me I'd have to pay for a dedicated line if I wanted a better connection. That seems like an extreme solution. Do you have any other suggestions?

Mike Dunnagan, Hillsborough, North Carolina

A Your situation is not uncommon. Many rural users find their modems stop supporting high speeds when the phone company "upgrades" equipment. A multiplexer funnels several hundred calls onto one set of lines. This reduces the bandwidth available for each call, which may be fine for voice communications but is deadly for data. Typically, the only solution the phone company offers is to lease you a data line for hundreds of dollars a month.

While I doubt the phone company will uninstall the multiplexer for you, you can try a couple of other approaches. First, try to persuade the phone company to remove the *repeaters*—amplifiers that boost the voice signal—from your line. Repeaters are common in rural areas and, when combined with multiplexers, can wreak havoc with modem signals. If the company agrees to do this, don't let it charge you.

Second, contact a local computer store and ask to borrow different modems to test on your line. Some modems work better with multiplexers than others. There are big differences in the way modems handle multiplexers. Hayes, MultiTech, and Microcom modems seem to do okay, while Zoom, Practical Peripherals, and Boca units

have a history of trouble. Trial and error may allow you to find a brand that will work on your line.

Online World a Good Place for Women?

I'm curious about online services, but I've heard they can be inhospitable to women. Is that true?

Barbara Stuart, Littleton, Colorado

Au contraire! I've been prowling online services and BBS's for ten years now, and I can tell you without hesitation that you have nothing to fear.

Sure, harassment exists, but in all these years I've never received an offensive message.

What I have received is treatment I can only describe as chivalrous.

As one online joke puts it, if you want technical advice, log on as a woman. A few years back some fellow business-women and I bought an account on a major online service under a male pseudonym. What did we find? We received less E-mail. When we requested technical advice, we got fewer replies. Frankly, signing on as men was boring; as women, we'd grown accustomed to a kinder online world. We let the account expire within a month.

The greatest barrier to women online appears to be price. A few years back, both Prodigy and GEnie cut their rates, and membership soared. Where did all the new members go? Both services had explosive growth in their quilting and home-life forums, whose participants are (still) mostly female. Over 1000 messages a month were posted in the embroidery conferences alone.

Don't care about embroidery? Don't worry. Whatever your interests, you'll find a place online to share them. The great thing about the online world is that people—women and men alike—share a great deal about themselves, posting messages about kids, spouses, jobs. It's the electronic equivalent of the backyard fence.

To get started, check out some of your local BBS's. Many are excellent—full of fun conversations, great people, and cool shareware. Yes, some are full of boors, but you can usually avoid those by using common sense: Stick with BBS's whose names seem respectable, and avoid the ones that sound sleazy (unless you like that sort of thing). Ask your local PC user group or computer store for recommendations; either one can probably provide you with a list of BBS numbers in your area.

If you want to try commercial ser-

I've been prowling online services and BBS's for ten years now, and in all these years I've never received an offensive message.

vices, start cheap. Delphi (800/695-4005), for example, charges just \$10 per month, including 4 free hours of access, \$4 per hour after that. America Online (800/827-6364) gives you the first month and 10 hours of use for free. After that, a subscription costs \$9.95 per month, which includes 5 hours of free connect time. GEnie (800/638-9636) is another low-cost favorite. For \$8.95 a month, you get 4 free hours. Subsequently it's \$3 an hour off-peak, \$9.50 in prime time (8 a.m. to 6 p.m. weekdays).

Finally, be sure to try the Women's Wire Worldwide Information Resource and Exchange (415/615-8989), a new online service for women. Subscriptions are \$15 per month and include 2 hours of access; after that, access runs \$3.75 to \$7.50 per hour for long distance, \$2.50 local and Internet. For a guide to the electronic underground from a woman's perspective, check out Elizabeth Powell Crowe's *The Electronic Traveler* (Windcrest/McGraw-Hill, \$16.95).

By Judy Heim

Judy Heim is a contributing editor for PC World. Communications welcomes your questions. See page 12 for contact information.

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HARDWARE Q&A

How All Those 486s Stack Up

I'm looking for a new system, and I can't keep track of all the 486s-SLC2, DX, SX, DLC, and so on. What are the differences between all these various chips?

Matt Goff, Olathe, Kansas

What you really want to know is how A one chip performs relative to another. Unfortunately, you can't really compare chips head to head because each one demands a slightly different system design, and that factor affects speed. So I've put together a performance table (FIGURE 1) that lists the average speeds of 486 systems (and for comparison pur-

He	w	the	Chips	Fall
	, 11	CITO	Olliba	IMII

Chip	Performance
Intel Pentium-601	229
Intel 486DX2-661	148
Intel 486 OverDrive-33/661, 2	145
IBM 486BL-66	139
IBM 486SLC2-66	127
Intel 486DX-501	118
Cyrix 486S-40	108
Intel 486DX2-501	108
Intel 486 OverDrive-25/50 ^{1, 2}	106
Intel 486DX-331	104
Intel 486SX-33	103
Intel 486DX2-401	93
Intel 486 OverDrive-20/401, 2	91
IBM 486SLC2-50	89
Intel 486DX-251	81
AMD 386DXL-40	80
Cyrix 486DLC-33	80
IBM 486SLC2-40	80
Intel 486SX-25	80
Intel 486SX-20	60
Intel 386DX-33	59
Cyrix 486SLC-25	50

² Chip available as upgrade only.

FIGURE 1: THESE PERFORMANCE NUMBERS are based on BAPCo SYSmark, a test suite that runs tasks In ten DOS and Windows applications. The numbers indicate how many times the task set repeats per hour; they should give you a good idea of the performance you can expect. In addition, 90-MHz Pentium chips should proliferate by summer.

poses, a few 386 systems) based on tests run by the PC World Test Center. As in real life, disk activity plays a major role in these tests, so you can get a reasonable idea of how one type of 486 PC is likely to perform relative to another.

As you can see, all chips with the name 486 do not smell as sweet. Cyrix's 486SLC-25 reeks, for example, falling behind even Intel's 386DX-33. I strongly suggest you avoid PCs with processors less powerful than Intel's 486SX-25, even if you're buying a home PC. Just glancing at some mail-order ads, I see several 486SX-25s with all the extras for about \$1000. If you're buying a business machine, you can find a fully loaded 486DX2-66 for around \$2000.

A word about the OverDrive scores in the table: PCs don't come with Over-Drive chips already installed. These chips are upgrade versions of 486DX2s; plug a 486 OverDrive-25/50 into a 486SX-25 system, for example, and performance will increase 30 to 70 percent-right at or near the power of a 486DX2-50. At one time, only Intel SX and DX systems accepted OverDrive chips, but an increasing number of non-Intel systems now come with sockets for OverDrives.

One more point: Had our testing placed greater emphasis on financial or statistical functions, or had it included CAD tests, the systems whose chips contained math coprocessors would have risen in the rankings. If you crunch numbers or design buildings and your current chip doesn't already include a math coprocessor, make sure you add math coprocessing to your system. The best way to do this is to add an OverDrive processor (if your system will accept one), since you get both number crunching and a healthy performance boost in one chip.

Are Hard Cards Worthwhile?

I want to install a second hard drive. From what I've read, a hard card—a type of hard disk mounted on an expansion board—would be easiest to

install. However, a friend told me that hard cards may not work with DOS 6.2, and that they're much slower than regular hard drives. Should I be worried? Duane Klinner, Flagstaff, Arizona

Your friend is wrong on both counts. MWhile it's true that DoubleSpace, DOS 6.0's notorious disk compression utility, ran afoul of quite a few older and nonstandard drives, Quantum (the only major hard card manufacturer) claims you should have no compatibility problems with DOS 6.2. At any rate, the company offers a money-back guarantee that covers the compatibility of its hard cards. As for speed, there's no truth to the rumor that hard cards are inherently slower. Quantum's 245MB Hardcard EZ, for example, performed slightly better in PC World tests than a couple of Quantum 245MB ProDrives.

You're right about hard cards being easiest to install. While many drives come with software that makes installation pretty quick, hard cards make cables unnecessary. Even better, you don't have to mount hard cards physically in a drive bay, a task that can be infuriating if screw holes and brackets don't line up. The only obvious disadvantage to hard cards is price: They tend to cost half again as much as ordinary drives of the same capacity. Personally, I'd rather save the money and spend the extra 20 minutes with cables and brackets.

To Upgrade...or Not

 I work for a small nonprofit agency that can't afford to replace its aging 16-MHz 386SX PCs. The systems have only 2MB of RAM, and we're using Windows—obviously we need to add RAM. But with our limited funds, would it be better to add 4MB of RAM to each PC, or to add 2MB and a CPU upgrade? Or should we not upgrade at all and wait for prices on 486 systems to drop, since future products will make the upgraded systems obsolete anyway? John Galgano, Wantagh, New York

The More Windows You) pen, The Cooler It Gets. SM



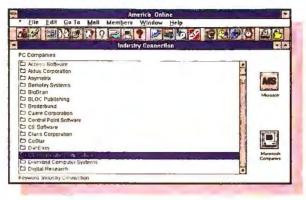




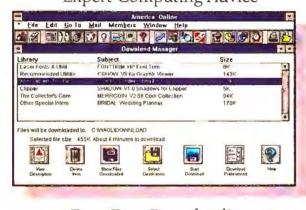
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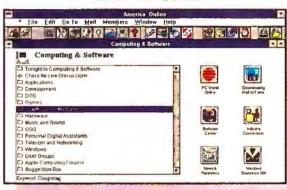
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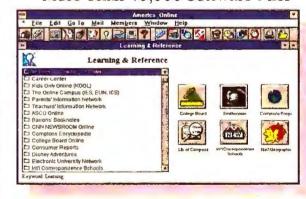
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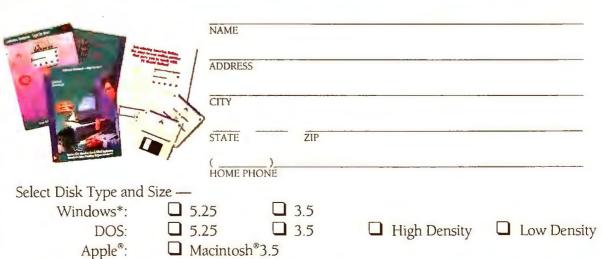
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PC WORLD

A Because you don't have money for new PCs, make sure your 386SXs have at least 4MB—it's the single biggest boost you can make to Windows performance. Do your PCs use standard SIMMs? If so, buy 80ns SIMMs, even though your systems probably call for 120ns or 100ns SIMMs. The 80ns SIMMs should cost the same (or only slightly more), and you have a greater chance of being able to transplant them into any new 486 system you eventually buy.

On the question of adding 4MB versus adding 2MB plus an accelerator board, however, I'm afraid your math doesn't add up. Since the office has such low-powered machines, I imagine most of your people are using just a couple of applications at a time, which means adding more than 2MB (to go beyond 4MB total system RAM) probably won't speed things up much. Besides, adding another 2MB will cost you only \$100 or so, while the cheapest SX CPU accelerator option I know of—Cyrix's 16-MHz Cx486-SRx2 upgrade chip—will run about \$269.

As I noted earlier, you can buy a complete 486SX system for about \$1000, and I rec-

ommend you do so rather than sink too much money into upgrades. I get flak all the time for saying this, from those who think I'm being paid by advertisers to tell people to throw their money away on hardware. But upgrading often means investing in several components—memory, CPU, hard disk, power supply—that together approach the price of a new PC. Worse, your upgraded PC will wear out sooner than a new one, and you won't have a warranty.

More on Sabotaging System Passwords

In last December's column, your advice to a reader who had forgotten his system password didn't go far enough. True, you can disable start-up password protection in some systems by yanking the battery, but this tactic doesn't work all the time. On some motherboards, the battery is soldered in, and removing it can be dangerous to the PC—or to you, since some batteries explode if overheated. In other cases, the password is held in nonvolatile memory, so pulling the battery won't work. Instead, you need to short the CMOS chip. With well-

designed motherboards you can do this by moving a jumper, but with others you need to short two of the chip's pins using a piece of wire. With three major manufacturers of CMOS chips, and with each chip differing in its pin assignments, the risk of error is high—and you can kiss the chip good-bye if you short the wrong pins. As you can see, this is a potential nightmare.

Jeffery Arnold, Shawnee, Kansas

A Thanks for the further explanation! My answer worked for that reader and his Fast Micro system, but I should have cautioned that pulling the battery won't do the trick with all PCs. If the manufacturer is still in business, you should call tech support before trying to disable anything. If not, and you don't have documentation, try contacting user groups, or shop around for estimates from third-party service organizations.

By Eric Knorr

Eric Knorr is a contributing editor for PC World. Hardware welcomes your questions (see page 12 for contact information).

COMINGUP

How Reliable Is Your PC Vendor?

Each year consumers spend millions on PCs. But are those dollars well spent? Our special report reveals just how well vendors build, test, and support their PCs. In addition to conducting factory visits and interviews with leading vendors—including IBM, Compaq, and Gateway—we polled 50,000 readers to find out which firms have the best track record.

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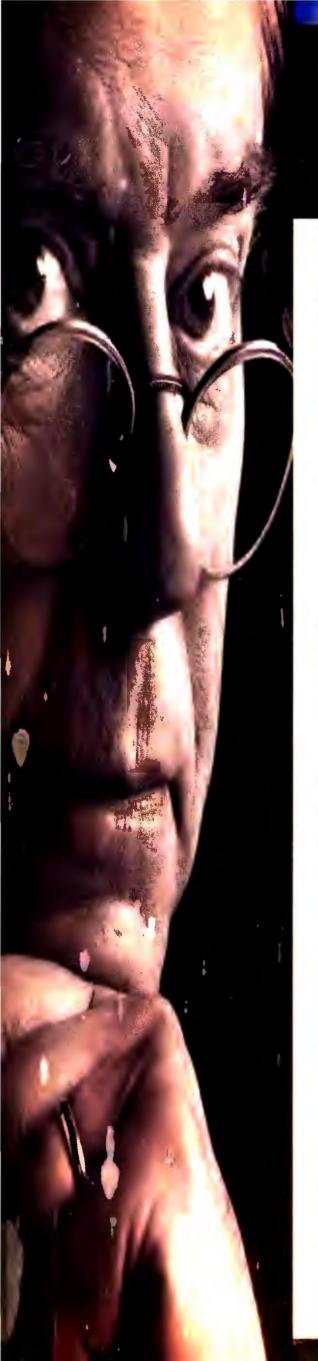
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PC WORLD



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"This Editors' Choice award-winning monitor is an excellent buy; very hard to pass up."

PC Magazine, March 15, 1994

"The extra-large display and on-screen controls make the Optiquest 4000DC a Best Buy."

PC World, April, 1994



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STAR-DOT-STAR TIPS

Rescue Your Rescue Disks

We have a 386-33 system on which, over a period of two years, we've installed DOS 5.0, The Norton Utilities, PC Tools, a Colorado Memory Systems internal tape drive, and finally DOS 6.0. Each time we installed one of these products, it suggested (and created) a "rescue" disk, to be used to boot the computer in the event of a hard disk problem.

Recently we had a catastrophic disk crash that prevented the machine from booting from the hard disk. When we used the rescue disks to boot the we never anticipated: We kept getting messages saying we were running the wrong version of DOS! The AUTO-EXEC.BAT and CONFIG.SYS files, which had been created with DOS 6.0, wouldn't work with a rescue disk containing DOS 5.0.

We quickly learned our lesson: When

machine, we encountered a problem

We quickly learned our lesson: When you upgrade to a new operating system, it's vitally important to re-create your rescue disks—your lifeline when disaster strikes—with your new operating system and configuration files. Otherwise, they may be useless when you need them the most.

Arnold Margolis, Oceanside, New York

Editor's note: Now that Microsoft has launched DOS 6.2 (which fixes many bugs and problems in DOS 6.0), the troubles Margolis experienced are likely to become common. Remember that using DOS's SYS command to upgrade the operating system image on a rescue disk may not be enough; it's better to re-create each disk from scratch after your DOS upgrade. Each of the three commercial applications Margolis mentions offers a command for re-creating a rescue disk after installation.

Unlike those programs, DOS doesn't create a rescue disk; instead, it prompts you to create an "uninstall" disk. By booting the system with the uninstall disk, you can switch your machine back to the previous installed version of DOS. If all you need is a bootable floppy containing a specific version of DOS, the uninstall disk is adequate. But if you need a bootable disk with all the utilities required to restore the system to order, it won't do the job. To create such a disk, run DOS's SETUP program with the /F parameter.

I'm My Own Grandpaw

One of DOS 6.x's best new features is its ability to define start-up menus that allow you to choose configurations for different tasks. However, in all of the CONFIG.SYS files I've seen (and all of the examples in Microsoft's docu-

mentation), there's no way to change your mind and return to an earlier menu once you descend into a submenu. This CONFIG.SYS fragment [FIGURE 1] shows my solution: It lets you return to a "parent" menu by listing the parent as if it were a submenu of its child. Note that in every submenu, DOS is instructed to create an entry called Previous Menu, which selects the previous menu as if it were a submenu of the current one. And if you get more than two levels deep, you can return directly to the main menu by selecting Main Menu. I know of no one else who has discovered or used this technique.

Tom Hard,

Port Hope, Ontario, Canada

Editor's note: This is a great tip that I'll bet Microsoft (the authors of DOS) never even thought of. In this hierarchy of menus, as in the folk song, each menu that contains a submenu (or child menu) is its own "grandpaw"—that is, it's listed as a submenu of its child. And because the main menu is also listed as the child of every submenu, you can return instantly to the main menu from anywhere in the hierarchy. This clever trick relies on the fact that DOS doesn't keep a record of where the user has been or which menu was a submenu of another. There's no internal stack to overflow, so you can take a circuitous path to your final selection without triggering an error.

Cutting Codes in WordPerfect for Windows

It's easy to cut and paste text in Word-Perfect for Windows, but cutting and pasting a special code (for example, a hard return) is difficult. If you open the Reveal Codes window (<Alt>-<F3>), you'll probably be disappointed to discover that you can't highlight special codes in that window with the mouse, cut or copy them to the Clipboard, and then paste them elsewhere.

Fortunately, there's an undocumented trick that will help you get around

[Menu]

MenuColor=15,1

MenuItem=Normal

MenuDefault=Normal,30

Submenu=Games

Submenu=Applications

[Games]

Submenu=WarGames, War Games

Submenu=Kids, Kids' Games

Submenu=Menu, Return to Main Menu

[WarGames]

MenuItem=Shootem, Shoot 'em up

Submenu=Games, Previous Menu

Submenu=Menu, Return to Main Menu

[Kids]

MenuItem=Barnev

Submenu=Games, Previous Menu

Submenu=Menu, Return to Main Menu

[Applications]

MenuItem=WP, Wordprocessor

Submenu=Menu, Return to Main Menu

[Normal]

REM Normal commands here

[Shootem]

REM "Shoot 'em up" commands here

[Barney]

REM "Barney" commands here

[WP]

REM WP commands here

[Common]

REM Common commands here

FIGURE 1: NAVIGATE UP AND DOWN MS-DOS START-UP MENUS by adapting this sample CONFIG.SYS file to your multiconfiguration needs.

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USER GROUP TIP

Optional CONFIG.SYS Commands

To have DOS 6.x ask you with a [Y,N] prompt whether to carry out a CONFIG.SYS command, insert a question mark after the command and before the equal sign. For example: DEVICE-HIGH?=C:\DOS\SETVER.EXE.

Bennett Landsman
Philadelphia Area Computer Society

this problem. While you're within the Reveal Codes window, move the selection point to the character before the code you want to cut or copy. Press the Select key, <**F8>**, which allows you to select text using the cursor keys rather than the mouse. Press <**Right>** until the code or codes you wish to cut or copy are displayed in gray. Use menu or keyboard commands to copy or cut the special codes, and paste the special codes where you want them in the Reveal Codes window.

William K. Carlson, Chico, California

Editor's note: Before I read this tip, I (like many other WordPerfect for Windows users) used a much more awkward technique to cut and paste special codes: I tried to select the codes in the document window (where they're invisible) using the mouse while simultaneously monitoring my progress in the Reveal Codes window. Carlson's technique makes far fewer demands on your hand-eye coordination and allows you to select exactly what you want on the first try.

A Disk by Any Other Name

My PC has a 1.44MB A: drive and a 1.2MB B: drive. I often need to copy files between two floppy disks of the same size—that is, from one 3½-inch floppy disk to another, or from one 5¼-inch floppy disk to another. But if you try to issue a COPY command with the same drive identified as the source and the destination (for example, COPY A:FILE.DOC A:), you get the error message 'File cannot be copied onto itself'.

The obvious solution is to copy the files first to the hard disk and then to the second

floppy. But here's another method that lets me copy directly between two floppies without the intermediate step: I add two brief commands, DEVICE=C:\DOS\DRI-VER.SYS /D:0 /F:7 and DEVICE=C:\ DOS\DRIVER.SYS /D:1 /F:1, to my CONFIG.SYS file. The commands create two "alias" drive letters, D: and E:, that refer to drives A: and B:, respectively. (The letters of the aliased drives may be different on your system depending on how many drives you have.) Now, when I want to copy files between two floppies of the same size, I can use a command such as COPY A:FILE.DOC D:. Instead of rejecting my request, DOS will prompt me to swap disks and copy the files.

Mugur Popsecu, Vienna, Austria

device driver DRIVER.SYS to create aliases for your floppy drives. If you use this technique, make sure to modify the /D: and /F: parameters in DSKALIAS.BAT to correspond to the disks on your system. The /D: parameter selects a physical drive; 0 is A:, 1 is B:, and so on. The /F: parameter selects a density for the aliased drive. For a list of the possible values for this parameter, consult your DOS documentation or query the online help program with the command HELP DRIVER.SYS

Another tip: It pays to use the XCOPY command, rather than COPY, with this technique. Why? Because copying files between disks in a bunch rather than one at a time (COPY's method) can spare you time-consuming disk swaps.

Finally, DRIVER.SYS has one minor drawback you should be aware of. When you load a program that insists on looking at every drive in your system to see what's there, you may see a message from DOS asking you to insert a disk in the "phantom" drive. When you get this message, you don't actually need to swap disks. Just hit **Enter>** to continue the program.

Spaces Can Speak Volumes

When you format a new disk and you assign a volume label to it, DOS will not allow you to include a space in the volume label. This is too bad, because it prevents the use of a name that's easy to remember, such as DISK 1 or DATA DISK. Fortunately, you can get around this restriction by using ASCII character 255 (press < Alt> and enter

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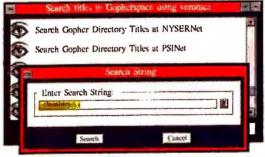


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STAR-DOT-STAR TIPS

255 on your numeric keypad). This character looks like a space, but DOS doesn't treat it like one, so you can use it when you want to create a volume label that appears to contain a space.

Andrew Kooi An Di,

Selangor Darul Ehsan, Malaysia

Editor's note: Internally, DOS stores volume labels the same way it stores file names—and applies the same restrictions to them. This means that some special characters (such as ASCII code 255) are allowed, but spaces aren't. The technique mentioned here is the only way to place a space in a volume or file name.

There is one thing that you have to keep in mind if you use this technique. Some utilities, such as FDISK, ask you to type a disk's volume name before doing something drastic to the disk such as reformatting it or removing a partition. If you use such a utility, you must remember to press <al>Alt> and type 255 on the numeric keypad again when typing the volume name, or else the utility will reject your request. Since the odds are that you won't repartition or reformat a disk (especially a hard disk) until long after you've named it, be sure that you make a note of the special character in the name. If you use ASCII code 255 in file names, similar warnings apply. Typing the code every time you want to open a file is cumbersome, and unenlightened users who have access to your files may be unable to figure out how. Of course, that may be the desired effect.

By Brett Glass

Brett Glass is a contributing editor for PC World. Star-Dot-Star welcomes your tips, macros, batch files, and short programs (see page 12 for contact information).

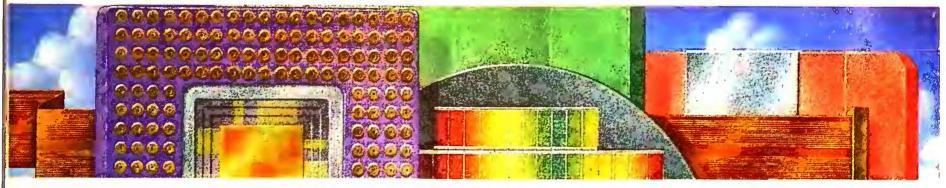


POWER TIP no. 303

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Chris Ellison Nantucket, Massachusetts

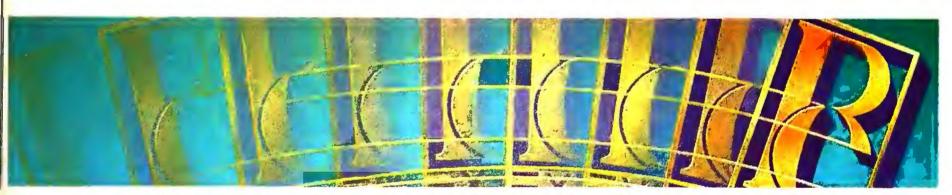
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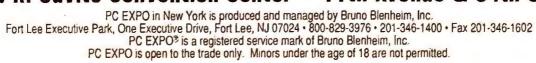
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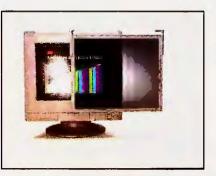
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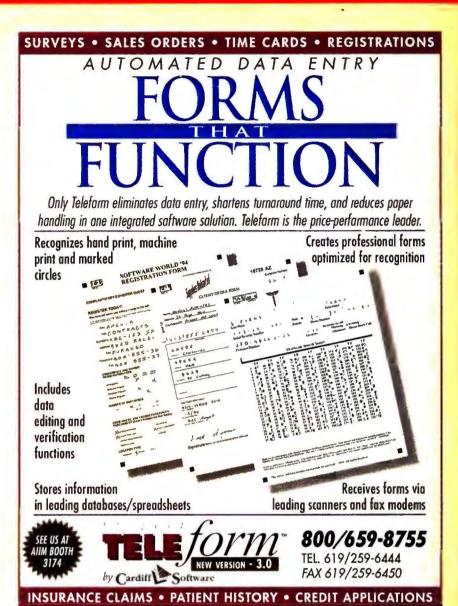
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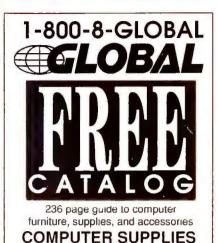
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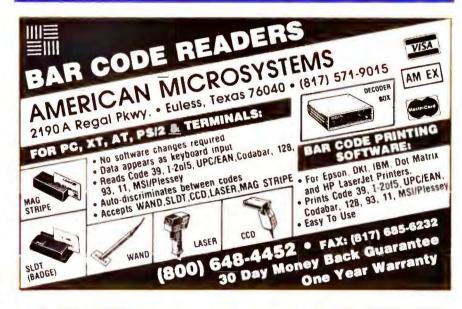
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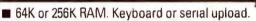
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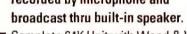
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HP Oeskjet 500, 500C, 550		59	146		-	_	-	-	-	-	-	-
HP Oeskiet 1200C, 1200C/P	_	_	_	89		_	180	_	-	359	-	-
HP Paintjet XL300	109	_	-	_		_	289	-	***	469	837	_
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NEC 90, 290	_	**		139		_	100	_	_	330	_	_
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256K X 1-100NS	6						,				,							,				3.50
256 X 1-80NS			. ,		٠.			٠				٠									,	3.75
256K X 1-70NS				٠.							,	,										3.75
256K X 1-60 NS	;				٠,	,																3.75
258K X 4-100NS	6			٠,																		6.00
256K X 4-80NS	,						,										 ,			,		6.25
256K X 4-70NS																						8.50
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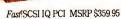


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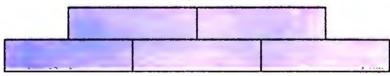
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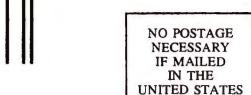
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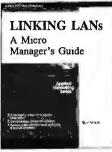
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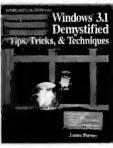
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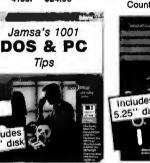
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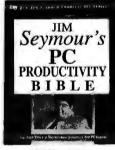


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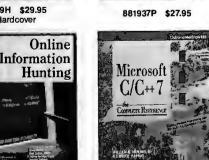


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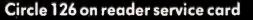
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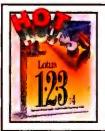
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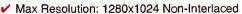


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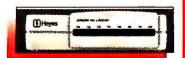
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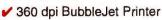
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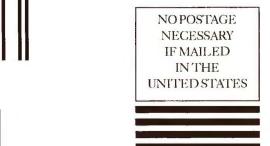
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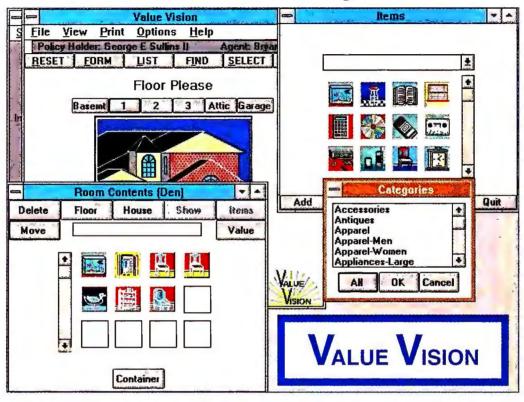
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P5

Golf to Stravinsky, and Everything in Between

ne way to find out where the digital world is headed is to keep an eye on Microsoft. These days Microsoft is getting into CD ROM infotainment software in a big way.

All the Info, All the Time

My dictionary defines encyclopedic as "embracing all branches of learning; very full of information, comprehensive." So when I fired up Microsoft's new multimedia CD ROM encyclopedia, Encarta 1994, I thought the simplest way to check it out would be to run a bunch of random inquiries.

Encarta was well informed on film-maker John Ford, Formula I racer A. J. Foyt, and Benoit Mandelbrot, the mathematician who developed fractal geometry. But it struck out on *Star Trek* creator Gene Roddenberry, Trinidadian steel drums, renowned novelists Thomas Pynchon and Paule Marshall, and calypsonian Slinger Francisco, aka The Mighty Sparrow (although it did come up with some nice bird photos and a loud performance by a sparrow).

That falls short of comprehensive in my book, but just to be fair I compared Encarta with my three-year-old Grolier Electronic Encyclopedia, also on CD ROM. Like Encarta, Grolier produced short articles on Ford, Foyt, and Mandelbrot—plus solid entries on steel drums, Pynchon, and Marshall. It bombed on Roddenberry, however; I can already hear Worf's Klingon growl.

Could it be that Encarta uses less space on the CD ROM? I checked: Grolier weighs in with 195MB of data, while Encarta boasts a huge 673MB. What's going on here?

Let's cut to the chase: What's going on is multimedia. While Grolier has a few sound files, Encarta has 8 hours of sound, 8400 photos and graphics, 100 animation and video clips, 798 maps,

By Michael Goodwin

and 100 interactive charts. With all those megabyte-gobbling files, it's impressive that Microsoft found space for any text. (The text, such as it is, comes from Funk and Wagnall's 29-volume encyclopedia.)

What does multimedia do for you? I clicked on the entry for the Civil War, which led me to an animated map of the Battle of Chancellorsville, where

I followed all the tactical maneuvers. I've never really understood that battle until now. The Britannica was never like this!

Encarta runs reasonably fast, even on my ancient CD ROM player, and comes with advice on how to paraphrase, so your kid won't get popped for plagiarism. Many students will no doubt find using Encarta a lot easier than trudging off to the library or finding shelf space for a printed encyclopedia. Unless, of course, the assignment happens to be on Caribbean music or contemporary American literature.

In spite of its exciting images and sounds, Encarta fails to deliver comprehensive information—and for an encyclopedia that's the test that counts.

Thwack!

For aficionados, golf is serious business. Last year Microsoft included an animated golf game in an Entertainment Pack, but this year it's getting serious. So instead of trying to beat the leading golf package—Access's Links 386 Pro—Microsoft joined forces with it.

Not only is Microsoft Golf based on Access Links 386 Pro, it can even use Links' Championship courses (available from Access at extra cost). When I reviewed Links last year, I liked the



photo-accurate rendering of its courses but thought it took too long for the screen to update all those beautiful details. The Microsoft version runs a lot faster without sacrificing high-resolution graphics. Not only do trees look like trees, but when your on-screen surrogate swings at the ball you'll think you're watching a movie. The CD ROM includes sound effects,

and your ball is whistling toward the green—or, in my case, into the trees. Microsoft Golf even provides tweeting birds.

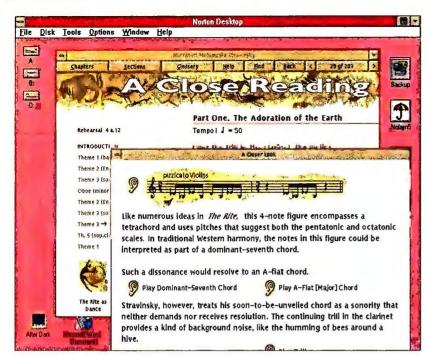
Three mouse clicks

too: everything from tweeting birds to the *thwack* of the club hitting the ball to spoken tips from a digital golf pro. The illusion of being on a real course is quite convincing. In fact, I understand that some players use Golf (and Links) to familiarize themselves with new courses before they actually play them.

Oddly enough, playing computer golf is almost as relaxing as the real thing. Maybe it's all those tweeting birds.

The Rite Stuff

Paris, 1913: One of the most dramatic moments in musical history was when composer Igor Stravinsky jumped out a backstage window to escape a riot caused by the premiere performance of



STRAVINSKY'S MAGNIFICENT RITE OF SPRING opens up its mysteries in Microsoft's multimedia musical package.

his avant-garde ballet score *The Rite of Spring*. The only trouble with this legendary event is that it never happened—at least according to Microsoft's fabulous MultiMedia Stravinsky: The Rite of Spring. Stravinsky's own on-screen account of the controversial premiere makes no mention of

a hair-raising getaway. The way he tells it, he simply stalked out of the auditorium to escape the noisy crowd.

Microsoft's Rite is the most impressive use of multimedia I've ever seen. There's an introduction to the instruments of Stravinsky's orchestra with audio samples; a detailed description of the ballet with synchronized musical accompaniment; biographies of the composer and his collaborators; Stravinsky's remi-

niscences; and historical accounts that put this famous composition in perspective.

At the center of the package is a complete performance of *The Rite of Spring* itself, accompanied by synchronized musical annotation and commentary that lets you plunge as deeply into the workings of this masterpiece as you wish. Play the entire composition, watching as each theme and variation appears on screen with detailed explanations. Or take a closer look at the score, bar by bar, comparing solo passages and harmonies. (Two companion packages are also available: Beethoven's Ninth Symphony and Mozart's Dissonant Quartet.)

I have only one kvetch: With the music coming through softly and the commentary blasting at ear-splitting level, this package would be much easier to use with a built-in volume control.

 Microsoft Encarta 1994 \$139; Microsoft; 800/426-9400

Reader service no. 671

 Microsoft Golf \$64.95; Microsoft; 800/426-9400

Reader service no. 672

 Multimedia Stravinsky: The Rite of Spring \$79.95; Microsoft; 800/426-9400

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Michael Goodwin is a contributing editor for PC World. He can be reached on PC World Online (see page 12 for contact information).

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PC WORLD

Parallel Universes

live in Southern California, so I have had to face riots, fire storms, floods, and earthquakes. But nothing frightened me more than the morning my wife asked, "Can we install a network?"

You see, I used to deal with a network at my office—an old Novell ELS-II system—and I hated it. I didn't understand the endless file server directories and files, and never quite grasped mapping. Every time I tried to change something I wound up having to hire an expert to fix the problem—at \$100 an hour. So I set out instead to examine those solutions that required just a simple parallel cable rather than all the complexities of a network.

The system that we had been using, Sneakernet, worked pretty well for a year. My wife Judy would fill a disk with files, walk about 5 feet from her "office" to mine, dislodge me from my chair, and usurp my computer and printer. No problem.

But things started changing. Her files got bigger and wouldn't fit on a floppy. I wanted to back up her system with my tape backup. She wanted to tap into some of the cool applications that were available on my CD ROM drive. And we each wanted to be able to access the other's system as unobtrusively as possible. Like it or not, I needed to set up a permanent connection between my system and Judy's.

Since I didn't want a network, I would have to use a special parallel cable—one that could plug into a computer on both ends. Finding a cable was no problem; most computer stores sell them for about \$10. But where could I plug it in? After all, computers generally come with only one parallel port, and I like having a printer. I solved the problem by installing a cheap bidirectional parallel interface card in each machine. I picked up the no-name cards at a local

By Steve Bass

swap meet for \$12 each. (By the way, don't even consider a serial cable; it'll be way too slow.)

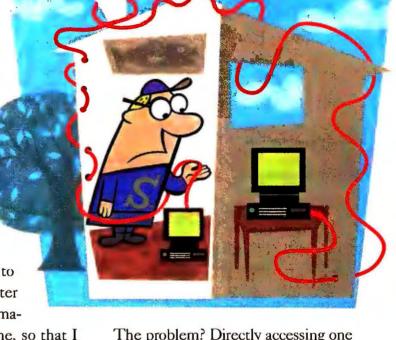
Not Quite Missing Links

Once I had the hard-ware in place, I decided to use some disk-sharing software that I already had. Interlink, which comes with DOS 6, connects two computers and enables them to share disk drives and printer ports. It let me turn Judy's ma-

chine into a server for mine, so that I recognized her A: and C: drives as my D: and E: ones. When we rebooted to switch client-server roles, she could do the same on my system.

The price was right, but Interlnk had its share of problems. While one machine was acting as a server, it couldn't be used for any other purpose, and it didn't recognize the CD ROM drive. I could back up Judy's computer with my tape drive, but Central Point Backup failed more often than it succeeded when it was going through the parallel cable. I finally got it to run correctly by doing a DOS 6 clean boot, holding down <Shift> as DOS loaded—a workable but inelegant solution. Besides, Interlnk was slow.

I found a better solution in Traveling Software's CommWorks, an assortment of five Windows communications programs that do pretty much everything you need done between cabled—or modemed—computers. CommWorks let us access each other's drives simultaneously. We could both go on working as we logged on and off each other's drives with ease. I even installed and ran the Microsoft Bookshelf CD ROM on Judy's CD ROM—less machine. Printer sharing worked just fine, and Traveling Software's LapLink was included for simple file sharing.



The problem? Directly accessing one system's drive from the other was slow enough to make me consider buying two Pentiums. And once again, my backup program stalled more often than it worked. Despite these failings, CommWorks' wide selection of goodies makes it a decent value, especially if you need a communication or modembased remote program for Windows. However, Travel Software really should have included a parallel cable; the package comes with a serial, but you have to pay an extra \$14.95 for parallel. • Comm-Works \$199.95; Traveling Software; 800/343-8080, 206/483-8088, 206/485-6786 (fax). Reader service no. 606

Want to share files between two computers? Fine. Maybe even run an application every so often or do occasional backups? Sure. A parallel cable and any of these programs will work.

But it was clear that none of these programs would fill my needs. There appears to be only one way for Judy and me to have seamless, fast access to each other's computers. No matter how much I hate the idea, I'm going to have to install a network. Stay tuned.

Contributing Editor Steve Bass is president of the Pasadena IBM Users Group. He can be reached on PC World Online (see page 12 for contact information).

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